



# AE Order Number Banner

## Report Description

This report shows an AE Order Number in Barcode format for purposes of scanning. The Barcode format is Code 39.



**App Number:** pCS1728955735

**144B - 16078**

**Williams Four Corners, LLC**

10/16/2017

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
811 S. First St., 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

OIL CONS. DIV DIST. 3

Form C-144  
Revised April 3, 2017

OCT 02 2017  
For temporary pits, below-grade tanks, and multi-well fluid management pits, submit to the appropriate NMOCD District Office.  
For permanent pits submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

16078

Pit, Below-Grade Tank, or  
Proposed Alternative Method Permit or Closure Plan Application

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

**Instructions: Please submit one application (Form C-144) per individual pit, 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 Four Corners LLC OGRID #: \_\_\_\_\_  
Address: 1755 Arroyo Drive, Bloomfield, NM, 87413  
Facility or well name: Glade Compressor Station (BGT 1)  
API Number: \_\_\_\_\_ OCD Permit Number: \_\_\_\_\_  
U/L or Qtr/Qtr NE/SW (K) Section 30 Township 31 N Range 12 W County: San Juan  
Center of Proposed Design: Latitude 36.867750 Longitude -108.142349 NAD83  
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.

☐ **Pit:** Subsection F, G or J of 19.15.17.11 NMAC  
Temporary: ☐ Drilling ☐ Workover  
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A ☐ Multi-Well Fluid Management Low Chloride Drilling Fluid ☐ yes ☐ no  
☐ 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.

☒ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC  
Volume: 45 bbl Type of fluid: Produced water  
Tank Construction material: 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 Double Bottom, Tank Installed prior to June 18, 2008  
Liner type: Thickness 40 mil ☒ HDPE ☐ PVC ☐ Other \_\_\_\_\_

4.

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

5.

**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 \_\_\_\_\_

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6.

**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)

7.

**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 19.15.16.8 NMAC

8.

**Variances 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:**

☒ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval.

☐ Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

9.

**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. Siting criteria does not apply to drying pads or above-grade tanks.*

**General siting**

**Ground water is less than 25 feet below the bottom of a low chloride temporary pit or below-grade tank.**

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

☐ Yes ☒ No  
☐ NA

**Ground water is less than 50 feet below the bottom of a Temporary pit, permanent pit, or Multi-Well Fluid Management pit.**

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

☐ Yes ☐ No  
☒ NA

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. **(Does not apply to below grade tanks)**

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

☐ Yes ☐ No

Within the area overlying a subsurface mine. **(Does not apply to below grade tanks)**

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

☐ Yes ☐ No

Within an unstable area. **(Does not apply to below grade tanks)**

- 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. **(Does not apply to below grade tanks)**

- FEMA map

☐ Yes ☐ No

**Below Grade Tanks**

Within 100 feet of a continuously flowing watercourse, significant watercourse, lake bed, sinkhole, wetland or playa lake (measured from the ordinary high-water mark).

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

☐ Yes ☒ No

Within 200 horizontal feet of a spring or a fresh water well used for public or livestock consumption;

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

☐ Yes ☒ No

**Temporary Pit using Low Chloride Drilling Fluid** (maximum chloride content 15,000 mg/liter)

Within 100 feet of a continuously flowing watercourse, or any other significant watercourse or within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). (Applies to low chloride temporary pits.)

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

☐ Yes ☐ No

Within 300 feet from a occupied 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 200 horizontal feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or 300feet of any other fresh water well or spring, in existence at the time of the initial application.

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

☐ Yes ☐ No



Within 100 feet of a wetland.

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

☐ Yes ☐ No

### **Temporary Pit Non-low chloride drilling fluid**

Within 300 feet of a continuously flowing watercourse, or any other significant watercourse, or within 200 feet of any 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 spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or 1000 feet of any other fresh water well or spring, in the existence at the time of the initial application;

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

☐ Yes ☐ No

Within 300 feet of a wetland.

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

☐ Yes ☐ No

### **Permanent Pit or Multi-Well Fluid Management Pit**

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 1000 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 spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application.

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

☐ 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

10.

#### **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: \_\_\_\_\_

11.

#### **Multi-Well Fluid Management Pit 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.

- ☐ 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
- ☐ A List of wells with approved application for permit to drill associated with the pit.
- ☐ 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
- ☐ Hydrogeologic Data - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC

☐ Previously Approved Design (attach copy of design) API Number: \_\_\_\_\_ or Permit Number: \_\_\_\_\_



12.

**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

13.

**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 ☐ Multi-well Fluid Management Pit  
☐ 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

14.

**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 C 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 H of 19.15.17.13 NMAC  
☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

15.

**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 require justifications and/or demonstrations of equivalency. Please refer to 19.15.17.10 NMAC for guidance.

Ground water is less than 25 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Ground water is between 25-50 feet below the bottom of the buried waste - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Within 100 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, 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 type="checkbox"/> 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	<input type="checkbox"/> Yes <input type="checkbox"/> No
Within 300 horizontal feet of a private, domestic fresh water well or spring used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input type="checkbox"/> No
Written confirmation or verification from the municipality; Written approval obtained from the municipality	<input type="checkbox"/> Yes <input type="checkbox"/> No
Within 300 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 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

☐ 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

16.

**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 E of 19.15.17.13 NMAC  
☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of Subsection K 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 19.15.17.13 NMAC  
☐ Waste Material Sampling Plan - based upon the appropriate requirements 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 H of 19.15.17.13 NMAC  
☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

17.

**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): Matt Webre

Title: EHS Supervisor

Signature: 

Date: October 2, 2017

e-mail address: matt.webre@williams.com

Telephone: (505) 632-4442

18.

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

OCD Representative Signature: 

Approval Date: 10/16/17

Title: Environmental Spec

OCD Permit Number: 16078

19.

**Closure Report (required within 60 days of closure completion):** 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: \_\_\_\_\_

20.

**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.

21.

**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 for private land only)  
☐ 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



**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: \_\_\_\_\_

Variance Request:

Williams requests a variance request from Subsection E(1) of 19.15.17.13 New Mexico Administrative Code (NMAC) which states:

*The operator shall notify the surface owner by certified mail, return receipt requested that the operator plans closure operations at least 72 hours, but not more than one week, prior to any closure operation. Notice shall include well name, API number and location. Evidence of mailing of the notice to the address of the surface owner shown in the county tax records is sufficient to demonstrate compliance with this requirement.*

The variance will allow Williams to notify public agencies such as the Bureau of Land Management (BLM), State of New Mexico, local government/municipalities, and/or tribal agencies via email based on their notification preferences



**SITING CRITERIA  
SUMMARY INFORMATION SHEET  
19.15.17.10 NMAC**



**LT Environmental Inc.**  
2243 Main Avenue, Suite 3  
Durango, Colorado 81301  
T 970-385-1096

**GENERAL INFORMATION**

**Site Name:** Glade Compressor Station  
**Pit Identifier:** BGT 1

**Operator:** Williams Four Corners LLC  
**Date:** 3/15/2016  
**Prepared by:** LT Environmental, Inc.

**GENERAL SITE LOCATION INFORMATION**

**Geologic Formation:** Nacimiento  
**Soil Type:** Gypsiorthids-Badland-Stumble  
**Annual Precipitation:** Aztec Ruins 9.79"  
**SEC:** 30 **TWN:** 31 N **RNG:** 12 W  
**Latitude:** 36.86775 **Longitude:** -108.142349

**GENERAL SITING CRITERIA**

**Is groundwater less than 25 feet below the bottom of below grade tank? - No**

See Figure 3 and attached iWaters Data

**BELOW GRADE TANK SITING CRITERIA**

**Within 100 feet of a continuously flowing watercourse? - No**  
2.5 miles east of the La Plata River.

See Figure 1

**Within 100 feet of a significant watercourse? - No**  
300 feet north to Thompson Arroyo.

See Figure 1 and Figure 3

**Within 100 feet of a lakebed, playa lake, or sinkhole? - No**  
430 feet northeast to Gypsum Tank stock pond.

See Figure 2

**Within 200 horizontal feet of a spring or a freshwater well used for public or livestock consumption? - No**

See Figure 3 and attached iWaters data

**ATTACHED DOCUMENTS:**

Hydrogeologic Report  
Figure 1: Topographic Map  
Figure 2: Aerial Photograph  
Figure 3: Water Well and Surface Water Features  
iWaters Data

**ADDITIONAL COMMENTS:**



## **Glade Compressor Station Hydrogeologic Report for Siting Criteria**

### **General Geology and Hydrology**

The San Juan Basin is a typical Rocky Mountain basin with a gently dipping southern flank and a steeply dipping northern flank. Asymmetrically layered Tertiary sandstones and shales, along with Quaternary alluvial deposits dominate surficial geology (Dane and Bachman, 1965). The below ground tank location is located east of the La Plata River between Aztec and La Plata, New Mexico. In this area, the Tertiary Nacimiento Formation is exposed, along with Quaternary alluvial and aeolian sands surrounding the center of the wash.

Cretaceous and Tertiary sandstones, as well as Quaternary alluvial deposits serve as the primary aquifers in the San Juan. In most of the area, the Nacimiento Formation lies at the surface. Thickness of the Nacimiento ranges from 418 feet to 2,232 feet, aquifers within the coarser and continuous sandstone bodies are between 0 feet and 1,000 feet deep in this section of the San Juan Basin (Stone et al., 1983). Groundwater within these aquifers flows toward the nearby San Juan River and its tributaries.

The prominent soil type at the below-ground grade tank are entisols, which are defined as soils that do not show any profile development. Soils are basically unaltered from their parent rock. Miles of arroyos, washes, and intermittent streams exist as part of the drainage network toward the San Juan River ([www.emnrd.state.nm.us](http://www.emnrd.state.nm.us)). These features often cut into soil and other unconsolidated materials, contributing to sedimentation downstream. The sudden influx of water from storm events easily erodes soils that cover the area.

Dry and arid weather further prohibit active recharge. The climate of the region is arid, averaging approximately 9.79 inches of rainfall annually. As is typical of the southwestern United States monsoonal weather patterns, most precipitation falls from August through October. The heaviest rainfall occurs in the summer in isolated, intense cloudbursts. November through June is relatively dry. Snow generally falls from December to mid-February and averages less than one-half inch in depth. However, most recharge occurs during the winter months during snowmelt periods from the upper elevations (Western Regional Climate Center [www.wrcc.dri.edu](http://www.wrcc.dri.edu)). The predominant vegetation are sagebrush and grasses with a more restricted pinon-juniper association (Dick-Peddie, 1993).

### **Site-Specific Hydrogeology**

Depth to groundwater is estimated to be between 50 and 75 feet beneath the bottom of the below-grade tank. This estimation is based on data from Stone et al. (1983), the United States Geological Survey (USGS) *Groundwater Atlas of the United States*. Additionally, local





topography and proximity to surface hydrologic features are taken into consideration. When available, permitted water well logs and cathodic protection well logs are referenced to infer depth to groundwater near the site.

Local aquifers include sandstones within the Nacimiento Formation, which range from 0 feet to 1,000 feet below ground surface in this area, as well as shallow aquifers within Quaternary alluvial deposits (Stone et al., 1983). The 1,000-foot depth range for Nacimiento aquifers covers an area greater than 20 miles wide in the central San Juan Basin and depth decreases toward the margins of the San Juan Basin.

The below-grade tank is located in a region incised by washes, gullies, and arroyos, with the Thompson Arroyo and the La Plata River being the predominant topographic features. Groundwater is expected to be shallow within this region, as the Quaternary deposits near the wash itself form shallow aquifers. The below-grade tank is located in the upper reaches of the Thompson Arroyo at an elevation of approximately 5,896 feet. An elevation difference between the site and the primary channel of the Thompson Arroyo of approximately 56 feet suggests groundwater is between 50 and 75 feet beneath the below-grade tank.

Groundwater data available from the New Mexico State Engineer's iWaters database for wells near the below-grade tank are attached. Groundwater data are sparse in this region; the nearest iWaters data point is well number SJ 03204 located approximately 1.15 miles to the south; however, this water well is separated hydraulically by a ridge and does not appear to be representative of groundwater near the site.

## References

Dane, C.H. and G.O. Bachman, 1965, *Geologic Map of New Mexico*: U.S. Geological Survey, 1 sheet, scale 1:500,000.

Dick-Peddie, W.A., 1993, *New Mexico Vegetation – Past, Present and Future*: Albuquerque, New Mexico, University of New Mexico Press, 244 p.

Stone, W.J., F.P. Lyford, P.F. Frenzel, N.H. Mizell, and E.T. Padgett, 1983, *Hydrogeology and Water Resources of the San Juan Basin, New Mexico*: HR-6 New Mexico Bureau of Geology and Mineral Resources Hydrology Report 6.

USGS, *Groundwater Atlas of the United States*: Arizona, Colorado, New Mexico, Utah, HA 730-C: (<http://www.pubs.usgs.gov>).

Western Region Climate Center, 2008, New Mexico climate summaries: Desert Research Institute at <http://www.wrcc.dri.edu/summary/climsmnm.html>.



New Mexico Energy, Minerals and Natural Resources Department, [www.emnrd.state.nm.us](http://www.emnrd.state.nm.us).



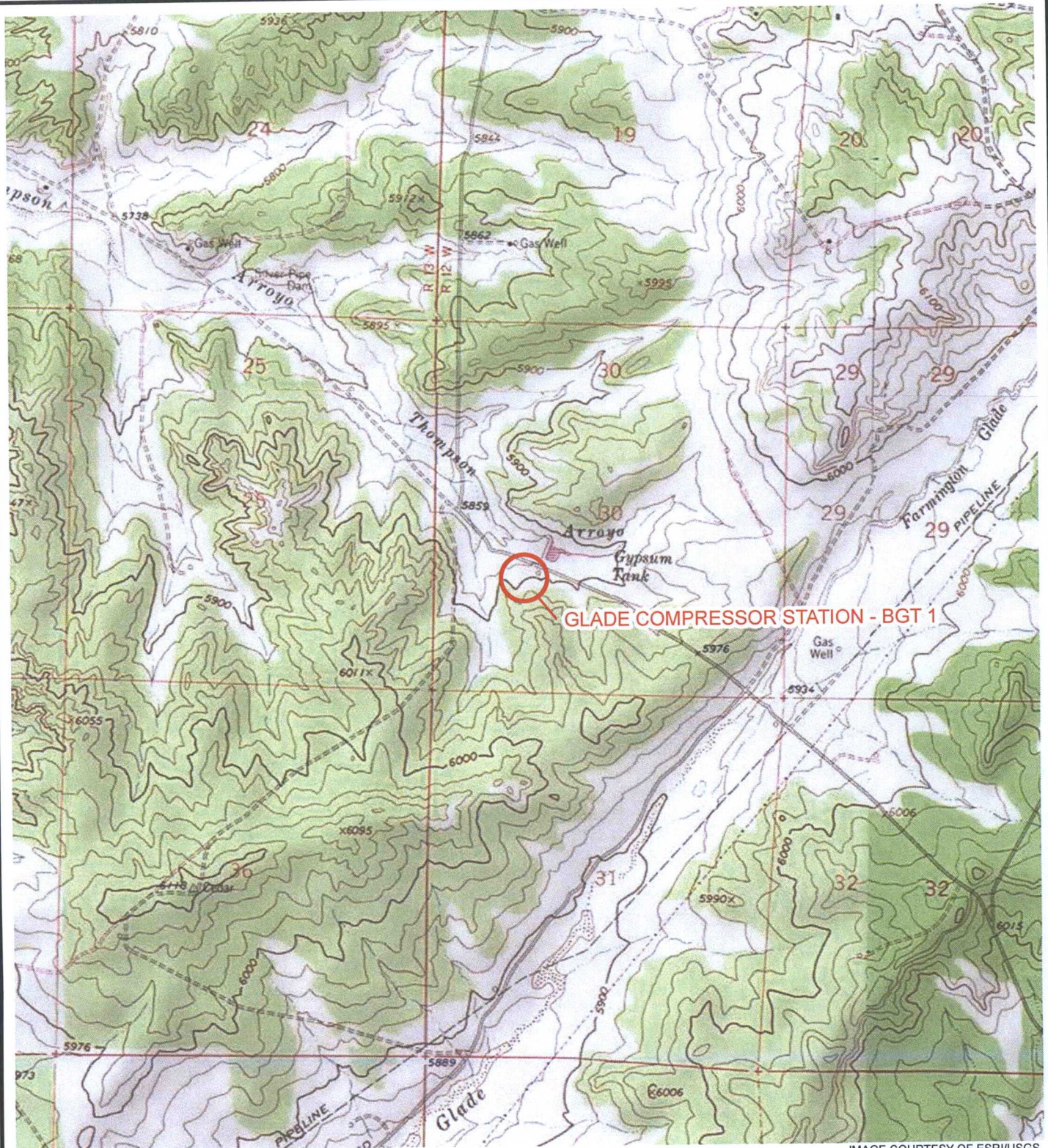


IMAGE COURTESY OF ESRI/USGS

# LEGEND

○ SITE LOCATION

BGT: BELOW GRADE TANK

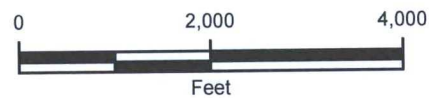


FIGURE 1  
TOPOGRAPHIC MAP  
GLADE COMPRESSOR STATION - BGT 1  
NE/SW (K) SEC 30 T31N R12W  
SAN JUAN COUNTY, NEW MEXICO  
WILLIAMS FOUR CORNERS





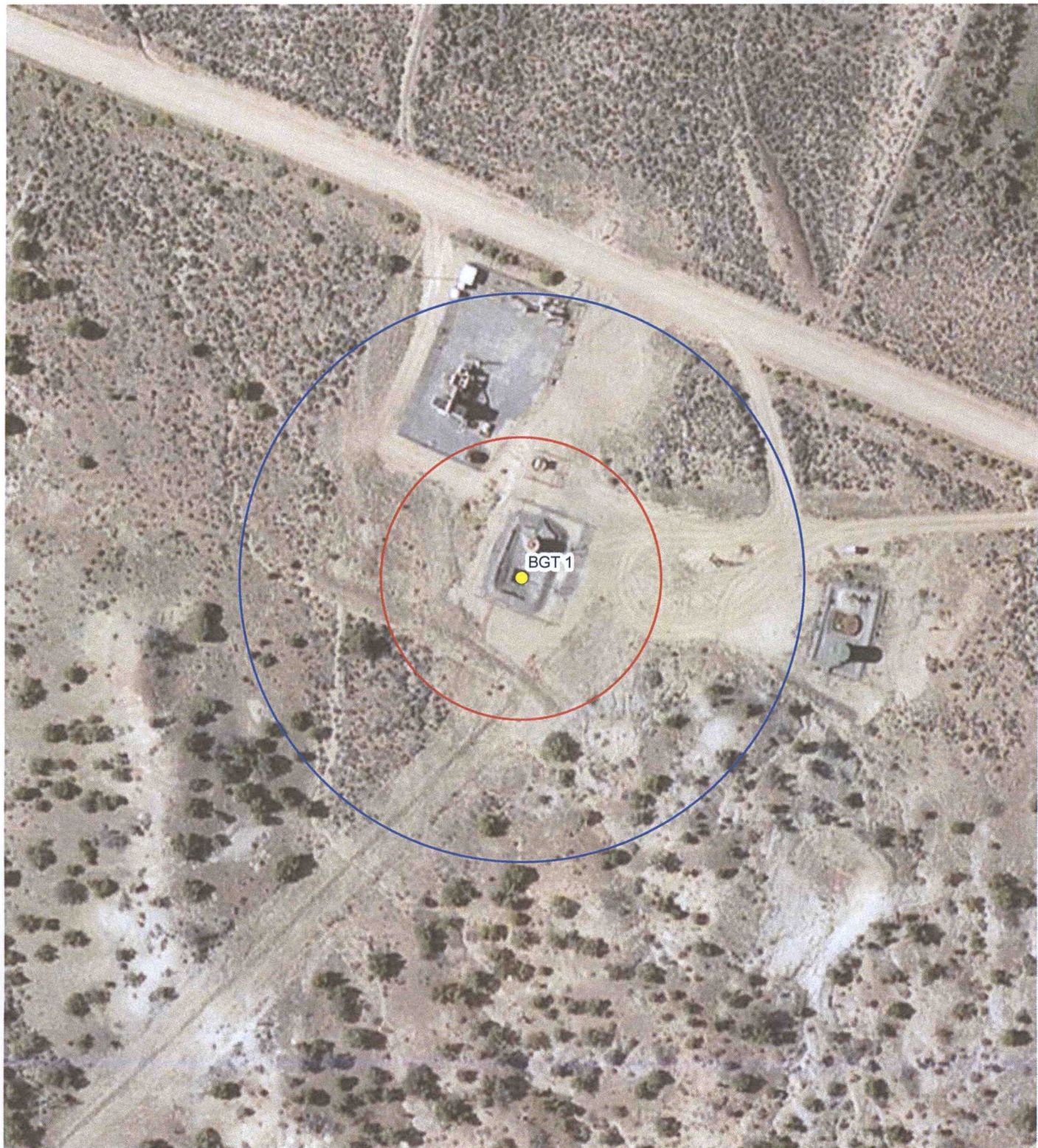
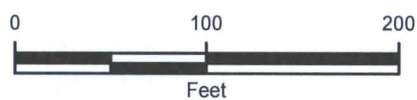


IMAGE COURTESY OF ESRI/USGS

# **LEGEND**

- BGT: BELOW GRADE TANK
- 100-FOOT RADIUS
- 200-FOOT RADIUS



**FIGURE 2**  
**AERIAL PHOTOGRAPHIC MAP**  
**GLADE COMPRESSOR STATION - BGT 1**  
**NE/SW (K) SEC 30 T31N R12W**  
**SAN JUAN COUNTY, NEW MEXICO**  
**WILLIAMS FOUR CORNERS**







IMAGE COURTESY OF ESRI/USGS

# LEGEND

- WATER WELL
- BGT: BELOW GRADE TANK

FIGURE 3  
 WATER WELL MAP  
 GLADE COMPRESSOR STATION - BGT 1  
 NE/SW (K) SEC 30 T31N R12W  
 SAN JUAN COUNTY, NEW MEXICO  
 WILLIAMS FOUR CORNERS







# New Mexico Office of the State Engineer

## Water Column/Average Depth to Water

(A CLW##### in the  
POD suffix indicates the  
POD has been replaced  
& no longer serves a  
water right file.)

(R=POD has  
been replaced,  
O=orphaned,  
C=the file is  
closed)

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

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">SJ 03204</a>			SJ	1	3	4	31	31N	12W	220133	4083029*	40	20	20

Average Depth to Water: **20 feet**

Minimum Depth: **20 feet**

Maximum Depth: **20 feet**

**Record Count: 1**

**PLSS Search:**

**Section(s): 31**

**Township: 31N**

**Range: 12W**

\*UTM location was derived from PLSS - see Help

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

**Williams Four Corners LLC**  
**Design and Construction Plan - Below Grade Tanks**

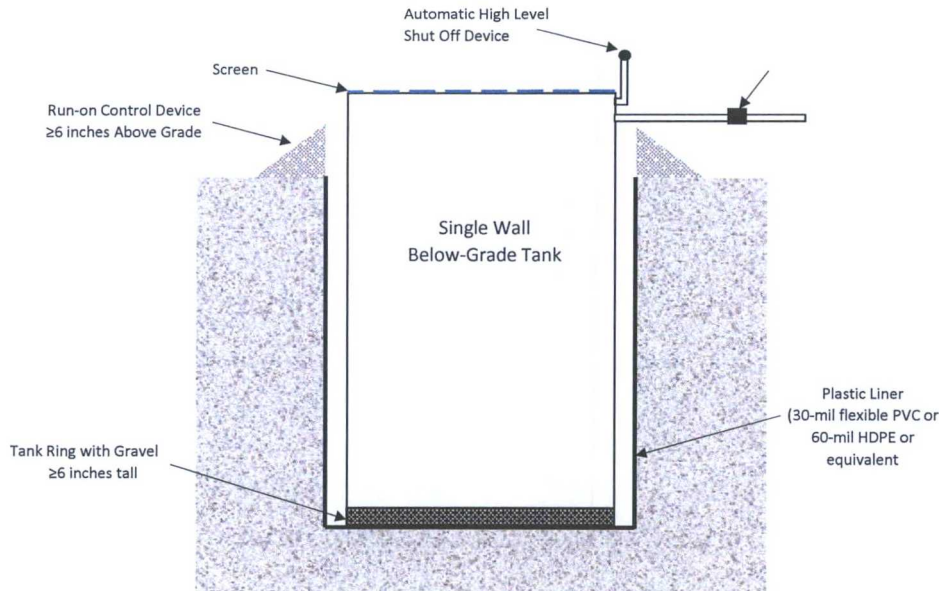
In accordance with Rule 19.15.17.11 NMAC of the New Mexico Administrative Code (NMAC), the information within this document describes the design and construction standards to be used by Williams Four Corners LLC (Williams) when installing Below Grade Tanks (BGTs). This is Williams' standard procedure for all BGTs. A separate design and construction plan will be submitted for any BGT which does not conform to this plan.

Pit Rule Citation (NMAC)	Rule Requirement	Operator Requirements
19.15.17.11.A	Design	Williams will design and construct a properly sized and approved BGT to contain liquids and solids, prevent contamination of fresh water and protect public health and environment. A solid riser pipe will be installed to facilitate liquid removal from the tank. The riser shall have a cap or cover and be positioned to prevent standing accumulation of liquids within the riser.
19.15.17.11.C	Construction	Williams will post appropriate signage to include operator name, legal location information, and emergency telephone contact information. The sign will be at least 12-inches x 24-inches with lettering not less than 2-inches in height and be placed on the fence surrounding the BGT.
19.15.17.11.D(1)	Construction	Williams will fence the BGT in a manner that deters unauthorized access and will maintain the fence in good repair. Williams facilities with an exterior perimeter fence will not have a fence installed around the BGT if it is located within the facility exterior perimeter fence.
19.15.17.11.D(3)	Construction	BGT installations will be fenced to protect livestock and wildlife. Fencing will be a minimum of four feet high with four strands of barbed wire spaced in the interval between one foot and four feet above ground. As a variance (if approved with the BGT registration), the fence may be constructed using four 4 foot tall "hog wire" with 1 stand of barbed wire at the top.
19.15.17.11.E	Construction	BGTs will have one-inch (or less) steel mesh (i.e. expanded metal), solid steel covers, or otherwise be constructed to prevent migratory bird contact.
19.15.17.11.I(1)	Design/Construction	Williams will design and construct the BGT to contain liquids associated with the dehydration and compression of natural gas, which will be resistant to the contents of the tank and resistant to damage from ultra violet light.
19.15.17.11.I(2)	Construction	The BGT foundation will be level and free of rocks, debris, sharp edges or irregularities and have a firm compacted bottom and sidewalls that are stable for the soil conditions.
19.15.17.11.I(3)	Construction	BGT installations will include an earthen berm or equivalent alternative at least 6-inches above ground to prevent surface water run-on; and install overflow monitoring device and/or monitor the tank at a frequency to prevent overflow as depicted in Figure 1.
19.15.17.11.I.4(a)	Construction	For BGTs that do not have double walls, Williams will construct the BGT to meet the requirements listed in 19.15.17.11.I.4(a) associated with visual inspection, tank construction, liner, and overflow as depicted in Figure 1. All other BGTs, in which the side walls are not open for visible inspection shall be double walled with leak detection capability as depicted in Figure 2.
19.15.17.11.I.4.(b)	Construction	Buried BGTs will be constructed of steel with double-walls and double-bottom, welded following appropriate API and industry codes, coated with an epoxy based paint. A solid riser pipe will be installed between the space of the double-walls to allow monthly inspection to determine tank integrity.
19.15.17.11.I.4.(c)	Design/Construction	Williams will meet with NMOCD district office before submitting application for an alternative BGT design.
19.15.17.11.I(5)	Construction	A single walled tank (installed prior to June 16, 2008) which has completely open sidewalls for visible inspection and which may or may not have a geomembrane liner, need not meet the above design and construction standards defined in Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC unless the integrity fails. If the integrity fails, the tank will then be closed pursuant to the approved Closure Plan or be retrofitted in accordance with the design drawings (see Figures 1 or 2) or NMOCD approved modification. Retrofitting actions that include changes to the BGT design and construction require an update to the BGT registration.
19.15.17.11.I(6)	Construction	All single walled BGTs must have sidewalls that are completely visible for inspection. Single walled tanks that do not meet this requirement must be retrofitted or closed pursuant to the approved Closure Plan. Retrofitting actions that include changes to the BGT design and construction require an update to the BGT registration.
19.15.17.11.I(7)	Construction	A double walled tank (installed prior to June 16, 2008) need not meet the above design and construction standards defined in Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC unless the integrity fails. If the integrity fails, the tank will then be closed pursuant to the approved Closure Plan or be retrofitted in accordance with the design drawings (see Figures 1 or 2) or NMOCD approved modification. Retrofitting actions that include changes to the BGT design and construction require an update to the BGT registration.



Williams Four Corners LLC  
Design and Construction Plan - Below Grade Tanks

**FIGURE 1. BGT DESIGN AND CONSTRUCTION – 19.15.17.11.I.(4)(a) NMAC**

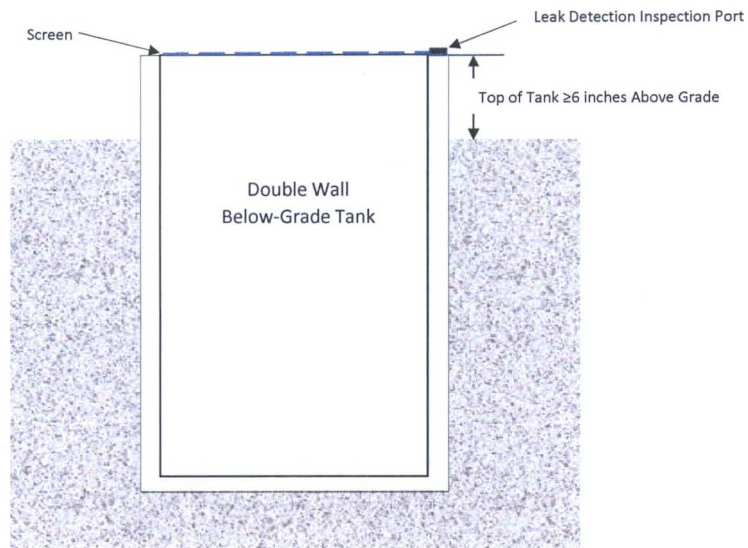


1. The BGT's bottom must be elevated a minimum of six inches above the underlying ground surface.
2. The BGT must be underlain with a geomembrane liner to divert leaked liquid to a location that can be visually inspected. Gravel will be contained within a tank ring and not cover the visible portion of the liner.
3. Geomembrane liner shall consist of 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner material. The liner must have a hydraulic conductivity no greater than  $1 \times 10^{-9}$  cm/sec, be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions, and resistant to ultraviolet light. The liner compatibility must comply with USEPA SW-
4. Equipped with a properly operating automatic high-level shut-off control device and manual controls to prevent overflows.



Williams Four Corners LLC  
Design and Construction Plan - Below Grade Tanks

**FIGURE 2. BGT DESIGN AND CONSTRUCTION – 19.15.17.11.I.(4)(b) NMAC**



1. Tank side walls are not open for visible inspection for leaks.
2. Double walled with leak detection capability.

**Williams Four Corners LLC**  
**Operations and Maintenance Plan - Below Grade Tanks**

In accordance with Rule 19.15.17.12 NMAC of the New Mexico Administrative Code (NMAC), the information within this document describes the operations and maintenance standards to be used by Williams Four Corners LLC (Williams) when operating Below Grade Tanks (BGTs). This is Williams' standard procedure for all BGTs. A separate operations and maintenance plan will be submitted for any BGT which does not conform to this plan.

Pit Rule Citation (NMAC)	Rule Requirement	Operator Requirements
19.15.17.12.A(1)	Integrity	Williams will operate and maintain the BGT to contain liquids and solids and maintain the integrity of the liner, liner systems and secondary containment system to prevent contamination of fresh water and protect public health and environment.
19.15.17.12.A(3)	Waste Management	Williams will not discharge or store any hazardous waste in a BGT. "Hazardous waste" means non-exempt waste that exceeds the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended.
19.15.17.12.A(5)	Release Requirements	If the BGT integrity is compromised: 1. All discharges will be shut off to the BGT. 2. All liquids will be removed as soon as possible but no later than 48 hours after discovery. 3. Williams will notify and report to NMOCD in accordance to 19.15.29 NMAC and all other applicable agencies as require.
19.15.17.12.A(7)	Surface Water Run-on	Williams will maintain a berm or equivalent alternative at least 6-inches above ground to keep surface water run-on from entering the BGT as shown on the Design and Construction Plan.
19.15.17.12.D(1)	Surface Water Run-on and Overflow	Williams will require and maintain an adequate freeboard to prevent overtopping of the BGT.
19.15.17.12.D(2)	Measurable Oil	Any oil or hydrocarbon collecting in the BGT will be removed. Saleable condensate will be returned to the facility or field condensate tank. Slop oil from compression will be removed and transported to an offsite recycle facility.
19.15.17.12.D(3)	Inspection	Williams will inspect the BGT for leakage and damage on a monthly basis. Williams will document the integrity of each tank at least annually and maintain a written record for five years. Inspections may include: 1. Containment berms adequate and no oil present 2. Tank had no visible signs of corrosion 3. Tank valves, flanges, and hatches had no visible leaks 4. No evidence of significant spillage of produced liquids. 5. BGT cover intact and no signs of dead wildlife. 6. Sidewalls are completely visible for single walled BGTs.
19.15.17.12.D(4)	Freeboard	Williams will maintain a 10-inch freeboard to prevent overtopping of the BGT.
19.15.17.12.D(5)	Integrity	If the BGT loses integrity, Williams will repair the damage or close the BGT pursuant to the approved Closure Plan.
19.15.17.12.D(6)	Retrofit or Replacement Requirements	While performing BGT equipment or retrofitting actions, Williams will visually inspect the area beneath the BGT and document any areas that are wet, discolored or showing other evidence of a release on OCD Form C-141. Williams will report the concentration of contaminants to the OCD with respect to the standards set forth in Table I of 19.15.17.13 NMAC. Williams will proceed with the approved Closure Plan if no evidence of impacts are present or concentrations of contaminants are below the OCD standards.



**Williams Four Corners LLC**  
**Closure Plan - Below Grade Tanks**

In accordance with Rule 19.15.17.13 NMAC of the New Mexico Administrative Code (NMAC), the information within this document describes the closure requirements to be used by Williams Four Corners LLC (Williams) when closing Below Grade Tanks (BGTs). This is Williams' standard procedure for all BGTs. A separate closure plan will be submitted for any BGT closure which does not conform to this plan.

Pit Rule Citation (NMAC)	Rule Requirement	Operator Requirements
19.15.17.13.A	Closure Plan	This plan describes Williams proposed closure methods and the proposed procedures and protocols to implement and complete BGT closure.
19.15.17.13.C(1)		Prior to commencing BGT closure, Williams will obtain a NMOCD approved closure plan before any closure activities start. Williams understands that the NMOCD considers the start of closure for a BGT is when the BGT is being removed from the ground.
19.15.17.13.C(2)		Williams will remove liquids and sludge from a BGT prior to commencing closure actions and will dispose the material in a NMOCD approved facility.
19.15.17.13.C.3(a)		Following removal of the tank and any liner material, Williams will test the soils beneath the BGT in accordance with 19.15.17.13.C.3(a) NMAC. Samples will be collected from beneath the liner and/or BGT for obvious stained or wet soils, or any other evidence of contamination.
19.15.17.13.C.3(b)		If any contaminant concentration is higher than the parameters listed in Table I of 19.15.17.13 NMAC, the NMOCD may require additional delineation upon review of the results and Williams must receive approval before proceeding with closure.
19.15.17.13.C.3(c)		Upon completion of BGT removal, if all contaminant concentrations are less than or equal to the parameters listed in Table I of 19.15.17.13 NMAC, the excavation will be backfilled with non-waste contained, uncontaminated, earthen material.
19.15.17.13.E(1)	Notification	Notice of closure will be given to the surface owner at least 72 hours, but not more than one week, prior to any closure operation via Certified mail. As a variance (if approved with the closure plan), surface owners which are public entities (State, BLM, or Tribal) will be notified by email or phone. The notification of closure will include the following: operators name, well name and API number (if applicable), and location (ULSTR).
19.15.17.13.E(2)		Notice of Closure will be given to the NMOCD office at least 72 hours, but not more than one week, prior to any closure operation via Certified mail. As a variance (if approved with the closure plan), the NMOCD district office will be notified by email or phone. The notification of closure will include the following: operators name, well name and API number (if applicable), and location (ULSTR).
19.15.17.13.F(1)	Reporting	Operator will send the NMOCD a closure report in accordance with 19.15.17.F(1) NMAC within 60 days of closure including the following items: Proof of closure notice, analytical results, backfill information, revegetation, and photo documentation of reclamation. Williams understands that the NMOCD considers the closure date the day in which the BGT is backfilled and re-contoured. Revegetation is still required but, may be addressed in closure report.
19.15.17.13.G.4(a)	Timing	Within 60 days of cessation of operations, Williams will remove liquids and sludge from a BGT prior to implementing a closure method and will dispose of the material in a NMOCD approved facility. Disposal facilities to be used by Williams are listed below based on the listed waste types.
19.15.17.13.G.4(b)		Within 6 months of cessation of operations, Williams will dispose, recycle, reuse, or reclaim the BGT in a NMOCD approved manner. If required, Williams will provide documentation of the disposition of the BGT to the NMOCD. Liner materials will be cleaned to remove soils or contaminated material for disposal as solid waste. Disposal facilities to be used by Williams are listed below based on the listed waste types.
19.15.17.13.H.1(a)	Reclamation	Williams will reclaim the area by substantially restoring the impacted surface area to the condition that existed prior to oil and gas operations by placement of soil cover as described below for 19.15.17.13.H.2 NMAC. The location and associated areas will be recontoured that approximates the original contour and blends with the surrounding topography and revegetate as described below for 19.15.17.13.H.5 NMAC.
19.15.17.13.H.1(b)		Williams will submit an alternative plan to be approved by the NMOCD and written approval from the surface owner before submitting the C-144 application.
19.15.17.13.H.1(c)		If a BGT is removed from an area where production operations will continue, the area will be reclaimed in such a way to minimize dust and erosion to the extent practicable.
19.15.17.13.H.2		Cover will include one foot of suitable material, with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0, to establish vegetation at the site, or the background thickness of topsoil, whichever is greater.
19.15.17.13.H.4		Williams will construct the soil cover to the existing grade to prevent ponding of water and erosion of the cover material.



**Williams Four Corners LLC  
Closure Plan - Below Grade Tanks**

Pit Rule Citation (NMAC)	Rule Requirement	Operator Requirements
19.15.17.13.H.5(a) 19.15.17.13.H.5(b) 19.15.17.13.H.5(c) 19.15.17.13.H.5(d) 19.15.17.13.H.5(e)	Reclamation	For those portions of the former BGT area no longer in use with the exception where production operations will continue, the area will be reclaimed as nearly as practicable to their original condition or their final land use. Reclamation will begin as early as practical. The areas will be maintained to minimize dust and topsoils placed and contoured to limit erosion control, maintain stability, and preserve surface-water flow patterns. Williams will seed the disturbed areas the first favorable growing season following closure of the BGT. Williams will comply with obligations imposed by other applicable federal or tribal agencies in which their re-vegetation and reclamation requirements provide equal or better protection of fresh water, human health and the environment. Williams will notify the NMOCD when reclamation and re-vegetation is complete.

Summary of Waste Materials and Disposal Facilities	
Waste Types	Disposal Facility
Steel Tank	San Juan County Landfill; Steel Recycling
Fiberglass Tank	San Juan County Landfill; Bondad Landfill; Re-use
Liner (cleaned – absent soil / sludge)	San Juan County Landfill; Bondad Landfill
Sludge	Envirotech; Industrial Ecosystems Inc.; T-N-T; Bondad Landfill
Liquids (Water / Hydrocarbons)	Basin Disposal; Key Energy; T-N-T
Contaminated Soil	Envirotech; Industrial Ecosystems Inc.; T-N-T; Bondad Landfill
Fencing / Miscellaneous	Re-use or Scrap

Table I Closure Criteria for Soils Beneath Below Grade Tanks, Drying Pads Associated with Closed Loop Systems and Pits where contents are Removed			
Depth Below Bottom of pit to ground water less than 10,000 mg/l	Constituent	Method	Limit**
≤50 feet	Chloride	EPA 300.0	600 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg
	BTEX	EPA SW-846 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 8021B or 8260B	10 mg/kg
51 feet – 100 feet	Chloride	EPA 300.0	10,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 8021B or 8260B	10 mg/kg
≤100 feet	Chloride	EPA 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846	10 mg/kg