

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: Devon Energy Production Company, L.P. OGRID #: 6137  
Address: 20 N. Broadway, Oklahoma City, OK 73102  
Facility or well name: NEBU Middle Mesa SWD #2  
API Number: 30-045-28553 OCD Permit Number: \_\_\_\_\_  
U/L or Qtr/Qtr M/ SW SW Section 11 Township 31N Range 7W County: San Juan  
Center of Proposed Design: Latitude 36.908272 Longitude -107.546965 NAD: ☐ 1927 ☒ 1983  
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.  
☐ **Pit:** Subsection F or G of 19.15.17.11 NMAC  
Temporary: ☐ Drilling ☐ Workover  
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A  
☐ Lined ☐ Unlined Liner type: Thickness \_\_\_\_\_ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other \_\_\_\_\_  
☐ String-Reinforced  
Liner Seams: ☐ Welded ☐ Factory ☐ Other \_\_\_\_\_ Volume: \_\_\_\_\_ bbl Dimensions: L \_\_\_\_\_ x W \_\_\_\_\_ x D \_\_\_\_\_

3.  
☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC  
Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Applies to activities which require prior approval of a permit or notice of intent)  
☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other \_\_\_\_\_  
☐ Lined ☐ Unlined Liner type: Thickness \_\_\_\_\_ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other \_\_\_\_\_  
Liner Seams: ☐ Welded ☐ Factory ☐ Other \_\_\_\_\_

4.  
☒ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC  
Volume: 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 \_\_\_\_\_  
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.

SCANNED

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: Four Foot high, steel mesh field fence (hog wire) with pipe top railing.

7.

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

- ☐ Screen ☐ Netting ☒ Other: Expanded metal or solid vaulted top
- ☐ 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: Fencing**

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

10.

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

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

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - 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 H<sub>2</sub>S, Prevention Plan
- ☐ Emergency Response Plan
- ☐ Oil Field Waste Stream Characterization
- ☐ Monitoring and Inspection Plan
- ☐ Erosion Control Plan
- ☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

14. **Proposed Closure:** 19.15.17.13 NMAC

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

Type: ☐ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Closed-loop System  
☐ Alternative

Proposed Closure Method: ☒ Waste Excavation and Removal (Below Grade Tank)  
☐ Waste Removal (Closed-loop systems only)  
☐ On-site Closure Method (Only for temporary pits and closed-loop systems)  
☐ In-place Burial ☐ On-site Trench Burial  
☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

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

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



16.

**Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:** (19.15.17.13.D NMAC)**Instructions:** Please identify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

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

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

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?☐ Yes (If yes, please provide the information below) ☐ No*Required for impacted areas which will not be used for future service and operations:*☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.

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

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

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

☐ Yes ☐ No  
☐ NA

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

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

☐ Yes ☐ No  
☐ NA

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

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

☐ Yes ☐ No  
☐ NA

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

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

☐ Yes ☐ No

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

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

☐ Yes ☐ No

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

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

☐ Yes ☐ No

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

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

☐ Yes ☐ No

Within 500 feet of a wetland.

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

☐ Yes ☐ No

Within the area overlying a subsurface mine.

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

☐ Yes ☐ No

Within an unstable area.

- Engineering measures incorporated into the design; NM Bureau of Geology &amp; 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): Katie Baird Title: Field Technician

Signature: Katie Baird Date: 06/08/09

e-mail address: katie.baird@div.com Telephone: (505) 324-5621

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

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

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

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

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

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

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

24.

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

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

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

25.

**Operator Closure Certification:**

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

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

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

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

**NEBU Middle Mesa SWD #002  
Below Ground Tank  
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 proposed pit location will be located in the north-central San Juan Basin near Navajo Lake. The predominant geologic formation is the San Jose Formation of Tertiary age, which underlies surface soils and is often exposed (Dane and Bachman, 1965). Deposits of Quaternary alluvial and aeolian sands occur near the surface of the area, especially near streams and washes.

Cretaceous and Tertiary sandstones, as well as Quaternary alluvial deposits, serve as the primary aquifers in the San Juan Basin (Stone et al., 1983). In most of the proposed area, the San Jose Formation lies at the surface and overlies the Nacimiento Formation. Thickness of the San Jose ranges from 200 to 2700 feet, thickening from west to east across the region of interest (Stone et al., 1983). Aquifers within the coarser and continuous sandstone bodies of the San Jose Formation are between 0 and 2700' deep in this section of the basin (Stone et al., 1983). Groundwater within these aquifers flows regionally to the southwest, toward the San Juan River. More locally, groundwater flow is controlled by Navajo Lake. Little specific hydrogeologic data is available for the San Jose Formation system, but "numerous wells and springs used for stock and domestic supplies" draw their water from the San Jose Formation (Stone et al., 1983).

The prominent soil types at the proposed site are entisols and aridisols, which are defined as soils exhibiting little to no profile development ([www.emnrd.state.nm.us](http://www.emnrd.state.nm.us)). Soils are basically unaltered from their parent rock. Miles of arroyos, washes and intermittent streams exist as part of the drainage network towards the San Juan River. These features often cut into soil and other unconsolidated materials, contributing to sedimentation downstream. The sudden influx of water from storm events easily erodes the soils that cover the area and prohibits effective recharge to the underlying aquifers.

Regional weather further prohibits active recharge. The climate is arid, averaging almost 13 inches of rainfall annually. As is typical of the southwestern United States monsoonal weather patterns, most precipitation falls from July through September. The heaviest rainfall occurs in the summer in isolated, intense cloudbursts. September through June is relatively dry. Snow generally falls from December to mid-February and averages less than one-half inch in depth. The most active recharge occurs during the winter snowmelt periods from the upper elevations (Western Regional Climate Center [www.wrcc.dri.edu](http://www.wrcc.dri.edu)).

The predominant vegetation is sagebrush and grasses with a more restricted pinon-juniper association (Dick-Peddie, 1993).



### **Site Specific Hydrogeology**

Depth to groundwater at the site is estimated to be greater than 100'. This estimation is based on data from Stone and others (1983), the USGS Groundwater Atlas of the United States and depth to groundwater data published on the New Mexico State Engineer's iWaters Database website. Local topography, proximity to adjacent channels and springs and observations made during a site visit are also taken into consideration.

The region is dominated by Navajo Lake and its associated canyons and gullies as evidenced on the attached topographic map and aerial photo. Relatively large, flat-topped mesas composed of thick sandstone sequences surround the perimeter of the lake and are often over 200 feet higher in elevation than the lake. Canyons and gullies erode into the sandstone and are filled with alluvium. This particular site is located on a mesa top 2.49 miles away from the main channel of Navajo Lake, and over 400 feet higher in elevation than the surface of the lake water. To the east lies Negro Andy Canyon, a first order tributary to the lake.

The massive sandstone outcrops, upon which the site in question is situated, is part of the San Jose Formation. Beds of water-yielding sandstone are present in the San Jose Formation, which are fluvial in origin and are interbedded with mudstone, siltstone & shale. Porous sandstones form the principal aquifers in the area, while relatively impermeable shales and mudstones form confining units between the aquifers (Stone et al., 1983). "Extensive intertonguing" of different members of this formation is reported (Stone et al, 1983). Local aquifers exist within the San Jose Formation at depths greater than 100 feet and thicknesses of the aquifer can be up to several hundred feet (USGS, Groundwater Atlas of the US; Stone et al, 1983).

Depth to groundwater data is extremely limited in this region. Groundwater data available from the NM State Engineer's iWaters Database for wells near the below grade tank are attached and are plotted on the iWaters Groundwater Data Map. The nearest permitted well lies 2210 feet southeast (SJ 03426). The water is used for livestock watering, as are many others in the surrounding area. Depth to groundwater in the permitted water well is recorded as 420 feet. Other wells located near Navajo Lake at similar elevations to the site in question contain groundwater at depths in excess of 400 feet.

The elevation difference of over 400 feet between the site and Navajo Lake, the lack of other surface water features and groundwater depths greater than 400 feet deep in nearby permitted water wells is enough to suggest that groundwater at the site is greater than 100 feet.

## References

Dane, C.H. and Bachman, G. O., 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., Lyford, F. P., Frenzel, P.F., Mizell, N.H. and Padgett, E.T., 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)





**Lodestar Services, Inc.**

**Pit Permit  
Siting Criteria  
Information Sheet**

<b>Client:</b>	Devon Energy
<b>Project:</b>	Pit Permits
<b>Revised:</b>	5/15/2009
<b>Prepared by:</b>	Brooke Herb

**API#:** 30-045-28553

**USPLSS:** T31N, R07W, S11M

**Name:** NEBU Middle Mesa SWD #002

**Lat/Long:** 36.908272, -107.546965

**Depth to groundwater:** >100'

**Geologic formation:** San Jose Formation

**Distance to closest continuously flowing watercourse:** 2.49 miles NW of main body of Navajo Reservoir

**Distance to closest significant watercourse, lakebed, playa lake, or sinkhole:** 1635' W of Negro Andy Canyon; 1382' N of 1st order tributary to Negro Andy Canyon

**Permanent residence, school, hospital, institution or church within 300'** NO

**Soil Type:** Entisols

**Annual Precipitation:** 12.95 inches (weather station at Navajo Dam)

**Precipitation Notes:** no significant precipitation events on record

**Domestic fresh water well or spring within 500'** NO

**Any other fresh water well or spring within 1000'** NO

**Within incorporated municipal boundaries** NO

**Attached Documents:** Site Visit Survey  
Hydrogeologic Report  
Topographic Map  
Aerial Photo  
Mines, Mills and Quarries Map  
FEMA Flood Zone Map

**Within defined municipal fresh water well field** NO

**Wetland within 500'** NO

**Mining Activity:** None identified in the vicinity

**Within unstable area** NO

**Within 100 year flood plain** NO - located within Zone X (500-yr floodplain)

**Additional Notes:** All ranges and bearings from the site to identified hydrogeologic features were measured from the aerial photo and confirmed during a site visit. The aerial photo is dated July 30, 2005. More recent aerial photos are available (2007), but show lower lake levels. The 2005 photo aids reviewers by allowing assessment during wetter conditions.

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

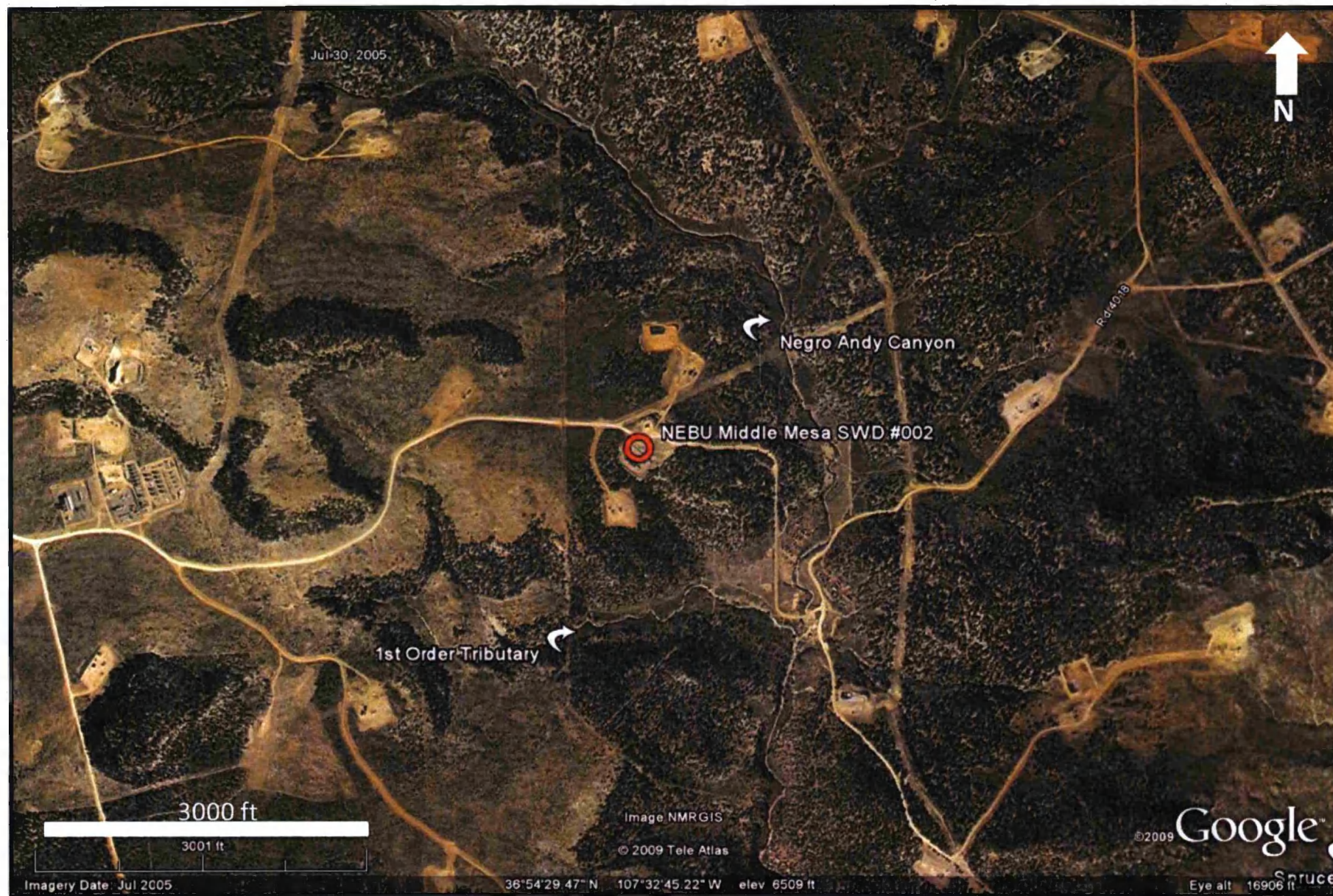
WATER COLUMN REPORT 12/05/2008

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

(quarters are biggest to smallest)

POD Number	Tws	Rng	Sec	q	q	q	Zone	X	Y	Depth Well	Depth Water	Water (in feet) Column
<u>SJ 03685 POD1</u>	31N	06W	07	1	2	4				460	310	150
<u>SJ 00011</u>	31N	06W	32							610		
<u>SJ 03649</u>	31N	07W	02	1		4				600	300	300
<u>SJ 03426</u>	31N	07W	14	1	2	4				540	420	120
<u>SJ 03355</u>	31N	07W	28	1	1	1				570	470	100
<u>SJ 03117</u>	32N	07W	07	2	2	2				240		
<u>SJ 01612</u>	32N	07W	34	3						800		



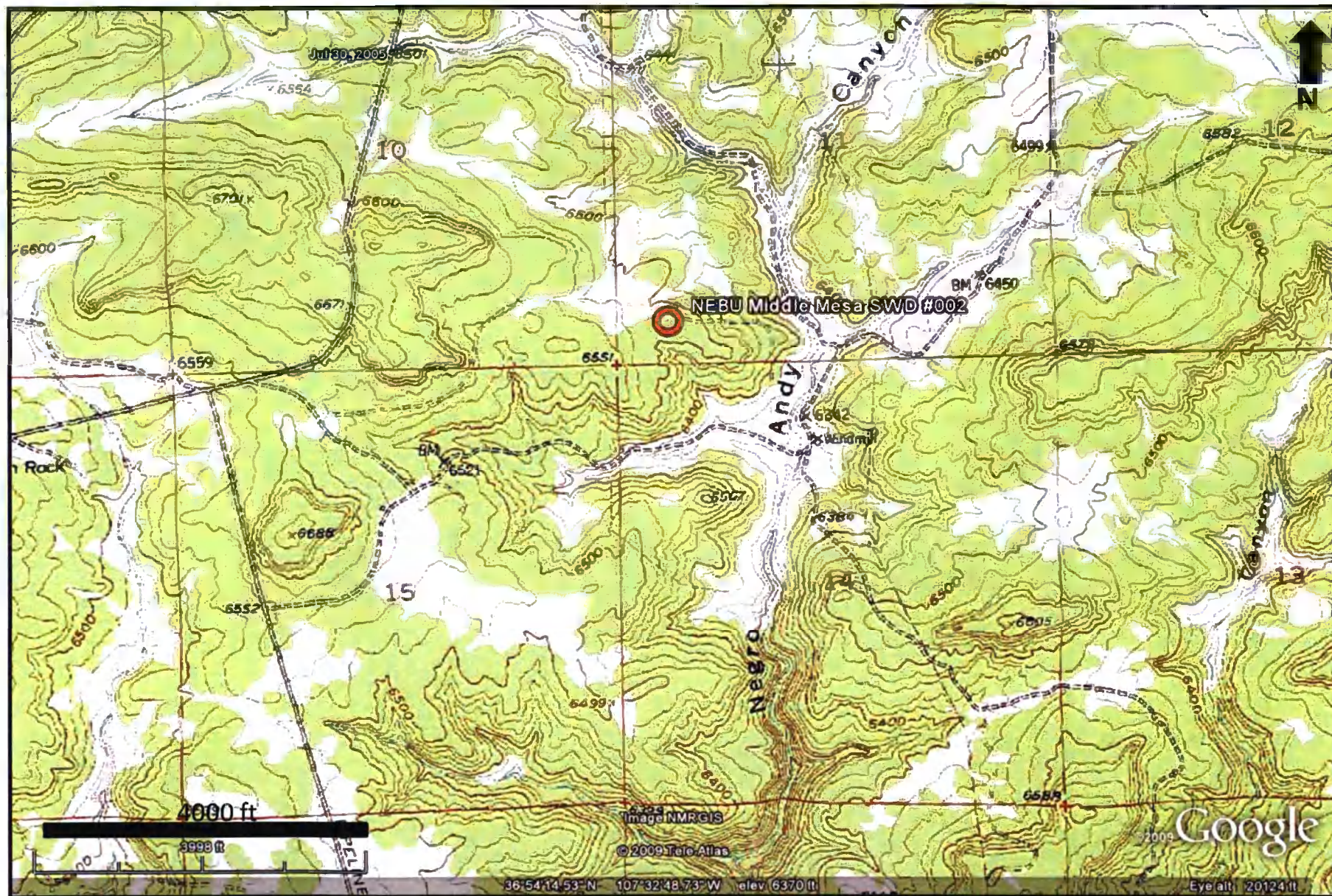


Lodestar Services, Inc  
PO Box 4465  
Durango, CO 81302

NEBU Middle Mesa SWD #002  
T31N, R07W, S11M  
San Juan County, NM

Aerial Photograph



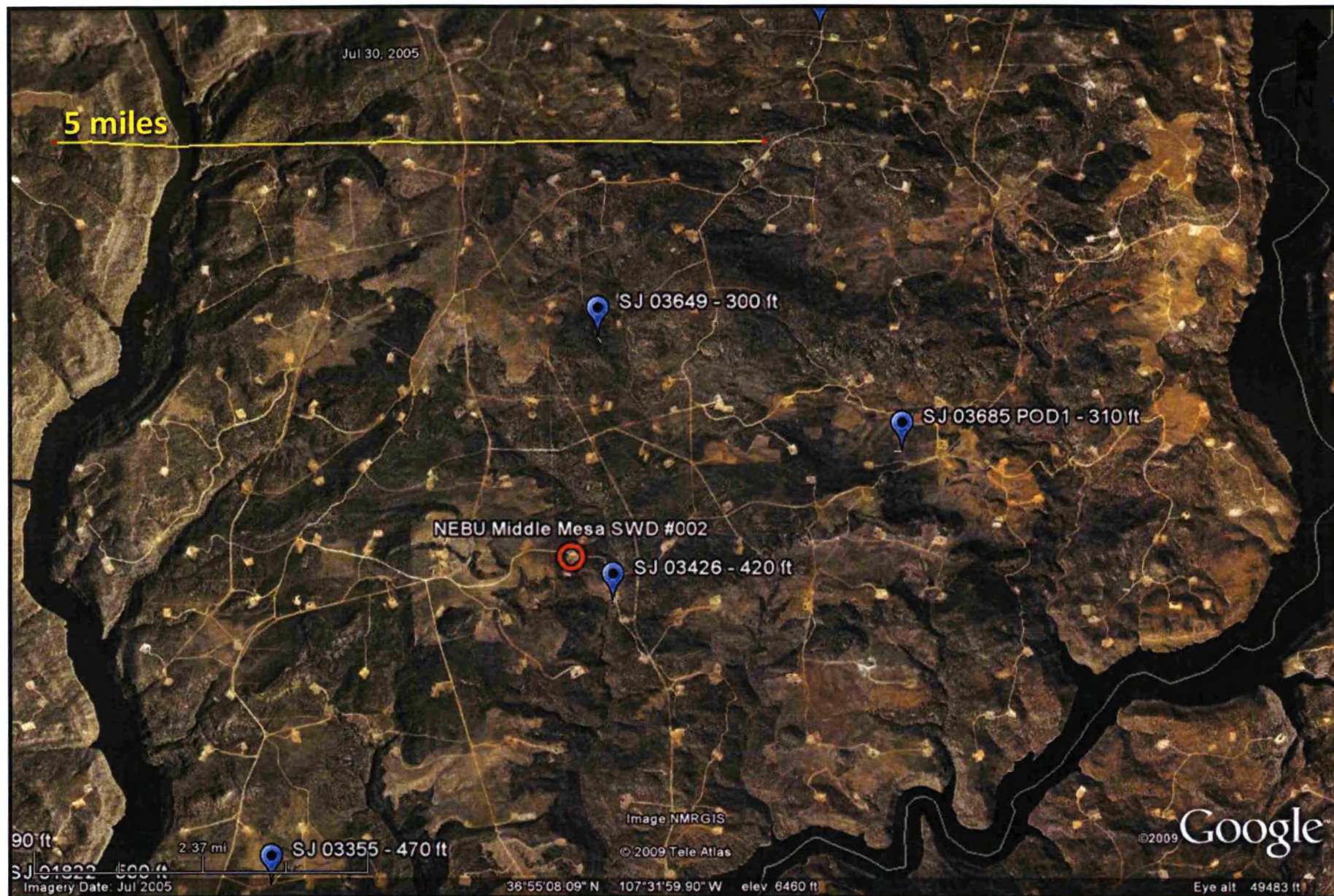


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San Juan County, NM

Topographic Map



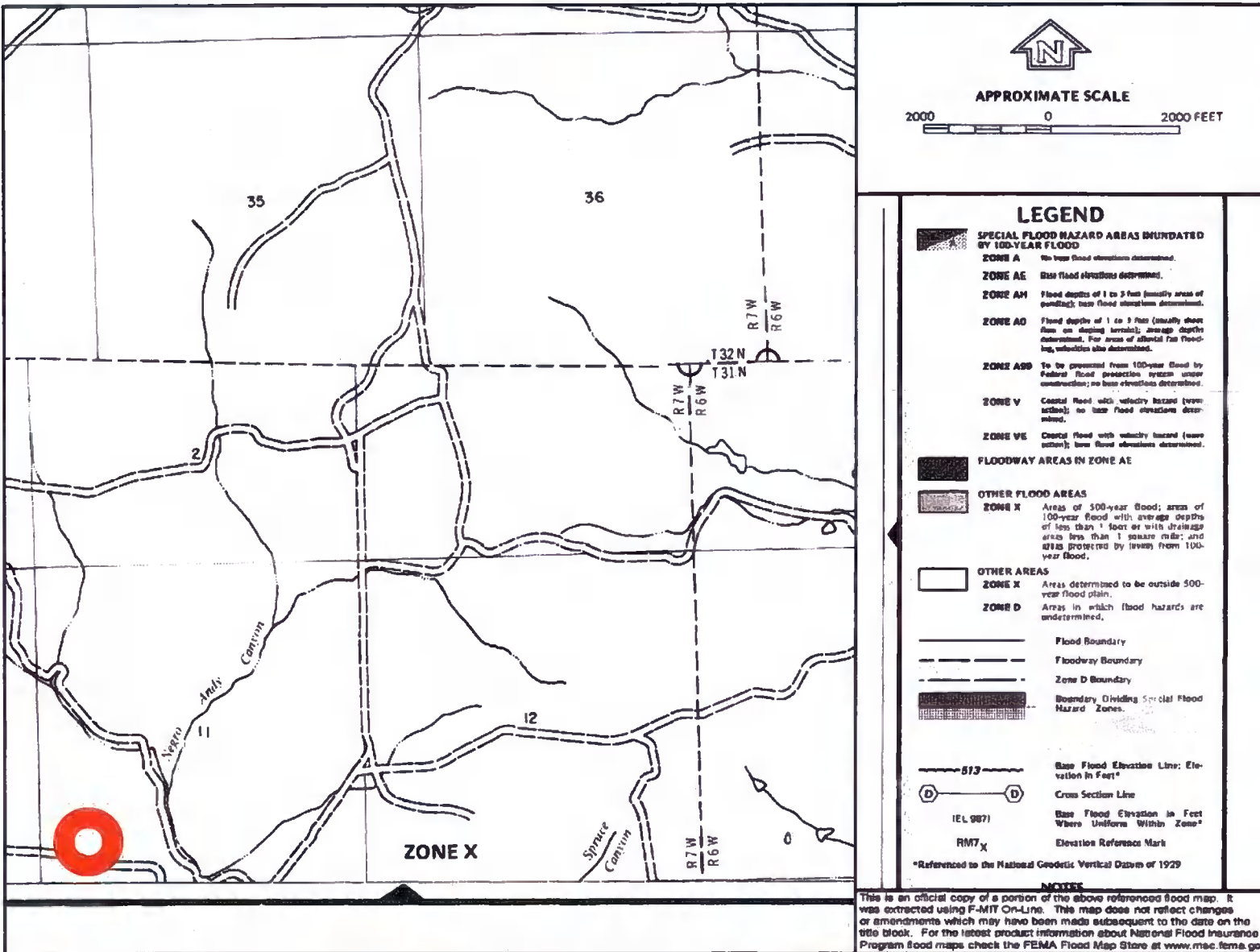


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iWaters Groundwater  
Data Map



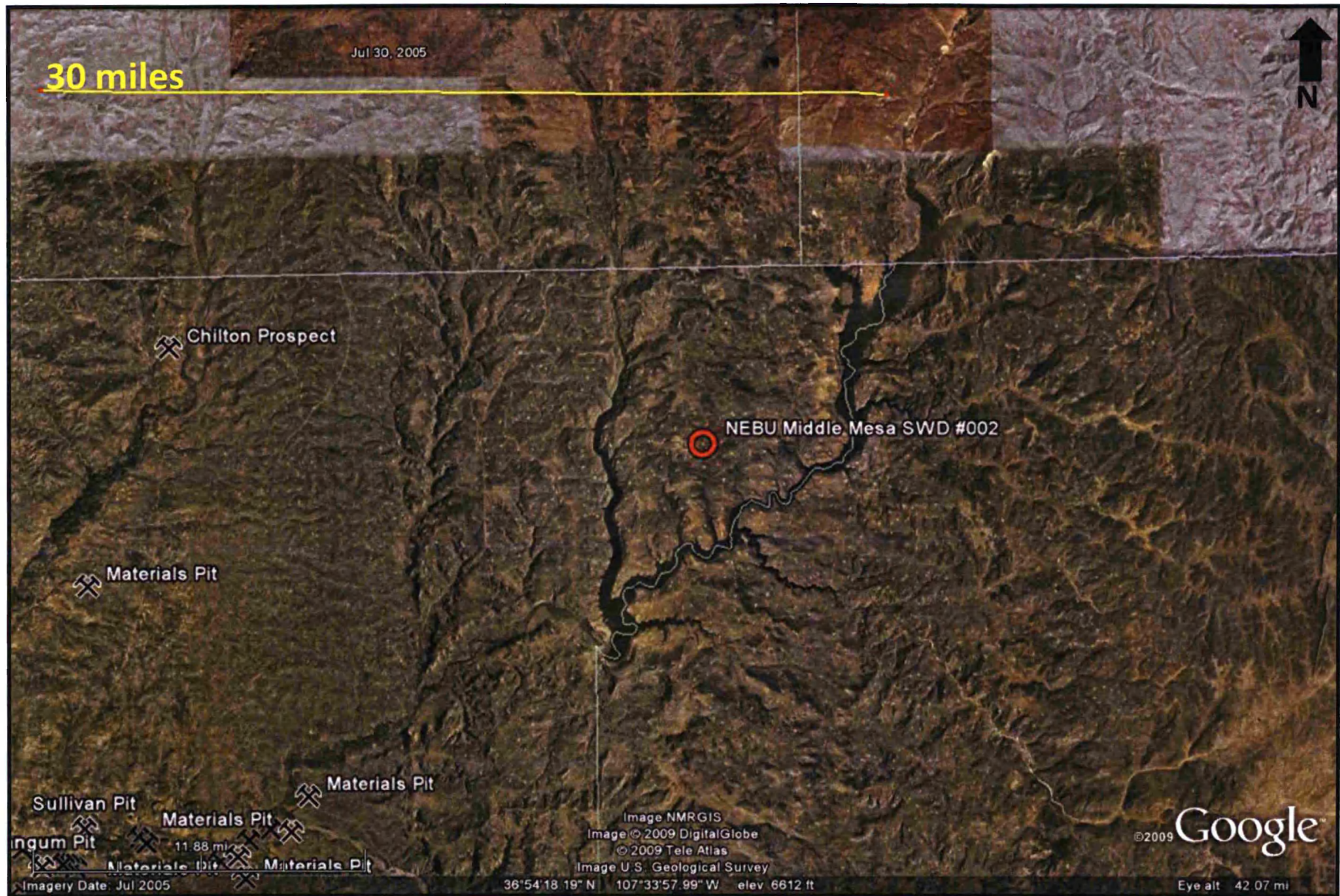


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San Juan County, NM

FEMA Flood Zone Map

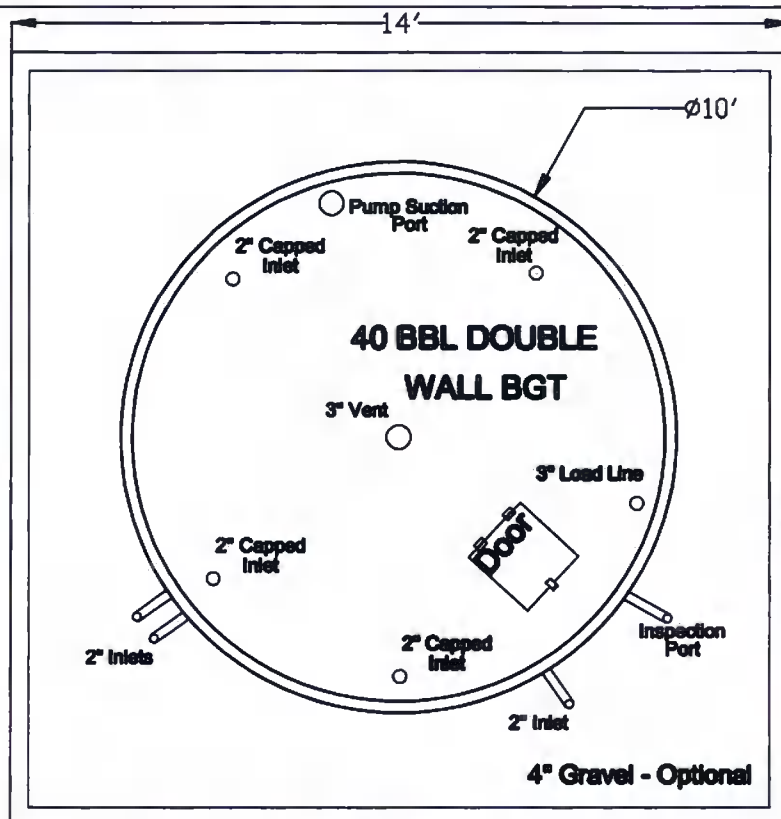




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San Juan County, NM

Mines, Mills, and  
Quarries Map



Wall

Note: Proved 6" minimum earthen berm around pit containment to keep surface runoff from entering pit.

Top View

Note: Outer edge of BGT will be left open and unobstructed to allow for visual inspection of secondary containment for evidence of leaks.

#### DESIGN INFORMATION:

The tank will have a solid metal top per Devon site specific design requirements, built by tank supplier.

Base will be level and free of rocks, debris, sharp edges, or irregularities prior to sand placement.

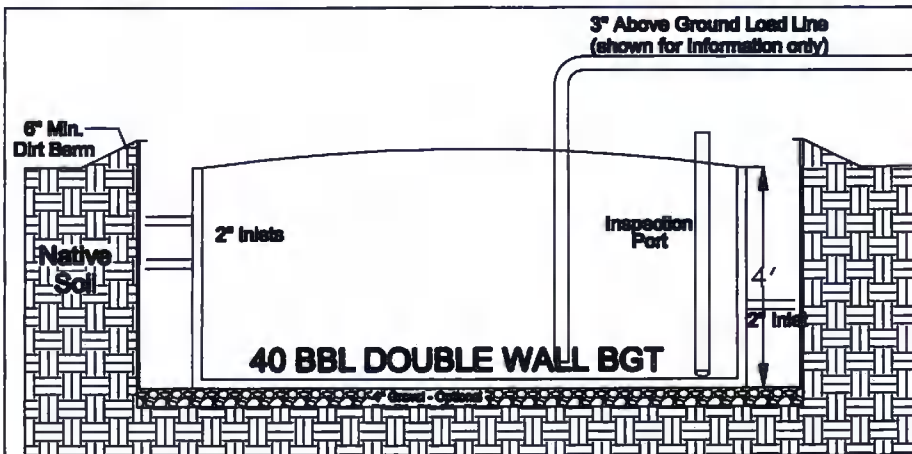
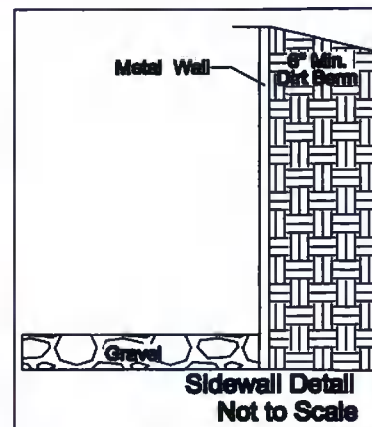
Visual inspection can be done on the BGT.

1 foot free board.

#### TANK A36 CARBON STEEL

3/16" sides

1/4" bottom



Profile View

**devon**

Typical Design  
**45 BBL DOUBLE WALL  
BGT**

**NEBU**

Prepared by:

**HOPKINS MAP SERVICE**

P. O. BOX 538

FARMINGTON, NM 87489



**Devon Energy Production Company, L.P.**  
**San Juan Basin**  
**Below Grade Tank Design and Construction Plan**

In accordance with Rule 19.15.17 NMAC the following information describes the design and construction of below grade tanks on Devon Energy Production Company, L.P. locations. This is Devon Energy's standard procedure for all below grade tanks (BGT). A separate plan will be submitted for any BGT which does not conform to this plan.

**General Plan**

- 1) Devon will design and construct a BGT to contain liquids to prevent contamination of fresh water and protect public health and the environment.
- 2) Devon will post a well sign, in compliance with 19.15.16.8 NMAC, on the existing well site operated by Devon Energy where the existing BGT is located. The sign will list the operator on record as the operator, the location of the well site by unit letter, section, township, range, and emergency telephone numbers.
- 3) Devon is requesting approval of an alternative fencing to be used on BGT locations. BGT locations will be fenced utilizing 48" steel mesh field-fence (hog wire) with pipe railing along the top. A 6' chain link fence will be utilized around the well pad if the well site is within a city limit or 1/4 mile of a permanent residence, school, hospital, institution, or church. BGTs located within 1000' of a permanent residence, school, hospital, institution, or church will be fenced by a 6' chain link fence with at least 2 strands of barbed wire at the top. All gates associated with BGTs will remain closed when responsible individuals are not on site.
- 4) Devon will construct BGT with an expanded metal covering or solid vaulted top on the top of the BGT.
- 5) Devon shall ensure that a BGTs are constructed of materials resistant to the BGT's particular contents and resistant to damage from sunlight. Tanks will be constructed of A36 carbon steel with 3/16" sides and 1/4" bottom. (see attached drawing)
- 6) Devon shall have a properly constructed foundation consisting of a level base free of rocks, debris, sharp edges or irregularities to prevent punctures, cracks or indentations of the tank bottom
- 7) Devon shall construct a BGT to prevent overflow and the collection of surface water run-on. Devon Energy's free board is set at 1 foot from the top of the tank. We have berms set to prevent any surface water run-on.
- 8) Devon will construct and use BGT's having double walls. The BGT side walls will be open with a plug for visual inspection for leaks. The bottom shall be elevated with the use of gravel to raise the BGT above the underlying ground surface to prevent damage to the bottom of the BGT.
- 9) The general specification for design and construction are attached in the Devon document.



**Devon Energy Production Company, L.P.**  
**San Juan Basin**  
**Below Grade Tank Maintenance and Operating Plan**

In accordance with Rule 19.15.17 NMAC the following information describes the maintenance and operation of below grade tanks on Devon Energy Production Company, L.P. locations. This is Devon Energy's standard procedure for all below grade tanks. A separate plan will be submitted for any BGT which does not conform to this plan.

**General Plan**

- 1) Devon will operate and maintain a BGT to contain liquids and solids as well as prevent contamination of fresh water to protect public health and the environment. Fluid levels will be monitored weekly and high levels will be removed as necessary. Monthly inspections will be conducted to monitor integrity of BGT systems.
- 2) Devon shall not allow a BGT to overflow or allow surface water run-on to enter the BGT. See attached drawing of vault design and placement of diversion berms.
- 3) Devon shall continuously remove any visible or measurable layer of oil from the fluid surface of a BGT in an effort to prevent significant accumulation of oil overtime.
- 4) Devon shall inspect the BGT at least once a month and maintain a written record of each inspection for five years. Monthly inspections will consist of documenting the following: (see attached template)
  - Well name
  - Section, Township, Range
  - Latitude longitude coordinates
  - Signature of inspector
  - Inspection date
  - Plug in place
  - Outer side wall ok
  - Fluid between walls
  - Measurable quantity oil
  - Comments
- 5) Devon shall maintain 1 foot free board to prevent overtopping of the BGT.
- 6) Devon will not discharge into or store any hazardous waste in any BGT.
- 7) If a BGT develops a leak or if any penetration of a BGT below the liquid surface on the outer wall, Devon will remove all liquids above the damage or leak within 48 hours, notify the appropriate division district office within 48 hours of the discovery and repair the damage or replace the BGT.

**Devon Energy Production Company, L.P.**  
**San Juan Basin**  
**Below Grade Tank Closure Plan**

In accordance with Rule 19.15.17.13 NMAC the following information describes the closure requirements of a below grade tank on Devon Energy Production Company, L.P. locations. This is Devon Energy's standard procedure for all below grade tanks (BGT). A separate plan will be submitted for any BGT which does not conform to this plan.

**General Plan**

- 1) Devon shall close a BGT 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.
- 2) Devon will close a BGT that does not meet the requirements of Paragraphs 1-4 of the Subsection I of 19.15.17.11 NMAC or is not included in Paragraph 5 of Subsection I of 19.15.17.11 NMAC within five years after June 16, 2008, if not retrofitted to comply with Paragraphs 1-4 of the Subsection I of the 19.15.17.11 NMAC.
- 3) Devon shall close a permitted BGT within 60 days of cessation of the BGT operation or as required by the transitional provisions of Subsection B of 19.15.17.17 NMAC in accordance with a closure plan that the appropriate division district office approves. The closure report will be filed on C-144.
- 4) 72 Hour notice of Closure will be given via email, or verbally to the Aztec Division office prior to any closure activity. The notification of closure will include the following:

- Operator's Name
- Location by Unit Letter, Section, Township, and Range. Well name and API number

The Surface owner shall be notified prior to the implementation of any closure operations of BGT's as per the approved closure plan using certified mail, return receipt requested.

- 5) Devon shall remove liquids and sludge from a BGT prior to implementing a closure method and shall dispose of the liquids and sludge in a division-approved facility.
  - Envirotech Permit No. NM01-0011 and IEI Permit No. NM 01-0010B
    - Soil contamination by exempt petroleum hydrocarbons
    - Produced sand, pit sludge and contaminated bottoms from storage of exempt wastes
  - Basin Disposal Permit No. NM01-005
    - Produced water
  - Middle Mesa SWD#1 30-045-27341
    - Produced water
  - Middle Mesa SWD #2 30-045-28553
    - Produced water
  - Pump Mesa SWD 30-045-27340
    - Produced water
  - Sims Mesa SWD 30-039-24236
    - Produced water
- 6) Devon will obtain prior approval from the OCD to dispose, recycle, reuse or reclaim the BGT and provide documentation of the final disposition of the BGT in the closure report.
- 7) If there is any on-site equipment associated with a BGT, then Devon shall remove the equipment, unless the equipment is required for some other purpose.
- 8) Devon will test the soils beneath the BGT to determine whether a release has occurred. At a minimum a five point composite soil sample will be taken. As well as notifying the Aztec

District office of the results on form C-141. Devon Energy will take separate individual discrete soil samples from any area that is wet, discolored or showing any other visible signs of release. All samples will be tested for the items listed in the chart below. Should it be determined that a release has occurred Devon shall comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.

Components	Test Method	Limit (mg/Kg)
Benzene	EPA SW-846 8021B or 8260B	0.2
BTEX	EPA SW-846 8021B or 8260B	50
TPH	EPA SW-846 418.1	100
Chlorides	EPA 300.1	250 or Background

- 9) If the sampling results demonstrate that there has been no release or that a release does not exceed the concentrations specified in Paragraph (4) of Subsection E of 19.15.17.13 NMAC, then Devon shall backfill the excavation with compacted, non-waste containing, earthen material; construct a division prescribed soil cover; re-contour and re-vegetate the site.
- 10) Re-contouring of the location will match fit, shape, line, form and texture of the surrounding area. Re-shaping will include drainage control to prevent ponding, and prevent erosion. Natural drainages will be unimpeded and water bars and/or silt traps will be placed in areas where needed to prevent erosion on a large scale. Final re-contour shall have a uniform appearance with smooth surface fitting the natural landscape.
- 11) A minimum of four feet of cover shall be achieved and the cover shall include one foot of suitable material to establish vegetation at the site, or the background thickness of topsoil, whichever is greater. Soil cover will be constructed to the site's existing grade and ponding of water and erosion of the cover material will be prevented with drainage control, natural drainages and silt traps where needed.
- 12) Devon shall seed the disturbed areas the first growing season after the operator closes the pit. Seeding will be accomplished via drilling when topography permits. BLM of Forest Service stipulated seed mixes will be used on all Federal Lands. Vegetative cover will equal 70% of the native perennial vegetative cover (un-impacted) consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintain that cover through two successive growing seasons. Devon Energy will notify the Division of Seeding and Revegetation when we have seeded and when we have achieved revegetation. Repeat seeding or planting will be continued until successful vegetative growth occurs.
- 13) All closure activities will include proper documentation and be available for review upon request and will be submitted to OCD within 60 days of closure of the BGT. Closure report will be filed on C-144 and incorporate the following:
  - Proof of the closure notice to the division and the surface owner
  - Inspection Reports
  - Sampling Results
  - Disposal facility and permit/API numbers
  - Soil backfilling and cover installation
  - Re-vegetation application rates and reseeding techniques (or approved alternative to re-vegetation requirements if applicable)
  - Photo documentation of the site reclamation



**Monthly Below Grade Pit Inspection**

**NEBU MM SWD Pit Number 1**

**45bbl Steel DW**

**Sec. 11, 31N, 7W**

**Lat. N36°908272      –      Long W107°546965**

Date	Plug in Place	Outer Sidewall Ok	Fluid Between Walls	Measurable Qty Oil	Comments	Signature of Inspector
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

**PROPOSED PIT/BELOW GROUND TANK LOCATION**  
**NEBU MM SWD #2 SITE VISIT OBSERVATIONS**

<b>GROUNDWATER</b>	
Estimate depth to groundwater (if possible)	<input type="checkbox"/> less than 50 feet <input type="checkbox"/> between 50 and 100 feet <input checked="" type="checkbox"/> greater than 100 feet <input type="checkbox"/> unknown
Comments: _____	
<b>SURFACE WATER</b>	
Distance to continuously flowing watercourse	<input type="checkbox"/> less than 300 feet <input checked="" type="checkbox"/> greater than 300 feet
Name of Water Feature: <u>Navajo Lake</u>	
Distance to other <i>significant</i> watercourse, lakebed, sinkhole or playa lake	<input type="checkbox"/> less than 200 feet <input checked="" type="checkbox"/> greater than 200 feet
Name of Water Feature (if known): _____	
Type of Water Feature: _____	
Distance to wetlands (look for clusters of cottonwoods, green shrubbery, reeds)	<input type="checkbox"/> less than 500 feet <input checked="" type="checkbox"/> greater than 500 feet
Comments: <u>None observed</u>	
<b>PUBLIC FACILITIES</b>	
Distance to permanent residence, school, hospital, institution or church	<input type="checkbox"/> less than 300 feet <input checked="" type="checkbox"/> greater than 300 feet
Distance to private or domestic fresh water well or spring (look for windmills, pump houses or small structures with power running to them)	<input type="checkbox"/> less than 500 feet <input checked="" type="checkbox"/> greater than 500 feet
Distance to freshwater well or spring (look for clusters of cottonwoods, green shrubbery, reeds)	<input type="checkbox"/> less than 1000 feet <input checked="" type="checkbox"/> greater than 1000 feet
Is site located within an incorporated municipal boundary or municipal fresh water field?	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no
Comments: _____	
<b>SITE STABILITY</b>	
Are there any known mines in the vicinity?	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no
If yes, how close? _____	
Mine Name: _____	
Mine Type: _____	
Does the site appear to be unstable? (any loose rocks, boulders, evidence of landslide)	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no
Comments: _____	

Additional Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I certify the above observations are true and accurate to the best of my knowledge.

Signature: Steve Zink Date: 6/8/9  
Printed Name: Steve Zink Title: Superintendent