

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

Form C-144  
Revised April 3, 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.

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: Oxy USA Inc. OGRID #: 16696  
Address: 5 Greenway Plaza, Ste 110, Houston, Texas 77046  
Facility or well name: Bravo Dome Carbon Dioxide Gas Unit #181  
API Number: 30-021-20683 OCD Permit Number: \_\_\_\_\_  
U/L or Qtr/Qtr J Section 18 Township 21N Range 30E County: Harding  
Center of Proposed Design: Latitude 36.046893 Longitude -103.785035 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 20 mil  LLDPE  HDPE  PVC  Other \_\_\_\_\_  
 String-Reinforced  
Liner Seams:  Welded  Factory  Other \_\_\_\_\_ Volume: ~8000 bbl Dimensions: L 100' x W 100' x D 5'

3.  
 **Below-grade tank:** Subsection I of 19.15.17.11 NMAC  
Volume: \_\_\_\_\_ bbl Type of fluid: \_\_\_\_\_  
Tank Construction material: \_\_\_\_\_  
 Secondary containment with leak detection  Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off  
 Visible sidewalls and liner  Visible sidewalls only  Other \_\_\_\_\_  
Liner type: Thickness \_\_\_\_\_ mil  HDPE  PVC  Other \_\_\_\_\_

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 \_\_\_\_\_

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.  
**Variations 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.*

<u>General siting</u>	
<b><u>Ground water is less than 25 feet below the bottom of a low chloride temporary pit or below-grade tank.</u></b> - <input checked="" type="checkbox"/> NM Office of the State Engineer - iWATERS database search; <input checked="" type="checkbox"/> USGS; <input checked="" type="checkbox"/> Data obtained from nearby wells	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
<b><u>Ground water is less than 50 feet below the bottom of a Temporary pit, permanent pit, or Multi-Well Fluid Management pit.</u></b> 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 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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within a 100-year floodplain. (Does not apply to below grade tanks) - FEMA map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b><u>Below Grade Tanks</u></b>	
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	<input type="checkbox"/> Yes <input type="checkbox"/> 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	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b><u>Temporary Pit using Low Chloride Drilling Fluid</u></b> (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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

<p>Within 100 feet of a wetland.</p> <ul style="list-style-type: none"> <li>- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p><b><u>Temporary Pit Non-low chloride drilling fluid</u></b></p>	
<p>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).</p> <ul style="list-style-type: none"> <li>- Topographic map; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.</p> <ul style="list-style-type: none"> <li>- Visual inspection (certification) of the proposed site; Aerial photo; Satellite image</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>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;</p> <ul style="list-style-type: none"> <li>- NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Within 300 feet of a wetland.</p> <ul style="list-style-type: none"> <li>- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p><b><u>Permanent Pit or Multi-Well Fluid Management Pit</u></b></p>	
<p>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).</p> <ul style="list-style-type: none"> <li>- Topographic map; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.</p> <ul style="list-style-type: none"> <li>- Visual inspection (certification) of the proposed site; Aerial photo; Satellite image</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>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.</p> <ul style="list-style-type: none"> <li>- NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Within 500 feet of a wetland.</p> <ul style="list-style-type: none"> <li>- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> 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 checked="" 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 checked="" 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 checked="" 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 checked="" 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 checked="" 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 checked="" type="checkbox"/> No
Written confirmation or verification from the municipality; Written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" 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 checked="" type="checkbox"/> No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

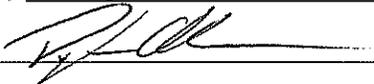
adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within the area overlying a subsurface mine. - Written confirmation 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

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): Dylan Allen Title: Environmental Specialist

Signature:  Date: 6/26/2018

e-mail address: Dylan.Allen@oxy.com Telephone: 432-312-4530

18.  
**OCD Approval:**  Permit Application (including closure plan)  Closure Plan (only)  OCD Conditions (see attachment)

**OCD Representative Signature:** \_\_\_\_\_ **Approval Date:** \_\_\_\_\_

**Title:** \_\_\_\_\_ **OCD Permit Number:** \_\_\_\_\_

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.*

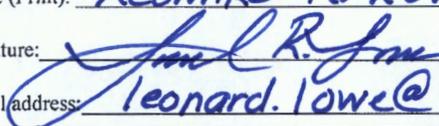
- Proof of Closure Notice (surface owner and division)
- Proof of Deed Notice (required for on-site closure for private land only)
- Plot Plan (for on-site closures and temporary pits)
- Confirmation Sampling Analytical Results (if applicable)
- Waste Material Sampling Analytical Results (required for 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

22.

**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): LEONARD R. LOWE Title: PETROLEUM ENGINEER  
Signature:  Date: July 19, 2018  
e-mail address: leonard.lowe@state.nm.us Telephone: 505-476-3492

- \* Ensure that the drillers are aware of the procedures needed to maintain the drilling pit. (Inspection sheet, etc.) during drilling.
- \* Please keep active the drying process of the drilling pit.



## **C-144 Permit Package**

**BRAVO DOME CARBON DIOXIDE GAS UNIT #181**

**Submitted: June 29<sup>th</sup>, 2018**



## Table of Contents

Introduction .....	1
Siting Criteria for Temporary Pit/Trench.....	2
Design and Construction Plan – Temporary Pit/Trench.....	4
Operating and Maintenance Plan .....	7
Temporary Pit/Trench Closure Plan .....	9
Appendices .....	13

Appendix 1: Survey Plats

Appendix 2: Temporary Pit/Trench Siting Criteria – Figures and Maps

Appendix 3: Temporary Pit/Trench Site Boring Report

Appendix 4: Temporary Pit/Trench Design Drawings

Appendix 5: Temporary Pit/Trench – FEMA/USDA Floodplain Maps

Appendix 6: Low Chloride Fluid – Previous Reports

Appendix 7: Environmental Report



## Introduction

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In accordance with NMAC 19.15.17, Oxy USA Inc. requests the permit of the proposed Bravo Dome Carbon Dioxide Gas Unit #181 low chloride temporary drilling pit/deep burial trench through the approval of this C-144 permit package.

A copy of the C-144 will be submitted to the land owner (Miller Feed Yard Inc.).



## Siting Criteria for Temporary Pit/Trench

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All figures and maps located in Appendix 2. An Environmental Report is located in Appendix 7.

### **Distance to Groundwater**

Figure 1A, 1B, 1C, 1D show the nearest New Mexico Office of the State Engineer mapped water wells (within a 3 miles radius) with depth to groundwater information. Figure 1A and 1B show two water wells 2.75 miles from the proposed temporary pit/trench with depth to water of 60 ft. (TU-00886) and 202 ft. (TU-02058). Figure 1C shows the nearest water well (TU-02164) to the site has 90 ft. depth to water. Figure 1D shows a 26 ft. depth to water well (TU-01454) approximately 2.8 miles to the southeast of the site. Note: This well appears to be drilled in the basin of the canyon. The proposed site is located on the plateau of the canyon – an over 100ft. elevation change. The New Mexico Office of the State Engineer well data suggest the groundwater is greater than 25 ft. below the bottom of the low chloride proposed temporary pit/trench. Past analysis showing a history of low chloride fluids can be found in Appendix 6.

A geotechnical analysis, consisting of an 80 ft. will be performed on-site prior to construction to verify groundwater depth – Oxy will notify NMOCD with results.

### **Distance to Subsurface Mines**

Figures 1e demonstrate that the proposed temporary pit/trench is not located within the area overlying a subsurface mine. Figure 1e is a map from the NM EMNRD – Mining and Mineral Division verifying the proposed site is not near an active mine.

### **Distance to Cave/Karst High or Critical Areas**

Oxy has discovered no evidence of karst activity in the general area. This is confirmed by reviewing the stratigraphic column of a recent well 2 miles to the south.

### **Distance to Surface Water**

Figures 1h and 1g demonstrate that the proposed temporary pit/trench is not located within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measure from the ordinary high-water mark). The nearest continuously flowing watercourse is the Canadian River located approximately 33 miles west. According to the National Wetlands Inventory (Figure 1i), the nearest riverine is approximately 150 ft. southeast – an on-site inspection shows this to be dry. The nearest Freshwater Emergent Wetland (Pond) is approximately 450 ft. to the southeast.



**Distance to Non-Public Water Supply**

Figure 1a-d demonstrate that the proposed temporary pit/trench is not located within 300 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of the initial application. A watering tank is present 500 ft. east of the proposed site. This watering tank appears to be used for domestic and livestock watering. A site inspection also verified no fresh water wells or springs within 300 horizontal feet of the proposed temporary pit/trench.

**Distance to Structures**

Figure 1h demonstrates that the proposed temporary pit/trench is not located within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.

**Distance to Wetlands**

According to the National Wetlands Inventory (Figure 1i), the nearest riverine is approximately 150 ft. southeast – an on-site inspection shows this to be dry. The nearest Freshwater Emergent Wetland (Pond) is approximately 450 ft. to the southeast.

**Distance to Municipal Boundaries and Defined Fresh Water Fields**

Figure 1j demonstrates that the proposed temporary pit/trench are not 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.

**Distance to 100-Year Floodplain**

The FEMA web map (Appendix 5) shows the proposed temporary pit/trench to be located in an unmapped area. The USDA web map (Appendix 5) shows that the proposed site is not within a 100-year floodplain.



## Temporary Pit/Trench Design and Construction Plan

Appendix 4 shows the design of the temporary pit/burial trench proposed for this project. Field conditions and the drilling rig layout will determine the final configuration of the pit.

Although unlikely due to the nature of the operation, the operator may install a system that can drain water entrained in the drilling waste of the drilling pit. The drainage system may be installed in the entire cell. As described in the closure plan, this system of fabric-wrapped perforated pipe and drainage mats lie on the bottom of the pit over the liner. The system will drain to the lowest corner of pit where a standpipe rises from the depression to the top of the berm. The drainage system can remove water to an above-ground tank or directly to a truck for re-use or disposal.

The temporary storage of fluids, fluid reuse or fluid disposal will be conducted in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment.

Although unlikely, for any temporary storage of fluids derived from the drilling pit and placed in an above-ground tank, the following will apply:

1. Construction, operation and maintenance of the temporary storage tank(s) will adhere to all applicable NMOCD Rules including but not limited to:
  - a. Safety stipulations
  - b. Protection from hydrogen sulfide mandates
  - c. Signage and identification requirements
  - d. Secondary containment requirements for temporary tanks
  - e. Applicable netting requirements
2. Any cleaning of the temporary tank(s) will adhere to NMOCD Rules relating to tank cleaning.
3. Transportation of water or drilling fluids derived from the drilling pit will adhere to all applicable NMOCD Rules relating to transportation.
4. Storage of water or drilling fluids in temporary above-ground tanks will also adhere to all applicable Federal mandates.

During final closure of the pit, the tanks and any secondary containment system will be removed from the location and the area beneath the tank inspected for any leakage. If any leakage is suspected, the operator will sample the soil beneath the tanks and report any release pursuant to NMOCD Rules.

### ***Construction/Design Plan of Temporary Pit***

#### **Stockpile Topsoil**

Prior to constructing the pit the qualified contractor will strip and stockpile any topsoil for use as the final cover or fill at the time of closure.



### Signage

The operator will post an upright sign in a conspicuous place in compliance with 19.15.16.8 NMAC as the pit and the well are operated by the same operator. Section 19.15.16.8 states in part:

#### 19.15.16.8 SIGN ON WELLS:

B. For drilling wells, the operator shall post the sign on the derrick or not more than 20 feet from the well.

C. The sign shall be of durable construction and the lettering shall be legible and large enough to be read under normal conditions at a distance of 50 feet.

F. Each sign shall show the:

- (1) well number;
- (2) property name;
- (3) operator's name;
- (4) location by footage, quarter-quarter section, township and range (or unit letter can be substituted for the quarter-quarter section);

and

- (5) API number.

The sign will also provide emergency telephone numbers.

### Fencing:

During drilling or workover operations, the operator will not fence the edge of the pit adjacent to the drilling or workover rig.

As the pit is not located within 1000 feet of a permanent residence, school, hospital, institution or church, the operator will fence the pit to exclude livestock with four-wire strands evenly spaced in the interval between one foot and four feet above ground level.

### Earthwork

The temporary pit will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base that is smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear.

The slopes of the pit will be no steeper than two horizontal feet to one vertical foot (2H:1V) unless in the transmittal letter the operator requested an alternative to the slope requirement with a demonstration that the pit can be operated in a safe manner to prevent contamination of fresh water and protect public health and the environment.

A berm or ditch will surround the temporary pit to prevent run-on of surface water.



If there is identified concerns relating to the instability, during construction of the pit the contractor will compact the earth material that forms the foundation for the pit liner. An expected proctor density of greater than 90% will be achieved by

1. adding water to the earth material as appropriate,
2. compacting the earth by walking a crawler-type tractor down the sides and bottom of the pit
3. repeating this process with a second 6-inch lift of earth material if necessary

### **Liner Installation**

The geomembrane liner will consist of 20-mil string reinforced LLDPE (or better) as specified by OCD Rules.

The operator will direct the liner installation contractor to:

1. minimize liner seams and orient them up and down, not across a slope
2. use factory welded seams where possible
3. overlap liners four to six inches and orient seams parallel to the line of maximum slope, i.e., oriented along, not across, the slope, prior to any field seaming
4. minimize the number of welded field seams in comers and irregularly shaped areas
5. utilize only qualified personnel to weld field seams
6. avoid excessive stress-strain on the liner
7. place geotextile under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity
8. anchor the edges of all liners in the bottom of a compacted earth-filled trench that is at least 18 inches deep
9. place additional material (liner, felt, etc.) to ensure that the liner is protected from any fluid force or mechanical damage at any point of discharge into or suction from the lined temporary pit.

A berm or ditch will surround the temporary pit/trench to prevent run-on of surface water. During drilling operations, the operator may elect to remove run-on protection on the pit edge adjacent to the drilling or workover rig provided that the pit is being used to collect liquids escaping from the drilling or workover rig and this additional fluid will not cause a breach of the temporary pit/trench.

The temporary pit/trench will not be used to vent or flare gas and the volume of the temporary drilling pit, including freeboard, will not exceed 10 acre-feet.



## Temporary Pit Operating and Maintenance Plan

The operator will maintain and operate the pit in accordance with the following plan to contain liquids and solids and maintain the integrity of the liner to prevent contamination of fresh water and protect public health and the environment.

If feasible, the operator will recycle, reuse or reclaim all drilling fluids in the temporary pit in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment. Re-use of drilling fluids and workover fluids (stimulation flow-back) for drilling and stimulation of subsequent wells is anticipated. If re-use is not possible, fluids will be sent to disposal at a division-approved facility.

The operator will not discharge into or store any hazardous waste in the pit.

If the pit develops a leak or if any penetration of the pit liner occurs above the liquid's surface, then the operator will repair the damage or initiate replacement of the liner within 48 hours of discovery or will seek a variance from the division district office within this time period.

If the pit develops a leak or if any penetration of the pit liner occurs below the liquid's surface, then the operator will remove all liquid above the damage or leak line within 48 hours of discovery. The operator will also notify the district division office (19.15.29 NMAC) within this same 48 hours of the discovery and repair the damage or replace the pit liner.

The operator will ensure that the drilling contractor installs and uses a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes during injection or withdrawal of liquids.

During construction, the operator or qualified contractor will install diversion ditches and berms around the pit as necessary to prevent the collection of surface water run-on. As outlined in the Construction and Design Plan, during drilling operations, the edge of the temporary pit adjacent to the drilling or workover rig may not have run-on protection if the operator is using the temporary pit to collect liquids escaping from the drilling or workover rig and run-on will not result in a breach of the temporary pit.

The operator will maintain on site an oil absorbent boom to contain and remove oil from the pit's surface.

The operator will only discharge fluids or mineral solids (including cement) generated or used during the drilling, completion, or workover processes into the pit.

The operator will maintain the temporary pit free of miscellaneous solid waste or debris. Immediately after cessation of drilling or a workover operation, the operator will remove any visible or measurable layer of oil from the surface of the pit.

The operator will maintain at least two feet of freeboard for the temporary pit, except under extenuating circumstances, which will be noted on the pit inspection log as described below.



The operator will inspect the temporary pit containing drilling fluids daily while the drilling rig or workover rig is on site. After the rigs have left the site, the operator will inspect the pit weekly as long as liquids are present in the pit. The operator will maintain a log of the inspections. The operator will make the log available to the division district office upon request.

The operator will remove all free drilling fluids from the surface of the temporary pit within 60 days from the date that the last drilling or workover rig associated with the pit permit is released. The operator will note the date of this release upon Form C-105 or C-103 upon well or workover completion. The operator may request an extension up to two months from the division district office as long as this additional time does not exceed the temporary pit life span (Subsection R of 19.15.17.7 NMAC).

## Temporary Pit Closure Plan

The wastes in the temporary pit are destined for burial at the trench immediately adjacent to the temporary pit. The operator will not begin closure operations without approval of the closure plan submitted with the permit application. The provisions below are in accordance with Subsection D of NMAC 19.15.17.13 (in-place closure).

### **Siting Criteria Compliance Demonstration**

Compliance with siting criteria is as described in the site-specific information appended to the C-144.

### **Proof of Surface Owner Notice**

The application package will be transmitted to the surface landowner, which serves as notification that the operator intends on-site burial of solids.

### **Construction/Design Plan of Temporary Pit**

The design and construction protocols for the temporary pit are provided in the design and construction plan and Appendix 4. The optional drainage system described in the design and construction plan is not shown on the Plates but can be important element of the closure plan.

### **General Protocols and Procedures**

- All free liquids from the pit will be recycled or disposed in a manner consistent with OCD Rules.
- Residual drilling fluids will be removed from the pit within 60 days of release of the last drilling or workover rig associated with the relevant pit permit.
- Water derived from the well stimulation program (flow-back or unused fresh water) that is significantly higher quality than the residual drilling fluids *may* discharge into the pit. The fresher water *may* discharge into the drainage system to flow through the solids or onto the solids in the pit.
- A low-flow pump *may* remove water from the drainage system to a tank or the fluids cell of the temporary pit; thereby further rinsing the residual solids in the pit.
- 20-60 days after placement of fresh or flow-back water into the drilling cell, any water in the pit will be removed for re-use or disposal.
- The residual drilling mud and cuttings will be stabilized to a capacity sufficient to support the 4-foot thick soil cover.
- The residual pit solids will not be mixed at a ratio greater than 1 part pit solids to 3 parts dry earth material (e.g. subsoil).
- The pit will not be closed until the stabilized pit contents pass the paint filter liquids test.

### Waste Material Sampling Plan

Prior to closure, a five-point composite sample of any solids in the fluids cell of the temporary pit will be tested in a laboratory to demonstrate that the stabilized material will not exceed the contaminant concentrations listed in Table II of 19.15.17.13 NMAC after being mixed in a ratio of 3:1 with the earth material to be used for stabilization of the residual cuttings and mud. A volumetric average of the laboratory result from the drilling cell solids and any fluid cells solids will be used to determine compliance with the standards of Table II.

<b>Table II</b> <b>Closure Criteria for Burial Trenches and</b> <b>Waste Left in Place in Temporary Pits</b>			
Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
25-50 feet	Chloride	EPA Method 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
51-100 feet	Chloride	EPA Method 300.0	40,000 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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
> 100 feet	Chloride	EPA Method 300.0	80,000 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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

In-place trench burial is the selected on-site disposal alternative.

If a concentration of a contaminant within the material mixed at a ratio not exceeding 3:1 is higher than the concentration given in Table II, closure will proceed in accordance with Subsection C of 19.15.17.13 NMAC.

In the event that on-site closure standards cannot be achieved, the operator will remove the solid pit contents and transfer to the following division-approved facility:

Disposal Facility: Gandy Marley New Mexico Permit: NM-01-0019

If the operator has removed the wastes and the liner to a burial trench pursuant to this subsection, the operator shall test the soils beneath the temporary pit as follows.

(a) At a minimum, a five point composite sample to include any obvious stained or wet soils, or other evidence of contamination shall be taken under the liner or the below-grade tank and that sample shall be analyzed for the constituents listed in Table I of 19.15.17.13 NMAC.

(b) If any contaminant concentration is higher than the parameters listed in Table I of 19.15.17.13 NMAC, the division may require additional delineation upon review of the results and the operator must receive approval before proceeding with closure.

(c) If all contaminant concentration are less than or equal to the parameters listed in Table I of 19.15.17.13 NMAC, then the operator can proceed to backfill the pit, pad, or excavation with non-waste containing, uncontaminated, earthen material.

<b>Table I</b>			
<b>Closure Criteria for Soils Beneath Below-Grade Tanks, Drying Pads Associated with Closed-Loop Systems and Pits where Contents are Removed</b>			
Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
	Chloride	EPA 300.0	20,000 mg/kg

> 100 feet			
	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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

### Protocols and Procedures for Earthwork

1. After de-watered, transfer contents of temporary pit to deep burial trench
2. Place the **Soil Cover** of:
  - a. at least 3-feet of compacted, uncontaminated, non-waste containing earthen fill with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0.
  - b. either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater, over the 3-foot earth material.
3. Contour the cover to
  - a. blend with the surrounding topography
  - b. prevent erosion of the cover and
  - c. prevent ponding over the cover.

### Closure Notice

The operator will 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. The notice will include the well name, API number, and location.

After approval for in-place burial, the operator shall notify the district office verbally and in writing at least 72 hours but not more than one week before any closure operation. Notice will include the operator's name and the location of the temporary pit. The location will include unit letter, section number, township and range. If the location is associated with a well, then the well's name, number and API number will be included.

Should onsite burial be on private land, the operator will file a deed notice including exact location of the burial with the county clerk of the county where the onsite burial is located.

## **Closure Report**

Within 60 days of closure completion, the operator will submit a

- i. closure report on form C-144, with necessary attachments
- ii. a certification that all information in the report and attachments is correct, that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan
- iii. a plat of the pit location on form C-105

if burial includes solids derived from a nearby well on the same lease, the report

will list the name, API # and location of the well(s) from which the solids originated Unless the permit transmittal letter requests an alternative marker to comply with surface landowner specifications, the operator will place at the center of an onsite burial a steel marker that

- is not less than four inches in diameter
- is placed at the bottom of a three-foot deep hole (minimum) that is filled with cement to secure the marker
- is at least four feet above mean ground level
- permanently displays the operator name, lease name, well number, unit letter, section, township and range in welded or stamped legible letters/numbers

## **Timing of Closure**

The operator will close the temporary pit within 6 months from the date the drilling rig was released from the first well using the pit. This date will be noted on form C-105 or C-103 filed with the division upon the well's completion (or re-completion in the case of a workover).

## **Reclamation and Re-vegetation Plan**

In addition to the area of the in-place burial, the operator will reclaim the surface impacted by the temporary pit, including access roads associated with the pit, to a safe and stable condition that blends with the surrounding undisturbed area including:

Areas not reclaimed as described herein due to their use in production or drilling operations will be stabilized and maintained to minimize dust and erosion. This includes the area of the temporary pit if a transmittal letter to OCD proposes an alternative to the re-vegetation or recontouring requirement with

- a demonstration that the proposed alternative provides equal or better prevention of erosion, and protection of fresh water, public health and the environment
- written documentation that the alternative is agreed upon by the surface owner.

As stated above, the soil cover for burial in-place

- A. consists of a minimum of three feet of non-waste containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg (or background concentration) as analyzed by EPA Method 300.0 placed over the liner and stabilized solids
- B. is capped by the background thickness of topsoil or 1-foot of suitable material to establish vegetation, whichever is greater
- C. blends into surrounding topography
- D. is graded to prevent ponding and to minimize erosion

For all areas disturbed by the closure process that will not be used for production operations or future drilling, the operator will:

- I. Replace topsoils and subsoils to their original relative positions
- II. Grade so as to achieve erosion control, long-term stability and preservation of surface water flow patterns
- III. Reseed in the first favorable growing season following closure

Re-vegetation and reclamation plans imposed by the surface owner will be outlined in communications with the OCD.

The operator will notify the division when the surface grading work element of reclamation is complete.

The operator will notify the division when the site meets the surface owner's requirements or exhibits a uniform vegetative cover that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.

## Burial Trench Closure Plan

The wastes in the temporary pit are destined for burial at the trench immediately adjacent to the temporary pit. The operator will not begin closure operations without approval of the closure plan submitted with the permit application. The provisions below are in accordance with Subsection D of NMAC 19.15.17.13 (Closure where wastes are destined for burial in place or into a nearby division approved pits or trenches).

### **Siting Criteria Compliance Demonstration**

Compliance with siting criteria is as described in the site-specific information appended to the C-144.

### **Proof of Surface Owner Notice**

The application package will be transmitted to the surface landowner, which serves as notification that the operator intends on-site burial of solids.

### **Construction/Design Plan of Temporary Pit**

The design and construction protocols for the burial trench are provided in the design and construction plan and Appendix 4.

### **General Protocols and Procedures**

- All free liquids from the burial trench will be recycled or disposed in a manner consistent with OCD Rules.
- The residual drilling mud and cuttings will be stabilized to a capacity sufficient to support the 4-foot thick soil cover.
- The residual pit solids will not be mixed at a ratio greater than 1 part pit solids to 3 parts dry earth material to achieve stabilization.
- If precipitation creates wet solids in the trench, the burial trench will not be closed until stabilized solids can support the soil cover.
- The soil cover will be placed such that there exists at least 4-feet of cover between the liner cap and natural grade.

### **Waste Material Sampling Plan**

Prior to closure, a five-point composite sample of any solids in the fluids cell of the temporary pit will be tested in a laboratory to demonstrate that the stabilized material will not exceed the contaminant concentrations listed in Table II of 19.15.17.13 NMAC after being mixed in a ratio of 3:1 with the earth material to be used for stabilization of the residual cuttings and mud. A volumetric average of the laboratory result from the drilling cell solids and any fluid cells solids will be used to determine compliance with the standards of Table II.

<b>Table II Closure Criteria for Burial Trenches and Waste Left in Place in Temporary Pits</b>			
Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
25-50 feet	Chloride	EPA Method 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
51-100 feet	Chloride	EPA Method 300.0	40,000 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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
> 100 feet	Chloride	EPA Method 300.0	80,000 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 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

In-place trench burial is the selected on-site disposal alternative.

If a concentration of a contaminant within the material mixed at a ratio not exceeding 3:1 is higher than the concentration given in Table II, closure will proceed in accordance with Subsection C of 19.15.17.13 NMAC.

In the event that on-site closure standards cannot be achieved, the operator will remove the solid pit contents and transfer to the following division-approved facility:

Disposal Facility: Gandy Marley New Mexico Permit: NM-01-0019

## Protocols and Procedures for Earthwork

1. After de-watered, transfer contents of temporary pit to deep burial trench
2. After stabilization: Fold the outer edges of the trench liner over solids.
3. Place a geomembrane cover over the stabilized waste material. It will be placed in a manner so as to prevent infiltration of water and so that infiltrated water does not collect on the geomembrane cover after the upper soil cover has been placed.
  - Use a geomembrane cover of a 20-mil string reinforced LLDPE liner
4. Over the stabilized material and liner, place the soil cover of
  - at least 3-feet of compacted, uncontaminated, non-waste containing earthen fill with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0.
  - either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater, over the 3-foot earth material.
  - The stabilized material must lie 4-feet below natural grade
3. Contour the cover to
  - blend with the surrounding topography
  - prevent erosion of the cover and
  - prevent ponding over the cover.

## Closure Notice

The operator will 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. The notice will include the well name, API number, and location.

After approval for in-place burial, the operator shall notify the district office verbally and in writing at least 72 hours but not more than one week before any closure operation. Notice will include the operator's name and the location of the temporary pit. The location will include unit letter, section number, township and range. If the location is associated with a well, then the well's name, number and API number will be included.

Should onsite burial be on private land, the operator will file a deed notice including exact location of the burial with the county clerk of the county where the onsite burial is located.

## **Closure Report**

Within 60 days of closure completion, the operator will submit a

- i. closure report on form C-144, with necessary attachments
- ii. a certification that all information in the report and attachments is correct, that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan
- iii. a plat of the pit location on form C-105

If burial includes solids derived from a nearby well on the same lease, the report will list the name, API # and location of the well(s) from which the solids originated.

Unless the permit transmittal letter requests an alternative marker to comply with surface landowner specifications, the operator will place at the center of an onsite burial a steel marker that

- is not less than four inches in diameter
- is placed at the bottom of a three-foot deep hole (minimum) that is filled with cement to secure the marker
- is at least four feet above mean ground level
- permanently displays the operator name, lease name, well number, unit letter, section, township and range in welded or stamped legible letters/numbers

## **Timing of Closure**

The operator will close the temporary pit within 6 months from the date the drilling rig was released from the first well using the pit. This date will be noted on form C-105 or C-103 filed with the division upon the well's completion (or re-completion in the case of a workover).

## **Reclamation and Re-vegetation Plan**

In addition to the area of the in-place burial, the operator will reclaim the surface impacted by the temporary pit, including access roads associated with the pit, to a safe and stable condition that blends with the surrounding undisturbed area including:

Areas not reclaimed as described herein due to their use in production or drilling operations will be stabilized and maintained to minimize dust and erosion. This includes the area of the temporary pit if a transmittal letter to OCD proposes an alternative to the re-vegetation or recontouring requirement with

- a demonstration that the proposed alternative provides equal or better prevention of erosion, and protection of fresh water, public health and the environment
- written documentation that the alternative is agreed upon by the surface owner.

As stated above, the soil cover for burial in-place

- A. consists of a minimum of three feet of non-waste containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg (or background concentration) as analyzed by EPA Method 300.0 placed over the liner and stabilized solids
- B. is capped by the background thickness of topsoil or 1-foot of suitable material to establish vegetation, whichever is greater
- C. blends into surrounding topography
- D. is graded to prevent ponding and to minimize erosion

For all areas disturbed by the closure process that will not be used for production operations or future drilling, the operator will:

- I. Replace topsoils and subsoils to their original relative positions
- II. Grade so as to achieve erosion control, long-term stability and preservation of surface water flow patterns
- III. Reseed in the first favorable growing season following closure

Re-vegetation and reclamation plans imposed by the surface owner will be outlined in communications with the OCD.

The operator will notify the division when the surface grading work element of reclamation is complete.

The operator will notify the division when the site meets the surface owner's requirements or exhibits a uniform vegetative cover that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.



## Appendices

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### Appendix 1 – Survey Plats

District I  
1625 N. French Dr., Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720

District II  
511 South First, Artesia, NM 88210  
Phone: (575) 748-1283 Fax: (575) 748-9720

District III  
1000 Rio Brazos Rd., Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170

District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department  
**OIL CONSERVATION DIVISION**  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
District Office

AMENDED REPORT

**WELL LOCATION AND ACREAGE DEDICATION PLAT**

API Number	Pool Code <b>96010</b>	Pool Name <b>BRAVO DOME CARBON DIOXIDE GAS 640</b>
Property Code <b>27111</b>	Property Name <b>BRAVO DOME CARBON DIOXIDE GAS UNIT</b>	
Well Number <b>181</b>		
OGRID No. <b>16696</b>	Operator Name <b>OXY USA INC.</b>	Elevation <b>5377.8</b>

**Surface Location**

UL or lot no.	Section	Township	Range	Lot Idn.	Feet from the	North/South line	Feet from the	East/West line	County
J	18	21 NORTH	30 EAST, N.M.P.M.		1780'	SOUTH	2296'	EAST	HARDING

**Bottom Hole Location If Different From Surface**

UL or lot no.	Section	Township	Range	Lot Idn.	Feet from the	North/South line	Feet from the	East/West line	County
Dedicated Acres		Joint or Infill	Consolidation Code	Order No.					

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

<div style="border: 1px dashed black; padding: 10px;"> <p>(NAD 83) <span style="float: right;">18</span></p> </div>	<p style="text-align: center;"><b>OPERATOR CERTIFICATION</b></p> <p><i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</i></p> <p style="text-align: right;">          Signature <span style="float: right;">6/18/18</span> Date       </p> <p style="text-align: center;">Sharon Wyatt</p> <p style="text-align: center;">Printed Name</p> <p style="text-align: center;">sharon_wyatt@oxy.com</p> <p style="text-align: center;">E-mail Address</p>
<div style="border: 1px dashed black; padding: 10px;"> <p style="text-align: center;"><b>SURVEYOR CERTIFICATION</b></p> <p><i>I hereby certify that the well location, shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i></p> <p style="text-align: right;">          Date of Survey <span style="float: right;">JUNE 1, 2018</span> Signature and Seal of Professional Surveyor       </p> <p style="text-align: right;">          Certificate Number <span style="float: right;">15079</span> </p> </div>	



## Appendices

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### Appendix 2 – Temporary Pit/Trench Siting Criteria – Figures and Maps

FIGURE 1A



**Coordinates**  
UTM - NAD 83 (m) - Zone 13  
 Easting 605631.000  
 Northing 3991632.000  
State Plane - NAD 83 (f) - Zone E  
 Easting 690963.668  
 Northing 1842797.261  
Degrees Minutes Seconds  
 Latitude 36 : 3 : 48.747636  
 Longitude -103 : 49 : 37.478780  
 Location pulled from POD Search

NEW MEXICO OFFICE OF THE STATE ENGINEER

**POD Information**  
 File Number: TU-00886  
 Owner: ONETA SKINNER-  
 Permit Use: NoData  
 POD Status: ACT  
 Permit Status: PMT

1:72,224  
 N  
 mi  
 0 0.275 0.55 1.1  
**Image Information**  
 Source: Basemap Error  
 Date: Basemap Error  
 Resolution (m): Basemap Error  
 Accuracy (m): Basemap Error



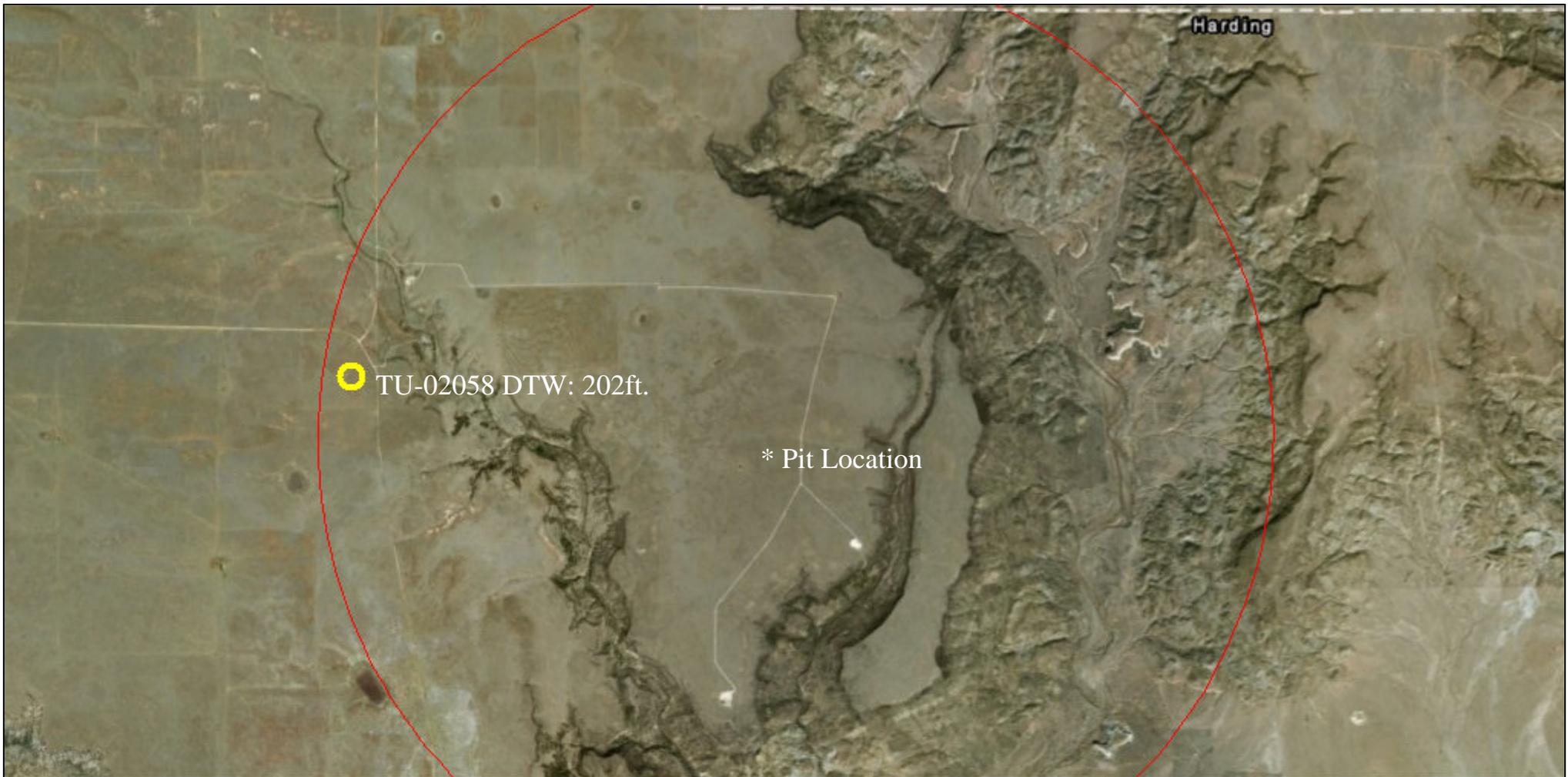
Author:  
 Purpose: STK  
 6/18/2018

**Spatial Information**  
 County: Harding  
 Groundwater Basin: Tucumcari  
 Sub-Basin: Ute  
 Land Grant: Not in Land Grant  
Restrictions:  
 NA  
**PLSS Description**  
 NENENSW Qtr of Sec 11 of 021N 029E  
 Derived from CADNSDI- Qtr Sec. locations are calculated and are only approximations

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
|  3 Miles Buffer | <b>OSE Conveyances</b>  |  Canal     |  Culvert |  Lateral |  Wash  |
|  Selected POD   |  Acequia |  Connector |  Ditch   |  Pipe    |  Other |
| OSE District Boundary   |  Arroyo  |  Creek     |  Drain   |  River   |   |

Reasonable efforts have been made by the New Mexico Office of the State Engineer (OSE) to verify that these maps are accurate to the best of its knowledge. The source of data used in their preparation, however, is a disclaimer of error or liability in these maps. These maps may contain errors, omissions, and inaccuracies in scale, resolution, specification, positional accuracy, development, method, timing, or in any other detail of source data, and other circumstances. These maps are distributed "as is" without warranty of any kind.

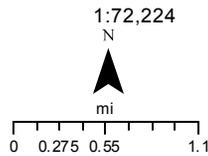
FIGURE 1B



**Coordinates**  
UTM - NAD 83 (m) - Zone 13  
 Easting 605074.000  
 Northing 3990389.000  
State Plane - NAD 83 (f) - Zone E  
 Easting 689107.987  
 Northing 1838730.995  
Degrees Minutes Seconds  
 Latitude 36 : 3 : 8.629140  
 Longitude -103 : 50 : 0.335919  
 Location pulled from POD Search

NEW MEXICO OFFICE OF THE STATE ENGINEER

**POD Information**  
 File Number: TU-02058-POD1  
 Owner: JESSE THOMAS  
 Permit Use: NoData  
 POD Status: ACT  
 Permit Status: PMT



**Image Information**  
 Source: Basemap Error  
 Date: Basemap Error  
 Resolution (m): Basemap Error  
 Accuracy (m): Basemap Error



Author:  
 Purpose: STK  
 6/18/2018

**Spatial Information**  
 County: Harding  
 Groundwater Basin: Tucumcari  
 Sub-Basin: Ute  
 Land Grant: Not in Land Grant  
Restrictions:  
 NA  
**PLSS Description**  
 SENSENE Qtr of Sec 15 of 021N 029E  
 Derived from CADNSDI- Qtr Sec. locations are calculated and are only approximations

- |                       |                        |           |         |         |       |
|-----------------------|------------------------|-----------|---------|---------|-------|
| 3 Miles Buffer        | <b>OSE Conveyances</b> | Canal     | Culvert | Lateral | Wash  |
| Selected POD          | Acequia                | Connector | Ditch   | Pipe    | Other |
| OSE District Boundary | Arroyo                 | Creek     | Drain   | River   |       |

Reasonable efforts have been made by the New Mexico Office of the State Engineer (OSE) to verify that these maps are accurate to the best of its knowledge. The source of data used in this presentation, however, is a disclaimer of error or liability in these maps. These maps may contain errors, omissions, and inaccuracies in scale, resolution, specification, positional accuracy, development, method, timing, or in any other way. These maps are distributed "as is" without warranty of any kind.

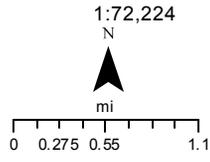
FIGURE 1C



**Coordinates**  
UTM - NAD 83 (m) - Zone 13  
 Easting 608220.000  
 Northing 3992988.000  
State Plane - NAD 83 (f) - Zone E  
 Easting 699489.693  
 Northing 1847188.626  
Degrees Minutes Seconds  
 Latitude 36 : 4 : 31.724651  
 Longitude -103 : 47 : 53.335382  
 Location pulled from POD Search

NEW MEXICO OFFICE OF THE STATE ENGINEER

**POD Information**  
 File Number: TU-02164-POD1  
 Owner: PENNY TRAINHAM  
 Permit Use: NoData  
 POD Status: ACT  
 Permit Status: PMT



**Image Information**  
 Source: Basemap Error  
 Date: Basemap Error  
 Resolution (m): Basemap Error  
 Accuracy (m): Basemap Error



Author:  
 Purpose: STK  
 6/18/2018

**Spatial Information**  
 County: Harding  
 Groundwater Basin: Tucumcari  
 Sub-Basin: Ute  
 Land Grant: Not in Land Grant  
Restrictions:  
 NA  
**PLSS Description**  
 SWSWNESE Qtr of Sec 01 of 021N 029E  
 Derived from CADNSDI- Qtr Sec. locations are calculated and are only approximations

- |                       |                        |           |         |         |       |
|-----------------------|------------------------|-----------|---------|---------|-------|
| 3 Miles Buffer        | <b>OSE Conveyances</b> | Canal     | Culvert | Lateral | Wash  |
| Selected POD          | Acequia                | Connector | Ditch   | Pipe    | Other |
| OSE District Boundary | Arroyo                 | Creek     | Drain   | River   |       |

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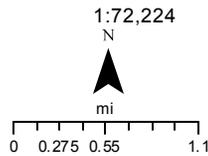
FIGURE 1D



**Coordinates**  
UTM - NAD 83 (m) - Zone 13  
 Easting 610731.000  
 Northing 3985417.000  
State Plane - NAD 83 (f) - Zone E  
 Easting 707559.143  
 Northing 1822288.843  
Degrees Minutes Seconds  
 Latitude 36 : 0 : 25.029771  
 Longitude -103 : 46 : 16.783587  
 Location pulled from POD Search

NEW MEXICO OFFICE OF THE STATE ENGINEER

**POD Information**  
 File Number: TU-01454  
 Owner: MANUEL AND MARY C  
 Permit Use: NoData  
 POD Status: ACT  
 Permit Status: PMT



**Image Information**  
 Source: Basemap Error  
 Date: Basemap Error  
 Resolution (m): Basemap Error  
 Accuracy (m): Basemap Error



Author:  
 Purpose: STK  
 6/18/2018

**Spatial Information**

County: Harding  
 Groundwater Basin: Tucumcari  
 Sub-Basin: Ute  
 Land Grant: Not in Land Grant  
Restrictions:

NA

**PLSS Description**

NESWSEW Qtr of Sec 32 of 021N 030E

Derived from CADNSDI- Qtr Sec. locations are calculated and are only approximations

- |                       |                        |           |         |         |       |
|-----------------------|------------------------|-----------|---------|---------|-------|
| 3 Miles Buffer        | <b>OSE Conveyances</b> | Canal     | Culvert | Lateral | Wash  |
| Selected POD          | Acequia                | Connector | Ditch   | Pipe    | Other |
| OSE District Boundary | Arroyo                 | Creek     | Drain   | River   |       |

Reasonable efforts have been made by the New Mexico Office of the State Engineer (OSE) to verify that these maps are accurate to the best of our knowledge. The source of data used in this map is not guaranteed, however, a degree of error is inherent in all maps, and these maps may contain omissions and errors in scale, resolution, specification, positional accuracy, development, methodology, or in the selection of source data, and other circumstances. These maps are distributed "as is" without warranty of any kind.

# Active Mines in New Mexico

Figure 1e



6/18/2018 2:15:58 PM

Registered Mines

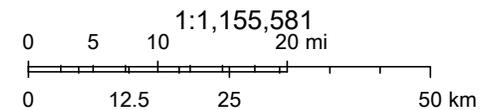
x Aggregate, Stone etc.

x Aggregate, Stone etc.

x Aggregate, Stone etc.



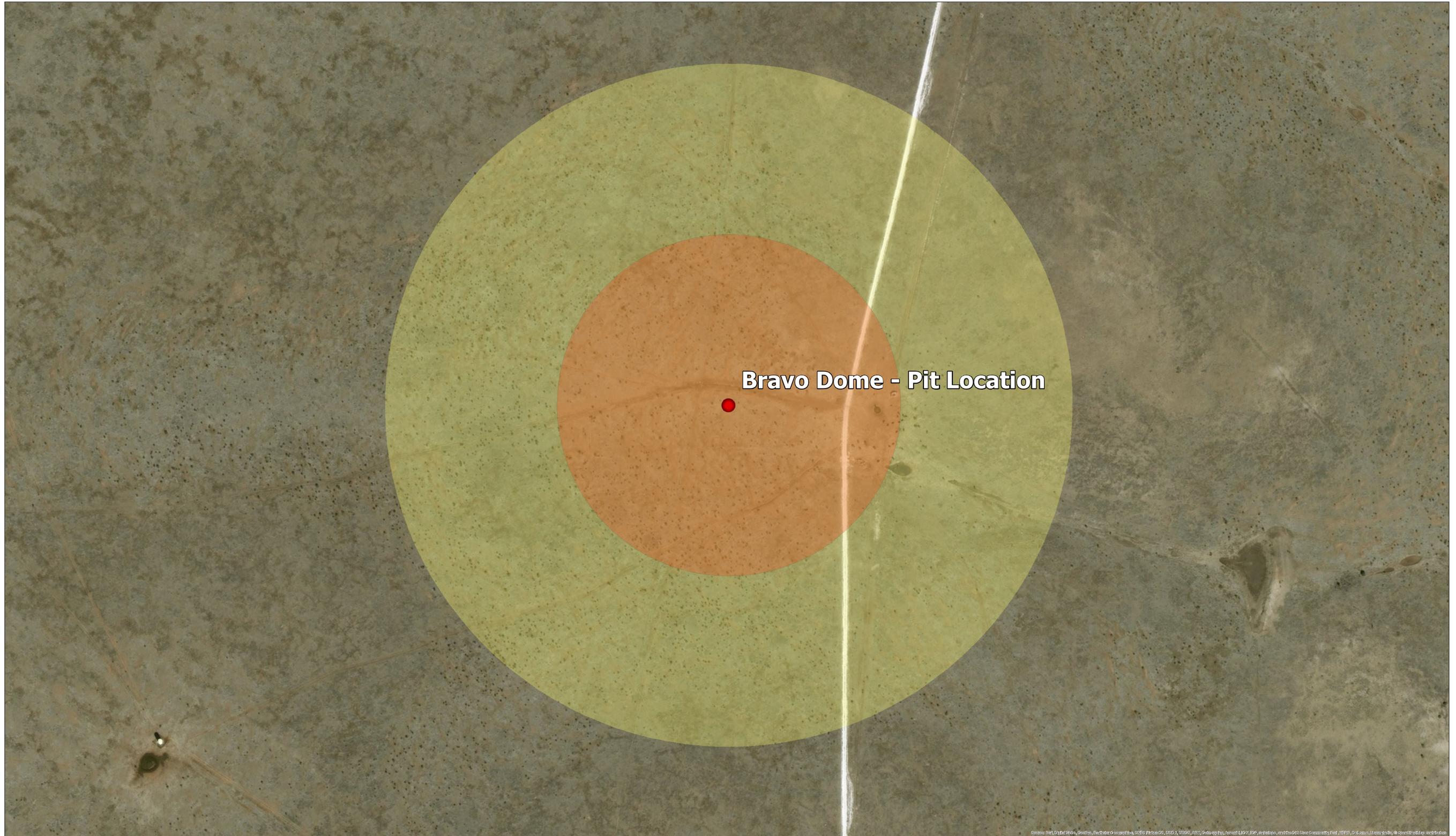
Red Dog, Scoria



Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

# Nearby Structures

Figure 1h



1:1,500

## Bravo Dome

 Pit Location

 1000 ft. Buffer

 500 ft. Buffer

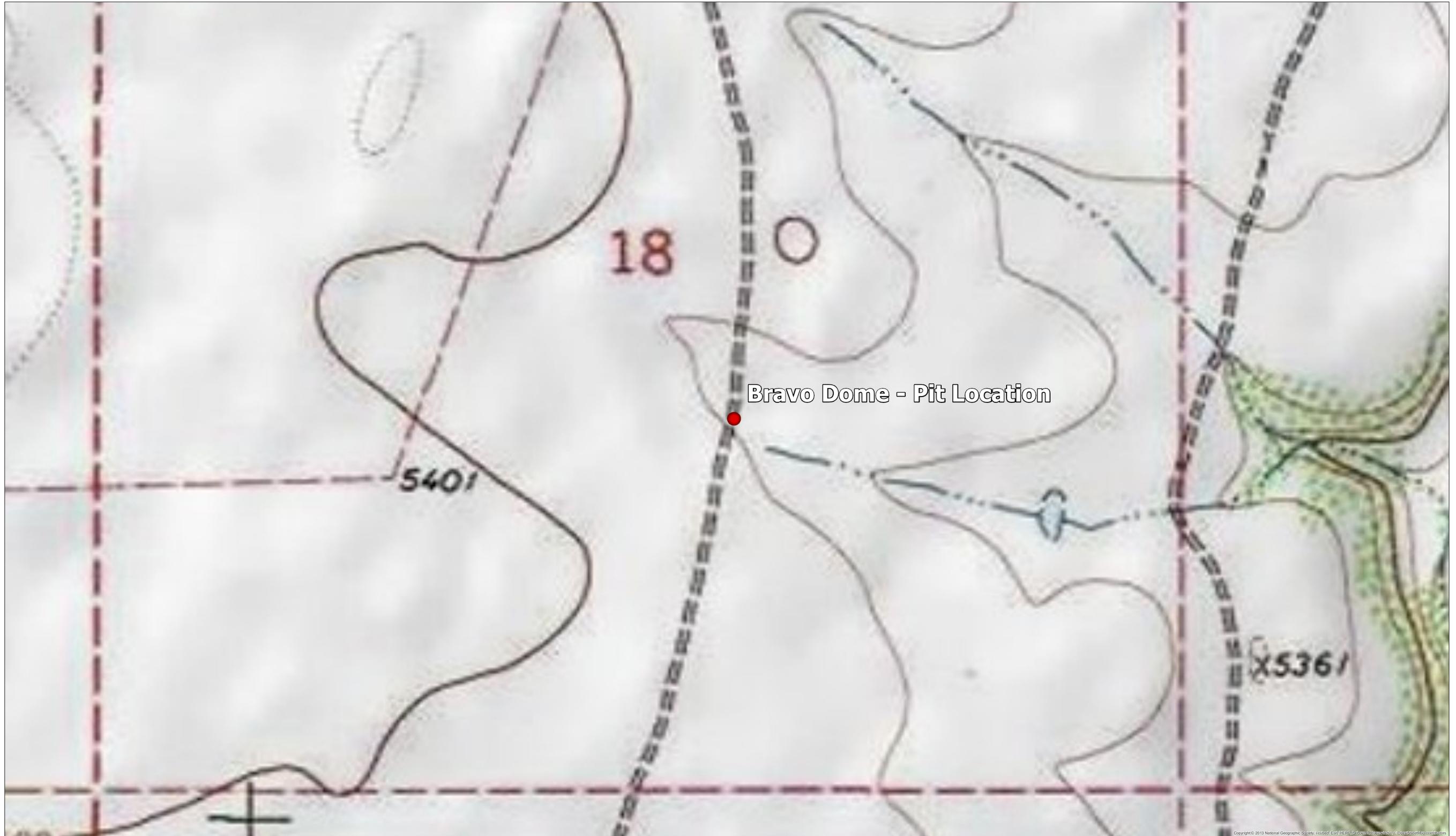
Date: 6/25/2018



Author: Dylan Allen

# Topographic/BLM Streams and Rivers

Figure 1g



Layers obtained from the BLM  
1:2,500

Date: 6/26/2018

**Bravo Dome**

● Pit Location



Author: Dylan Allen



# Wetlands

Figure 1i



June 15, 2018

### Wetlands

-  Estuarine and Marine Deepwater
-  Estuarine and Marine Wetland

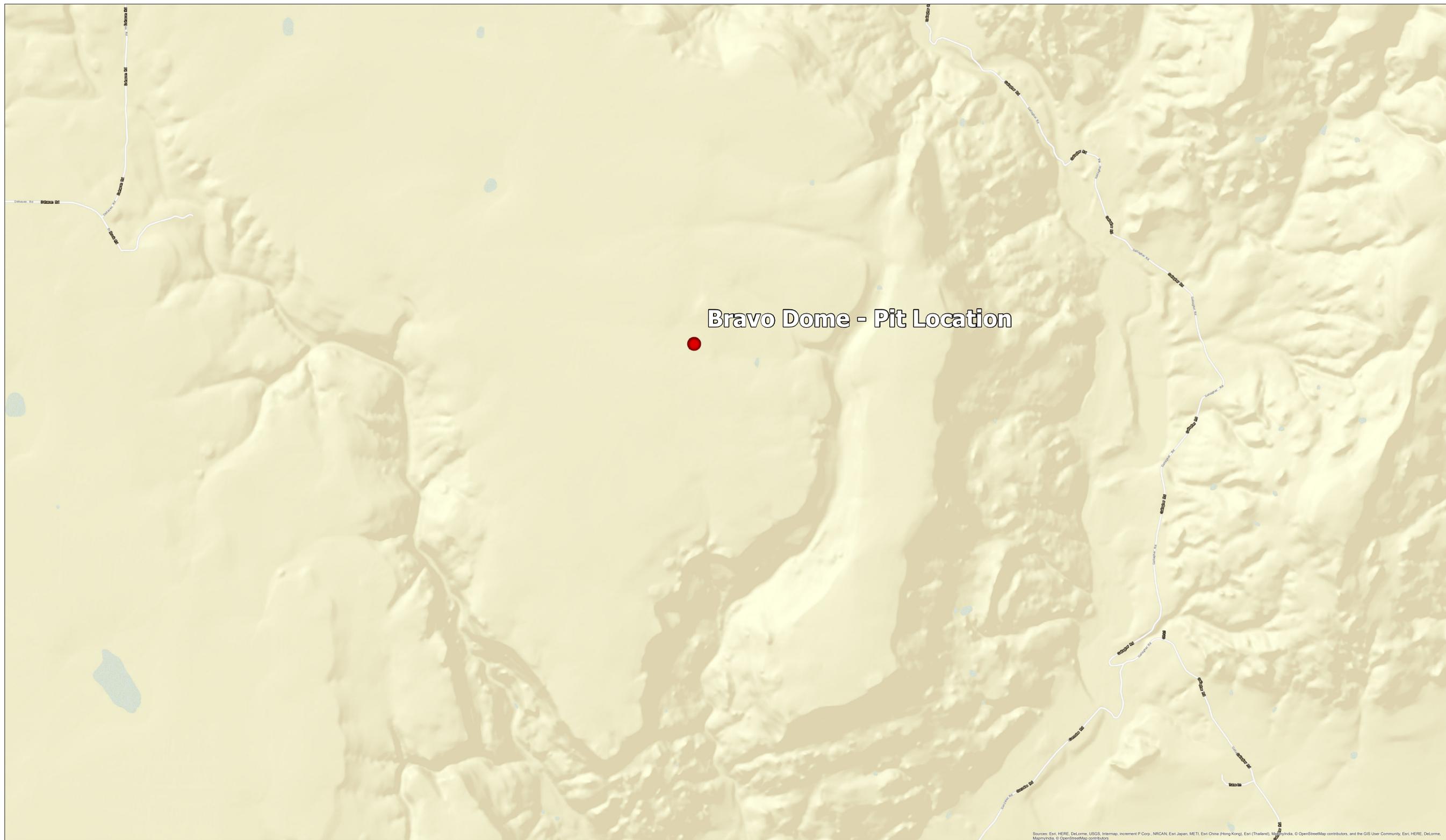
-  Freshwater Emergent Wetland
-  Freshwater Forested/Shrub Wetland
-  Freshwater Pond

-  Lake
-  Other
-  Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

# Municipalities/Defined Fresh Water Well Fields

Figure 1j



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), Magnum, © OpenStreetMap contributors, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors



1:12,500

Date: 6/26/2018

**Bravo Dome**  
● Pit Location



Author: Dylan Allen



## Appendices

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### Appendix 3 – Site Boring Report



## Appendices

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### Appendix 4 – Temporary Pit/Trench Design Drawings





## Appendices

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### Appendix 5 – FEMA/USDA Floodplain Maps



# FEMA Flood Map Service Center: Search By Address

Navigation

Search

Languages

Enter an address, place, or coordinates: ?

-103.784698, 36.047067

Search

Whether you are in a high risk zone or not, you may need [flood insurance](https://www.fema.gov/national-flood-insurance-program) because most homeowners insurance doesn't cover flood damage. If you live in an area with low or moderate flood risk, you are 5 times more likely to experience flood than a fire in your home over the next 30 years. For many, a National Flood Insurance Program's flood insurance policy could cost less than \$400 per year. Call your insurance agent today and protect what you've built. Learn more about [steps you can take](https://www.fema.gov/what-mitigation) to reduce the risk flood damage.

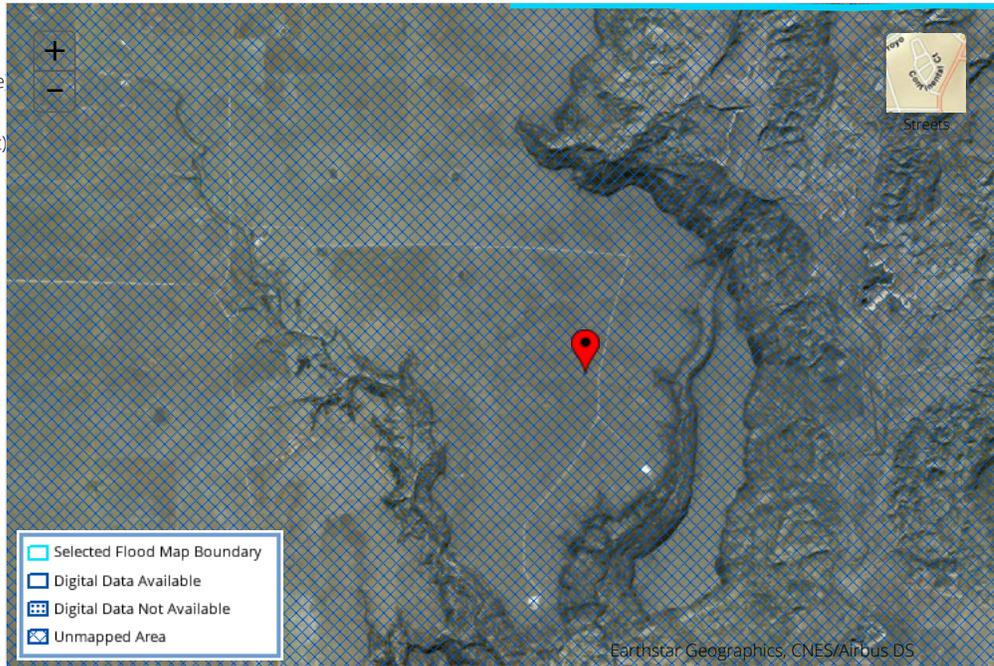
- MSC Home ([//msc.fema.gov/portal/](https://msc.fema.gov/portal/))
- MSC Search by Address ([//msc.fema.gov/portal/search](https://msc.fema.gov/portal/search))
- MSC Search All Products ([//msc.fema.gov/portal/advanceSearch](https://msc.fema.gov/portal/advanceSearch))
- MSC Products and Tools ([//msc.fema.gov/portal/resources/productsandtools](https://msc.fema.gov/portal/resources/productsandtools))
  - Hazus ([//msc.fema.gov/portal/resources/hazus](https://msc.fema.gov/portal/resources/hazus))
  - LOMC Batch Files ([//msc.fema.gov/portal/resources/lomc](https://msc.fema.gov/portal/resources/lomc))
  - Product Availability ([//msc.fema.gov/portal/productAvailability](https://msc.fema.gov/portal/productAvailability))
- MSC Frequently Asked Questions (FAQs) ([//msc.fema.gov/portal/resources/faq](https://msc.fema.gov/portal/resources/faq))
- MSC Email Subscriptions ([//msc.fema.gov/portal/subscriptionHome](https://msc.fema.gov/portal/subscriptionHome))
- Contact MSC Help ([//msc.fema.gov/portal/resources/contact](https://msc.fema.gov/portal/resources/contact))

## Search Results—Products for HARDING COUNTY UNINCORPORATED AREAS

Show ALL Products » (<https://msc.fema.gov/portal/availabilitySearch?addcommunity=350129&communityName=HARDING>)

FEMA has not completed a study to determine flood hazard for the selected location; therefore, a flood map has not been published at this time. You can contact your community or the FEMA FMIX for more information about flood risk and flood insurance in your community.

You can choose a new flood map or move the location pin by selecting a different location on the locator map below or by entering a new location in the search field above. It may take a minute or more during peak hours to generate a dynamic FIRMette. NOTE: Please be sure to enable popups for this site.



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[Home](https://www.fema.gov/) ([//www.fema.gov/](https://www.fema.gov/)) [Download Plug-ins](https://www.fema.gov/download-plug-ins) ([//www.fema.gov/download-plug-ins](https://www.fema.gov/download-plug-ins)) [About Us](https://www.fema.gov/about-agency) ([//www.fema.gov/about-agency](https://www.fema.gov/about-agency)) [Privacy Policy](https://www.fema.gov/privacy-policy) ([//www.fema.gov/privacy-policy](https://www.fema.gov/privacy-policy)) [FOIA](https://www.fema.gov/foia) ([//www.fema.gov/foia](https://www.fema.gov/foia)) [Office of the Inspector General](https://www.oig.dhs.gov/) ([//www.oig.dhs.gov/](https://www.oig.dhs.gov/)) [Strategic Plan](https://www.fema.gov/fema-strategic-plan) ([//www.fema.gov/fema-strategic-plan](https://www.fema.gov/fema-strategic-plan)) [Whitehouse.gov](https://www.whitehouse.gov/) ([//www.whitehouse.gov](https://www.whitehouse.gov/)) [DHS.gov](https://www.dhs.gov/) ([//www.dhs.gov](https://www.dhs.gov/)) [Ready.gov](https://www.ready.gov/) ([//www.ready.gov](https://www.ready.gov/)) [USA.gov](https://www.usa.gov/) ([//www.usa.gov](https://www.usa.gov/)) [DisasterAssistance.gov](https://www.disasterassistance.gov/) ([//www.disasterassistance.gov/](https://www.disasterassistance.gov/))



<https://www.oig.dhs.gov/hotline>

 Official website of the Department of Homeland Security

**Description — Flooding Frequency Class**

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent.

"None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years.

"Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

"Rare" means that flooding is unlikely but possible under unusual weather conditions. The chance of flooding is 1 to 5 percent in any year.

"Occasional" means that flooding occurs infrequently under normal weather conditions. The chance of flooding is 5 to 50 percent in any year.

"Frequent" means that flooding is likely to occur often under normal weather conditions. The chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year.

"Very frequent" means that flooding is likely to occur very often under normal weather conditions. The chance of flooding is more than 50 percent in all months of any year.

**Map Legend**

**Layer Properties Menu**

- Area of Interest (AOI)
- Area of Interest (AOI)
- Location Marker
- Soils
  - Soil Survey Areas
  - Soil Map Unit Polygons
  - Soil Map Unit Lines
  - Soil Map Unit Points
  - Soil Rating Polygons
    - None
    - Very Rare
    - Rare
    - Occasional
    - Frequent
    - Very Frequent
    - Not rated or not available
  - Soil Rating Lines

**Advanced Options**

Scale: (not to scale)

0 1,000 ft



## Appendices

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### Appendix 6 – Low Chloride Fluids – Previous Reports



**MI SWACO  
MIDLAND  
DISTRICT**

**DRILLING FLUIDS SUMMARY**

**Operator :** OXY-USA-PERMIAN  
**Well Name :** BDCDGU-2233-101-G  
**Contractor :** NABORS  
**Field :** BRAVO DOME  
**Location :** S10, T22N, R33E  
**Sales Engr :** MIKE HEROD

**Casing Program**  
 Depth (ft)            O.D. (in)  
 607                    8.625  
 2751                   5.500

**Page :** 1  
**Report Date :** 12/17/2008  
**Spud Date :** 8/19/2008  
**Control No. :** 78458  
**Warehouse :** HOBBS, NM  
**Dist Engr :** MIKE DAVIS/JIMMY

Mud Type : Water-Based																							
Date	Depth	Wt	FV	PV	YP	Gels		Filtration		Solids	Water	Oil	Sand	MBT	pH	Pm	Pf	Mf	Chlorides	Hardness	Ca	Cost	(\$)
mm/dd/yyyy	ft	lb/gal	s/qt	cP	lb/100ft <sup>2</sup>	10s	10m	API	HTHP	%	%	%	%	lb/bbl					mg/l		Daily	Cumulative	
8/14/2008	0	8.4	27	0	1	1	1	NA							7	0	0	0	100	160			
TVD :	0	RIGGING UP			Still rigging up.																		
8/19/2008	385	8.7	30	6	7	1	2	25+							8.5	0	0	0	100	160			
TVD :	385	PREP TO SPUD			Building slug pit with high vis for sweeps when spudding in.																		
8/20/2008	550	8.7	53	11	17	3	6	7.4							11.5	0.2	0.4	0.7	100	160			
TVD :	550	DRILLING			Drilling ahead at 550' with no major problems. About to TD surface section.																		
8/21/2008	607	8.5	55	12	24	3	6	7.4							11.0	0.2	0.3	0.8	100	160			
TVD :	607	DRILLING PLUG			TIH with coil tubing.																		
8/22/2008	1355	9.3	47	12	19	2	4	9.8							10.5	0.1	0.2	0.5	100	160			
TVD :	1355	DRILLING			Drilling ahead at 1,355' with no major problems. Dumping and diluting to maintain proper mud weight.																		
8/23/2008	2487	9.0	43	12	17	2	5	12.0							10.0	0	0	0	100	160			
TVD :	2487	DRILLING			Minor losses over night, mix LCM pills and cured losses. Fluid loss came up a some because of CO2.																		
8/24/2008	2487	9.1	41	10	12	2	4	9.4							11.0	0.1	0.3	0.6	100	160			
TVD :	2487	DRILLING			Drilling ahead at 2,487' with minor mechanical issues. Mud in good condition to TD well.																		
8/25/2008	2751	9.0	54	13	13	2	4	8.4							9.0	0	0	0	100	160			
TVD :	2751	TD			Rigging down.																		



**Miswaco**  
**Midland**  
**District**

**DRILLING FLUIDS SUMMARY**

**Operator :** OXY- PERMIAN  
**Well Name :** BDCDGU - 1830-241J  
**Contractor :** CAPSTAR  
**Field :** BRAVO DOME  
**Location :** SEC 241-18N-R230E  
**Sales Engr :** RANDALL KLOSE

**Casing Program**  
 Depth (ft)      O.D. (in)  
 700                8.625  
 2268              5.500

**Page :** 1  
**Report Date :** 10/10/2008  
**Spud Date :** 7/31/2008  
**Control No. :** 77950  
**Warehouse :** HOBBS NM  
**Dist Engr :** TODD PASSMORE

Mud Type : Water-Based																							
Date	Depth	Wt	FV	PV	YP	Gels		Filtration		Solids	Water	Oil	Sand	MBT	pH	Pm	Pf	Mf	Chlorides	Hardness	Ca	Cost	(\$)
mm/dd/yyyy	ft	lb/gal	s/qt	cP	lb/100ft <sup>2</sup>	10s	10m	API	HTHP	%	%	%	%	lb/bbl					mg/l			Daily	Cumulative
7/31/2008	0	8.3	26	1	1	1	1	n/c	n/a	0	100	0	0	n/a	8.7	n/a	n/a	n/a	100	160			
TVD :	0	Rigging up			Completed last well yesterday- rigging on new location today doing rig repairs/modification																		
8/1/2008	711	8.3	26	1	1	1	1	n/c	n/a	0	100	0	0	n/a	10	n/a	n/a	n/a	100				
TVD :	711	Circulating			Completed Drlg surface																		
8/2/2008	700	8.3	26	1	1	1	1	N/C	N/A	0	100	0	0	N/A	10	N/A	N/A	N/A	100	650			
TVD :	700	Prep to drill out			Tripped in hole, preparing to drill, beginning to mudup																		
8/3/2008	1300	9.1	48	8	14	3	3	8	n/a	3	97	0	tr	n/a	11	n/a	n/a	n/a	100	800			
TVD :	1300	Drilling			Loss Circulation@0300, rebuilt volume , minor losses continued thru the day																		
8/4/2008	1890	8.7	57	18	16	4	4	6	n/a	3	97	0	tr	n/a	11.0	n/a	n/a	n/a	100	830			
TVD :	1890	Drilling-tripped bit			drilled to 1890' tripped for bit,																		
8/5/2008	2268	9.4	56	16	19	3	3	10	N/A	3	97	0	TR	N/A	11	N/A	N/A	N/A	100	835			
TVD :	2268	Preparing to run csg			LOGGING COMPLETED- PREPARING TO RUN CSG																		



**MI Swaco**  
**Midland**  
**District**

**DRILLING FLUIDS SUMMARY**

**Operator :** OXY-PERMIAN  
**Well Name :** BDCDGU - 1831-301G  
**Contractor :** CAPSTAR  
**Field :** BRAVO DOME  
**Location :** N/4SW/4,SEC.30-T18N-R3  
**Sales Engr :** RANDALL KLOSE

**Casing Program**  
 Depth (ft)                      O.D. (in)  
    690                                      8.625  
    2286                                     5.500

**Page :** 1  
**Report Date :** 10/10/2008  
**Spud Date :** 8/7/2008  
**Control No. :** 78454  
**Warehouse :** HOBBS NM  
**Dist Engr :** TODD PASSMORE

Mud Type : Water-Based																							
Date	Depth	Wt	FV	PV	YP	Gels		Filtration		Solids	Water	Oil	Sand	MBT	pH	Pm	Pf	Mf	Chlorides	Hardness	Ca	Cost	(\$)
mm/dd/yyyy	ft	lb/gal	s/qt	cP	lb/100ft <sup>2</sup>	10s	10m	API	HTHP	%	%	%	%	lb/bbl					mg/l		Cost	Cumulative	
8/7/2008	0	8.3	26	1	1	1	1	N/C	N/A	0	100	0	TR	N/A	8	N/A	N/A	N/A	100	180			
TVD :	0	Rigging up to spud			RIGGING TO SPUD																		
8/8/2008	186	8.3	26	1	1	1	1	n/c	n/a	0	100	0	0	n/a	10	n/a	n/a	n/a	100	300			
TVD :	186	Waiting on parts			Waiting on Pump parts																		
8/9/2008	431	8.6	29	1	1	1	1	N/C	N/A	1	99	0	TR	N/A	10	N/A	N/A	N/A	100	360			
TVD :	431	Drilling surface			Began drilling @4PM after replacing pump																		
8/10/2008	705	8.3	26	1	1	1	1	n/a	n/a	0	100	0		0	10	n/a	n/a	n/a	100	360			
TVD :	705	Nipple up			Surface drilled , csg set@690'																		
8/11/2008	1017	8.9	47	12	11	6	6	14	n/a	3	97	0	t	n/a	10	n/a	n/a	n/a	100	650			
TVD :	1017	Drilling			Drlg ahead with no problems. Mudup completed.																		
8/12/2008	1465	8.8	59	13	27	13	15	11	n/a	3	97	0	tr	n/a	11	n/a	n/a	n/a	100	860			
TVD :	1465	Tripping			Drilled to 09:00 - lost slip die down hole																		
8/13/2008	2298	9.4	35	8	3	4	4	10cc	n/a	2	98	0	tr	b/a	11	n/a	n/a	n/a	100	875			
TVD :	2298	Circulating			Well at TD 2298' circulating prior to logging																		
8/14/2008	2286	9.3	59	8	3	2	3	10CC	N/A	3	97	0	TR	N/A	11	N/A	N/A	N/A	100	865			
TVD :	2286	WOC			Casing set and cemented. Prep to move rig.																		







**DRILLING FLUIDS SUMMARY**

**Operator :** Oxy Permian Drilling

**Field/Area :** Bravo Dome

**Well Name :** BDU\_1832-191G

**Description :** Sec 19, Lot # G

**Contractor :** Trinidad drilling

**Location :** Harding county, NM

Date		6/24/2011	6/25/2011	6/26/2011	6/26/2011	6/27/2011	6/28/2011
Depth/TVD	ft	0/0	796/796	1346/1346	1005/1005	2260/2260	2260/2260
Activity		Rig Move	Cementing	Drilling ahead	Drilling ahead	TOOH for logs	Rig Down
Mud Type		Fresh Water	Fresh Water	Fresh Water	Fresh Water	Fresh Water	Fresh Water
Hole Size	in	12.25	12.25	12.25	12.25	7.875	7.875
Circ Volume	bbbl	300	347	408	408	436	436
Flow Rate	gal/min	0	0	435	435	0	0
Circ Pressure	psi	0	0	750	750	0	0
Avg ROP	ft/hr	0	0	94	94	0	0
Sample From	In	In	In	In	In	In	
Flow Line Temp	°F	0	80	85	85	0	0
Mud Weight	lb/gal	8.4@65 °F	9.1@80 °F	8.5@80 °F	8.4@80 °F	9.0@80 °F	9.0@80 °F
Funnel Viscosity	s/qt	26	32	31	30	36	36
PV	cP	1	1	1	1	3	3
YP	lb/100ft <sup>2</sup>	4	7	8	8	16	16
R600/R300/R200		6/5/4	9/8/7	10/9/8	10/9/8	22/19/15	22/19/15
R100/R6/R3		3/2/1	6/5/4	7/6/5	7/6/5	12/7/5	12/7/5
10s/10m/30m Gel	lb/100ft <sup>2</sup>	1/1/1	1/1/1	2/3/3	2/2/2	5/6/9	5/6/9
API Fluid Loss	cc/30 min	45	45	45	45	4	4
HTHP Fluid Loss	cc/30 min	0	0	0	0	0	0
Cake API/HT	1/32"	0/0	0/0	0/0	0/0	1/0	1/0
Solids	% Vol	0	4	4	3	3	3
Oil/Water	% Vol	0/100	0/96	0/96	0/97	0/97	0/97
Sand	% Vol	0	0	0	0	0	0
MBT	lb/bbl	0	0	0	0	6.5	6.5
pH		8.5	9	9	9	9	9
Alkal Mud (Pm)		.01	.01	.01	.01	.01	.01
Pf/Mf		0.01/0.15	0.01/0.25	0.01/0.25	0.01/0.25	0.01/0.35	0.01/0.35
Chlorides	mg/l	800	1000	1200	1200	1200	1200
Hardness Ca		1000	120	160	160	160	160
Daily Mud Cost	USD						
Cuml Mud Cost	USD						
Sales Engineer		Mike Baker	Mike Baker	Mike Baker	Mike Baker	Mike Baker	Mike Baker
Products Used		ENG / 1. Camper / 1.	ENG / 1. Gel / 105. DRL PPR / 2. M200 / 4. MF55 / 1. POLYP / 2. SOAP / 60. Camper / 1. DD / 11.	ENG / 1. Gel / 35. DRL PPR / 7. MF55 / 2. POLYP / 1. SOAP / 60. Camper / 1.		ENG / 1. Gel / 30. DRL PPR / 16. FBR SL / 1. LIME / 4. MF55 / 2. POLYP / 2. Camper / 1. Dris / 10. DD / 7.	ENG / 1. Camper / 1.

**REMARKS**

6/24/2011: Currently rigging up. Total Hardness of drilling fluid is 1000 mg/l. Treat with 10 sacks of soda ash once before start  
 6/25/2011: We have drilled surface down to 796 ft and have pulled out of the hole to run 8 5/8 inch casing. We are currently cement  
 6/26/2011: Drilling ahead with no problems.  
 6/27/2011: Currently tripping out of hole for wireline logs as of 21:00 hrs. TD determined at 2260 ft unless otherwise notified.  
 6/28/2011:



## Appendices

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### Appendix 7 – Environmental Report



ENVIRONMENTAL CONSULTANTS

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Albuquerque, New Mexico 87109  
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## Environmental Desktop Review and Critical Issues Analysis

**To:** Veronica Rapp  
Oxy USA Inc.  
5 Greenway Plaza, Suite 110  
Houston, Texas 77046

**From:** Jenn Clayton and Sarah Griffin, SWCA Environmental Consultants

**Date:** June 25, 2018

**Re:** **Oxy's Bravo Dome Development Project**

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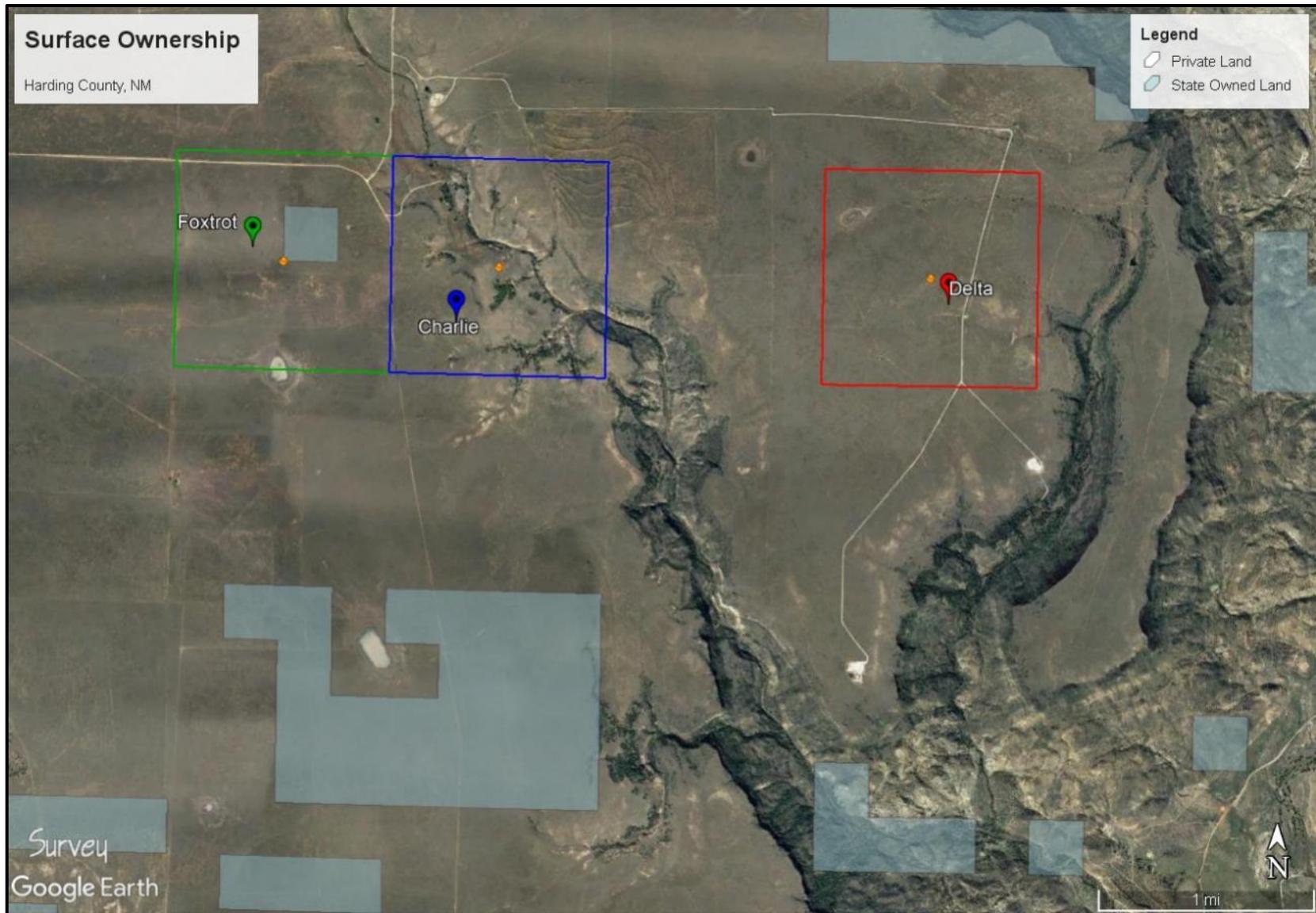
### INTRODUCTION

SWCA Environmental Consultants (SWCA) was retained by Oxy USA, Inc. (Oxy), to complete an environmental desktop review and critical issues analysis for potential impacts to protected natural resources for the Oxy Bravo Dome Development Project, a project focused on developing carbon dioxide (CO<sub>2</sub>) with a private land owner. Three potential project locations in Harding County, New Mexico, all residing on private land, were analyzed via this desktop review (Table 1 and Figure 1). SWCA understands that of the three potential project locations, Oxy would select a site to develop. Applicable Federal and State permitting processes were identified based on resource interaction and jurisdiction, described in (Table 2).

This brief report describes the results of the desktop review that was conducted of the proposed project areas in reference to the resource list and summarized results included in Tables 2 and 3.

**Table 1. Locations of Proposed Project Areas**

<b>Project Area Name:</b>	<b>Township</b>	<b>Range</b>	<b>Section</b>
<b>Location 1:</b> Foxtrot	21N	29E	15
<b>Location 2:</b> Charlie	21N	29E	14
<b>Location 3:</b> Delta	21N	30E	18



**Figure 1. Map of Surface Ownership of Proposed Development Areas**

Source: BLM CFO (BLM 2017a)

**Table 2. Permitting Matrix**

<b>Permit/Notification</b>	<b>Issuing Agency</b>	<b>Status</b>
<b>Federal Permit, Approval, or Clearance</b>		
Clearance under Section 7 of the ESA	USFWS	Once a project location is selected, a general biological survey would be conducted. Findings would be described in a biological survey report (BSR). Findings would determine the need for consultation with USFWS under Section 7. Based on desktop reviews it is expected that no formal consultation would be required.
Clean Water Act Section 404 Permitting Discharges of Dredge or Fill Material into Waters of the U.S. (including wetlands)	USACE	Once a project location is selected, a biological survey would be conducted to identify potential waters of the U.S. that could be impacted by the proposed project. If necessary, Nationwide Permit 12 and 14 could likely be applied.
Clean Water Act Section 402 General Construction (Stormwater) Permit	U.S. Environmental Protection Agency (EPA) and New Mexico Environmental Department	If necessary, the permit would be obtained prior to construction under the EPA's Construction General Permit.
Onshore Oil and Gas Operations	Department of Interior	If federal minerals are developed, compliance with the Onshore Orders would be necessary.
Clearance under Section 106 of the National Historic Preservation Act	USACE	Cultural resource would be investigated according to the USACE's requirements for any impacts to jurisdictional surface water features intersected by the proposed project. If necessary, a cultural resources report would be submitted to the USACE.
<b>State Permit, Approval, or Clearance</b>		
Clean Water Act Section 401 Water Quality Permit	New Mexico Environmental Department	Once a project location is selected, a biological survey would identify potential waters of the U.S. that could be impacted by the proposed project. If necessary, Nationwide Permit 12 and 14 could likely be applied.
Clean Air Act New Mexico Air Quality Control Act	New Mexico Environmental Department	The project would not likely be considered a new major source of emissions; therefore, a New Mexico Environmental Department new source permit is unlikely to be required.
Access permit or public highway utility accommodation permit	New Mexico Department of Transportation	Once a project location is selected, discussions with the New Mexico Department of Transportation regarding the location of the proposed project and access locations would occur.

**Table 3. Summary of Environmental Resource Analysis**

<b>Natural Resource</b>	<b>Summary of Analysis</b>
Water Resources	Several wetlands, streams and drainages are known to occur within the section boundaries of the proposed development areas and should be avoided during footprint development to the greatest extent possible.
Air Resources	The project is not a major new source of emissions and special permitting requirements are unlikely.
Karst Resources	Karst resources are not managed within the vicinity of this project.
Paleontological Resources	The proposed development areas intersect low to moderate rated areas of paleontological resources; therefore, paleontological surveys are unlikely needed.
Cultural Resources	Three recorded cultural sites intersect or are adjacent to the Charlie development area and should be avoided during project planning. In addition, SWCA recommends avoiding construction near the Alamosita Creek to avoid triggering cultural requirements with the USACE.
Soils	Mapped soils data is included, soils designated as farmland of statewide importance could be impacted.
Vegetation	Biological surveys would be required to determine vegetation communities.
Wildlife	Impacts to USFWS and State-listed species, as well as species protected under the Migratory Bird Treaty Act are discussed below. Biological surveys would be needed to determine the presence of these species within the proposed project area.
Special Designations	The proposed development areas do not intersect lands protected by special designations.
Grazing	No significant impact to grazing resources is thought to occur as a result of the proposed project.

## **Project Description**

Oxy is considering the above described development areas (3) to construct infrastructure to facilitate the production and transport to market of CO<sub>2</sub> resources in Harding Country, NM. Prior to the project site selection, Oxy is utilizing information derived from this environmental desktop review and analysis, with the possible addition of biological surveys, to inform this decision.

If the proposed project were to trigger a federal nexus, compliance under the National Environmental Policy Act would be required.

## **METHODS**

For the review and analysis of environmental concerns, U.S. Geological Survey (USGS) topographic maps were reviewed to determine the location and elevation of the proposed project area. Soil types were evaluated using the Natural Resources Conservation Service (NRCS) Web Soil Survey mapper (NRCS 2018a). Wetland and drainage data were also evaluated using National Hydrography Dataset (USGS 2018) and National Wetland Inventory maps (U.S. Fish and Wildlife Service [USFWS] 2018a), as well as geographic information system (GIS) data.

SWCA biologists reviewed the USFWS (2018b) Information for Planning and Consultation System, the New Mexico Department of Game and Fish (NMDGF) Biota Information System of New Mexico (BISON-M) for state-listed species (BISON-M 2018), the New Mexico Rare Plants website (New Mexico Rare Plant Technical Council 1999), and the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) state endangered plant species list (EMNRD 2018) for the proposed project area.

A biological survey consisting of a pedestrian survey of the proposed project area to assess general vegetation and habitat suitability for USFWS and state protected special status species would be required to determine actual presence/absence or potential to occur. SWCA would additionally survey for any sensitive habitats, such as wetlands, surface waters, playas, vegetated depressions, and potential jurisdictional waters of the U.S.

## **RESULTS**

### **General Characteristics**

The average elevation of the proposed project area is 5,418 feet above mean sea level (amsl). The climate for this area, based on the climatic records for Roy, New Mexico in Harding County, has an average annual maximum temperature of 66.2 degrees Fahrenheit (°F), with an average annual minimum temperature of 38.1°F. The average annual precipitation is 16.33 inches, with the majority occurring between May and September (U.S Climate Data 2018).

The proposed project area has been previously developed with roads, residential development, energy production facilities, and utility corridors. In addition, livestock grazing has and continues to occur within and adjacent to the proposed project area.

### **Water Resources**

As part of the desktop review, the proposed project area was evaluated using the National Hydrography Dataset (USGS 2018) and the National Wetland Inventory maps (U.S. Fish and Wildlife Service [USFWS] 2018a) for the potential presence of special aquatic sites and other waters described below. Final determination of the presence/absence of jurisdictional sites would require a biological survey and visual observation of the proposed project area.

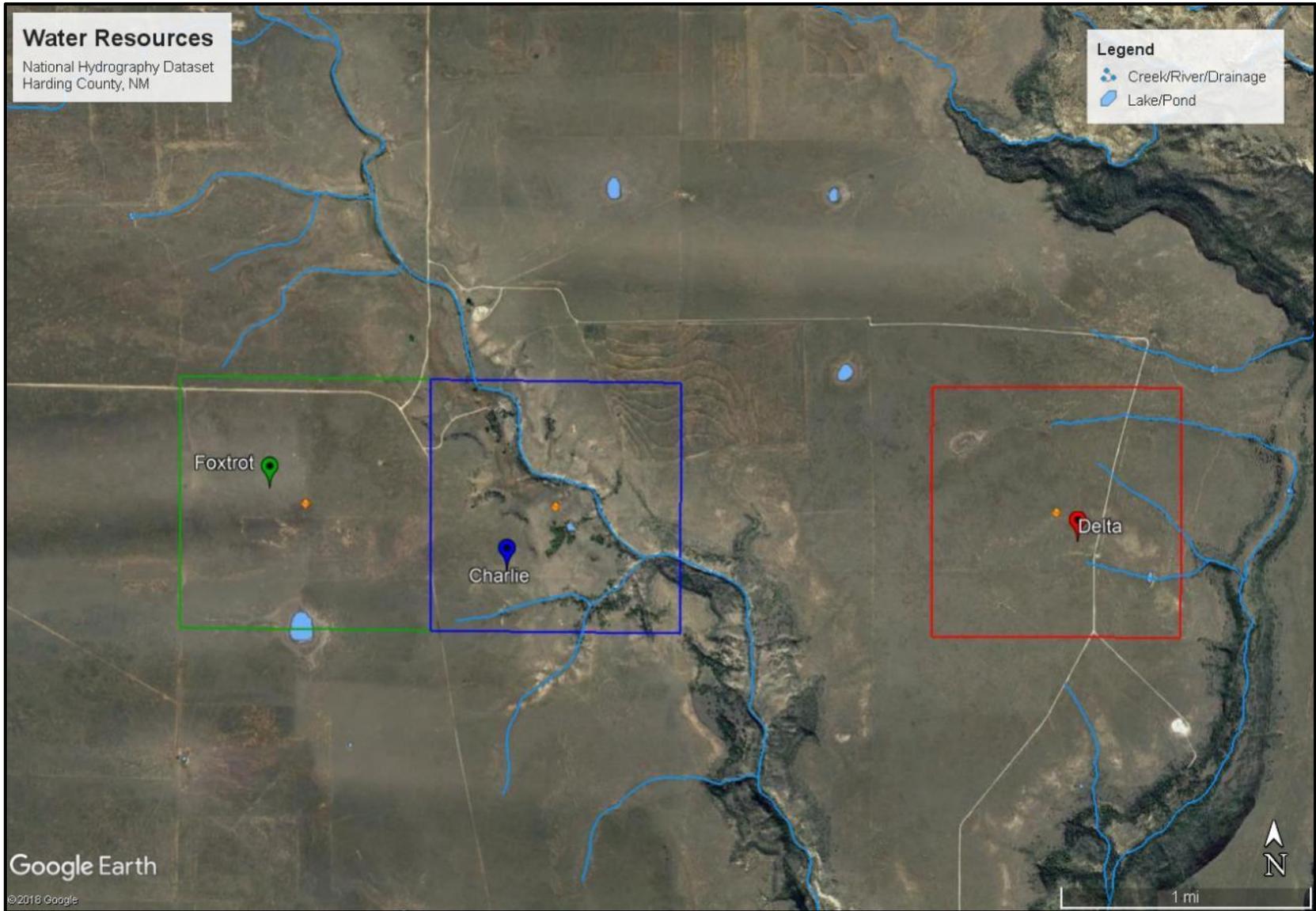
Wetlands are the most common type of special aquatic site and are defined by the U.S. Army Corps of Engineers (USACE) as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE 1987:9). According to the USACE in order for an area to be considered a wetland, it must contain the following three parameters under normal circumstances: 1) the presence of wetland hydrology showing regular inundation, 2) a predominance of hydrophytic (water-loving) vegetation, and 3) soils characteristic of frequent saturation (i.e., hydric soils). The presence or absence of a wetland would need to be identified in the field using routine on-site delineation methods outlined in the Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a).

The presence/absence of special aquatic sites other than wetlands (sanctuaries, refuges, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes) would need to be determined by visual observation with a biological survey of the proposed project area.

The presence/absence of lotic systems (e.g., creeks, rivers, arroyos, human-made ditches—collectively “streams”) would need to be identified in the field using the methods outlined in A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008b). An OHWM is a line on a shore or bank established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. The OHWM is a defining

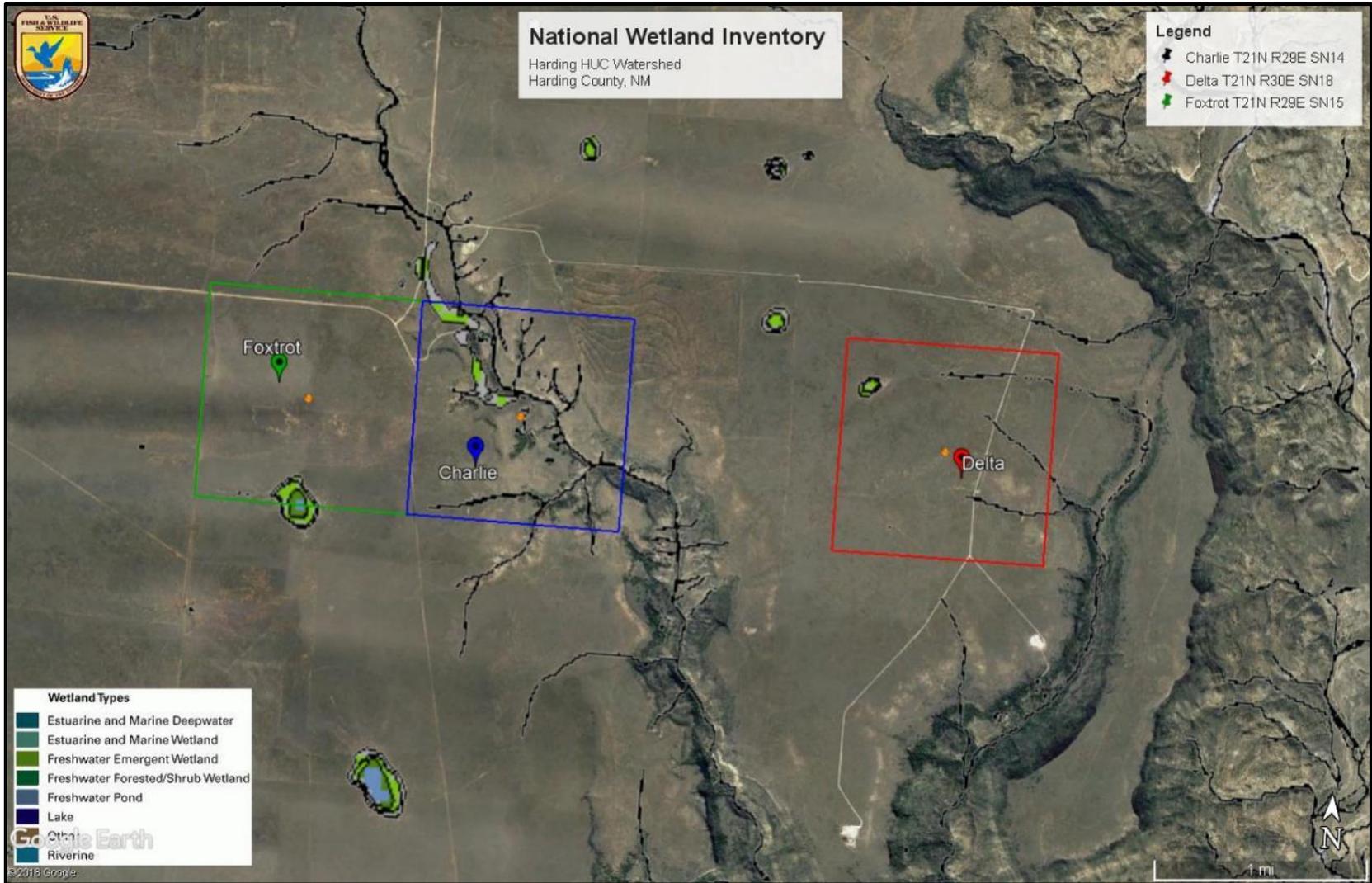
element for identifying the lateral limits of non-wetland waters. Federal jurisdiction over a non-wetland water of the U.S. typically extends to the OHWM.

The desktop review of the aforementioned datasets determined that the proposed development areas of Foxtrot, Charlie, and Delta contain lotic systems and identified wetland areas (see Figure 2 and 3 below). The proximity of infrastructure within the Charlie and Delta development areas to water resources is of greater concern than Foxtrot. The Alamosa Creek, a large drainage, intersects the Charlie development area (Figure 2).



**Figure 3. Map of Water Resources (NHD) within the Proposed Project Area**

Source: U.S. Geological survey 2013 (USGS 2013)



**Figure 4. Wetland delineations within the Proposed Development Areas.**

Source: United State Army Corps of Engineers (USACE 2008a.)

## Air Resources

As the project is not a major new emissions of greenhouse gas source emitter, it is unlikely that unique or special permitting would be required. However, if the proposed project triggers a federal nexus, impacts to air quality and climate would need analyzed.

## Karst

The proposed development area is within proximity to the BLM Taos Field Office (TFO) managed lands. The TFO does not manage for cave or karst resources, therefore SWCA has not provided any karst data.

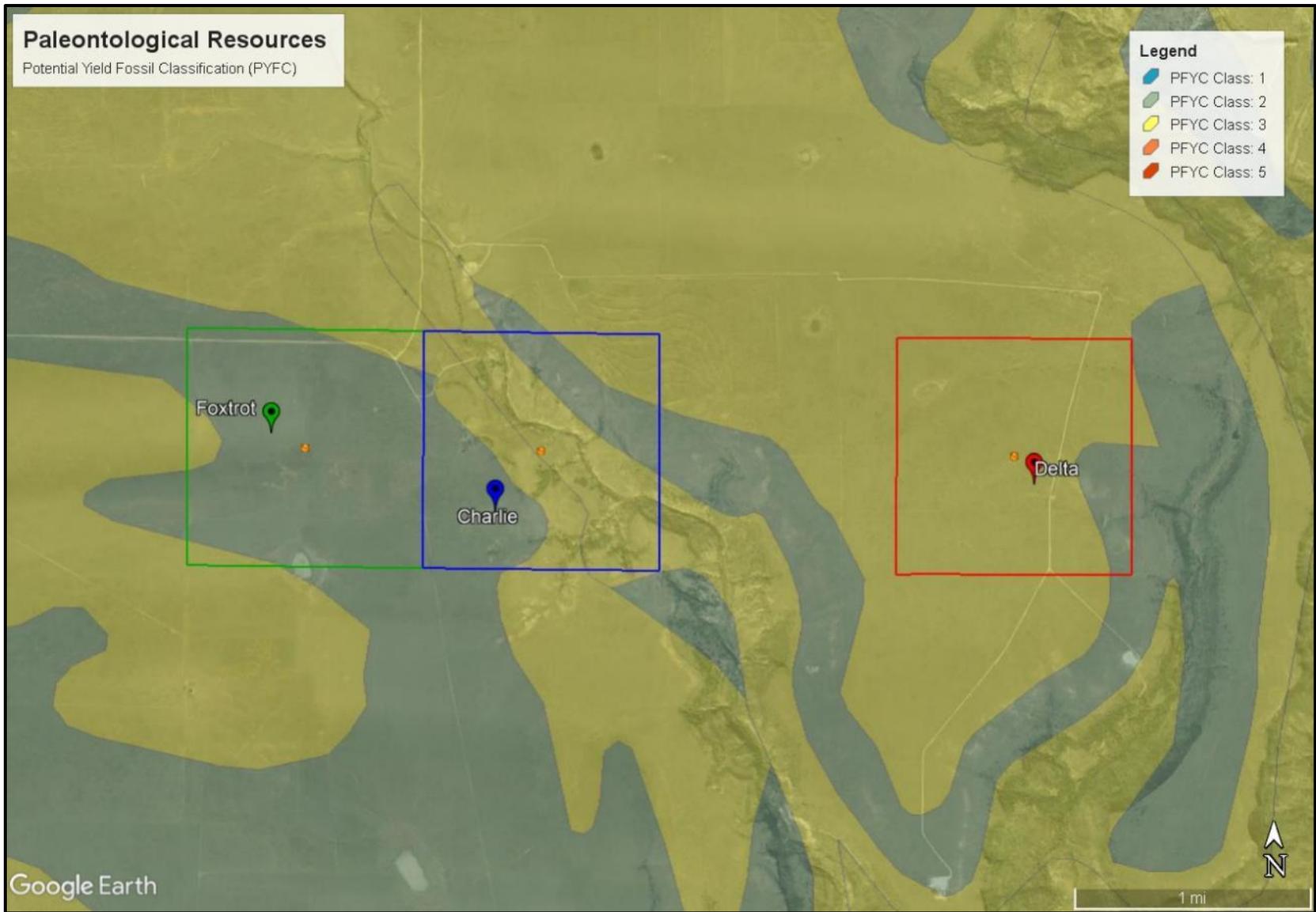
## Paleontological Resources

The proposed project occurs within areas designated as potential yield fossil classification (PYFC) 2, and PYFC 3. The PYFC system is used to identify criteria or use restrictions to ensure that areas likely to contain vertebrate or noteworthy invertebrate plant fossils are evaluated prior to surface disturbance. Cultural resource inventory surveys could identify exposed paleontological resources prior to surface disturbance. Table 4 outlines management concerns for each PFYC designation, and Figure 4 illustrates the PYFC near and within the project area (Table 4)(Figure 5). Given the low to moderate potential it is unlikely that paleontological surveys would be needed.

**Table 4. Management Concerns for PYFC Designations**

PFYC	Level of Concern	Management Concerns
1	Very low	Management concern for paleontological resources in PFYC 1 units is usually negligible or not applicable. Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.
2	Low	Management concern for paleontological resources is generally low. Assessment or mitigation is usually unnecessary except in rare or isolated circumstances. Ground-disturbing activities are not likely to require mitigation.
3a or 3b	Moderate or unknown	Management concern for paleontological resources is moderate or cannot be determined from existing data. Surface-disturbing activities may require field assessment to determine appropriate course of action. In areas where the fossil occurrence is "unknown," it is necessary to perform a field survey of the area. The survey recommendations can be used to change the PFYC ranking based on the results of the survey. A survey report is necessary to support the reclassification of a PFYC ranking.
4	High	Management concern for paleontological resources in PFYC 4 areas is high. A field survey by a qualified paleontologist is usually needed to assess local conditions. Mitigation often would be necessary before and/or during ground-disturbing actions. Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered.
5	Very high	Management concern for paleontological resources in PFYC 5 areas is high to very high. A field survey by a qualified paleontologist is usually necessary prior to surface-disturbing activities or land tenure adjustments, along with monitoring during ground-disturbing activities. Mitigation often would be necessary before and/or during such activities. Official designation of areas of avoidance, special interest, and concern may be appropriate.

Source: 2014 BLM New Mexico State Office unpublished Paleontological Dataset.

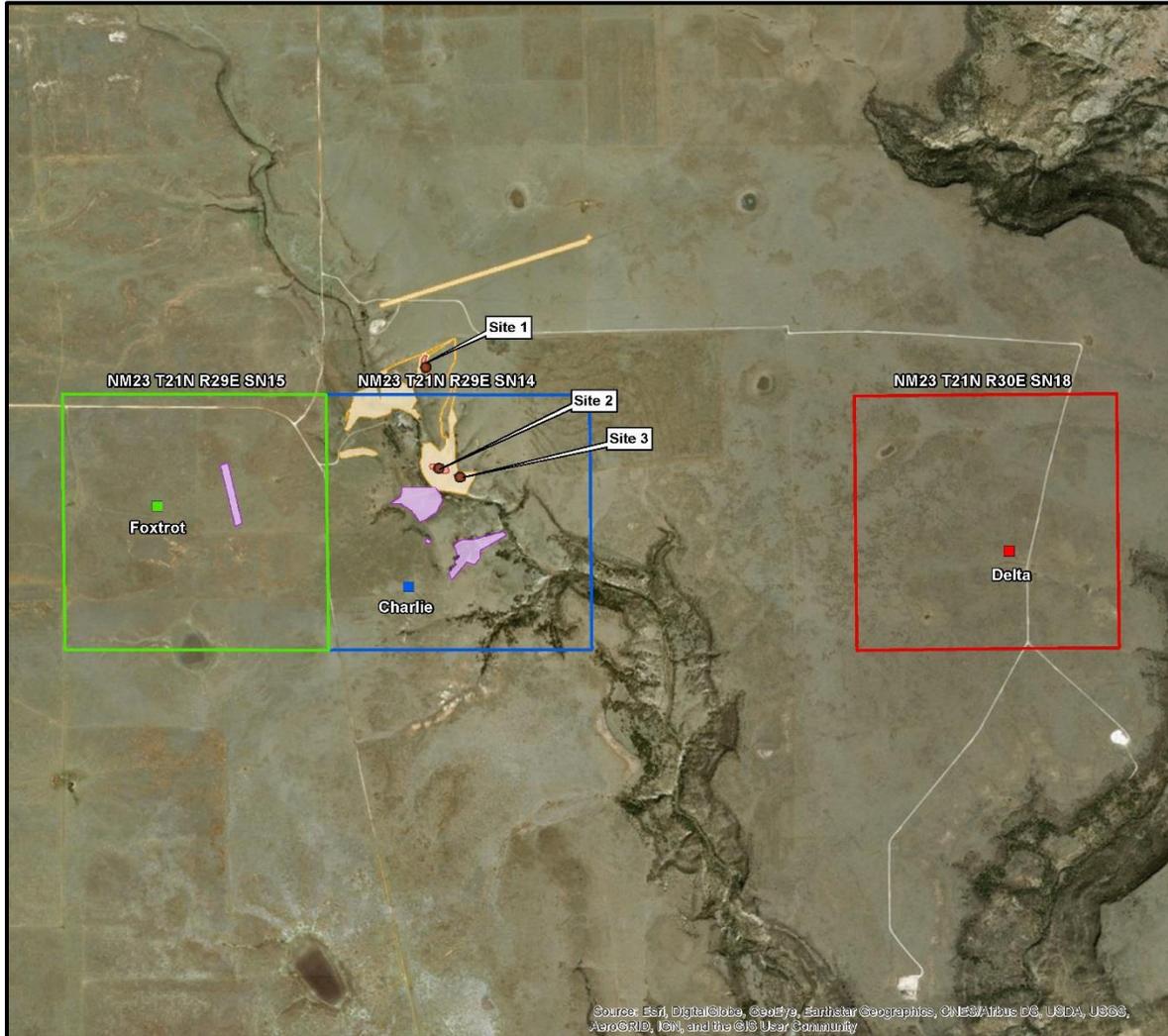


**Figure 5. Map of Potential Yield Fossil Classification of the Proposed Project Area**

Source: Bureau of Land Management (BLM 1998a, 1998b, 2008a, 2008b)

## **Cultural Resources**

A Class I cultural resources search of the New Mexico Cultural Resources Information System (NMCRIS) database was conducted for the proposed project area and three cultural sites (represented as red dots in Figure 6) were identified within or adjacent to the Charlie development area (Figure 6). In addition, the purple and tan polygons mapped on Figure 6 represent previous surveyed areas for cultural resources. The USACE is the lead agency for the undertaking. As a federally permitted action, the USACE must consider potential effects to historic properties prior to issuance of a permit under Section 106 of the National Historic Preservation Act. The USACE would determine whether these known archaeological resources are within the permit area and/or if these resources would be directly affected by the undertaking. If determined necessary, the USACE would add permit conditions to avoid or reduce effects on historic properties in accordance with 33 CFR 325.4. If the USACE concludes that permitting the activity would result in the irrevocable loss of important scientific, historical, or archaeological data, the USACE may require treatment to mitigate such loss to be included as permit conditions, in accordance with the Archaeological and Historic Preservation Act of 1974.



**Figure 6. Map of Cultural Resources within the Vicinity of the Proposed Project Area**

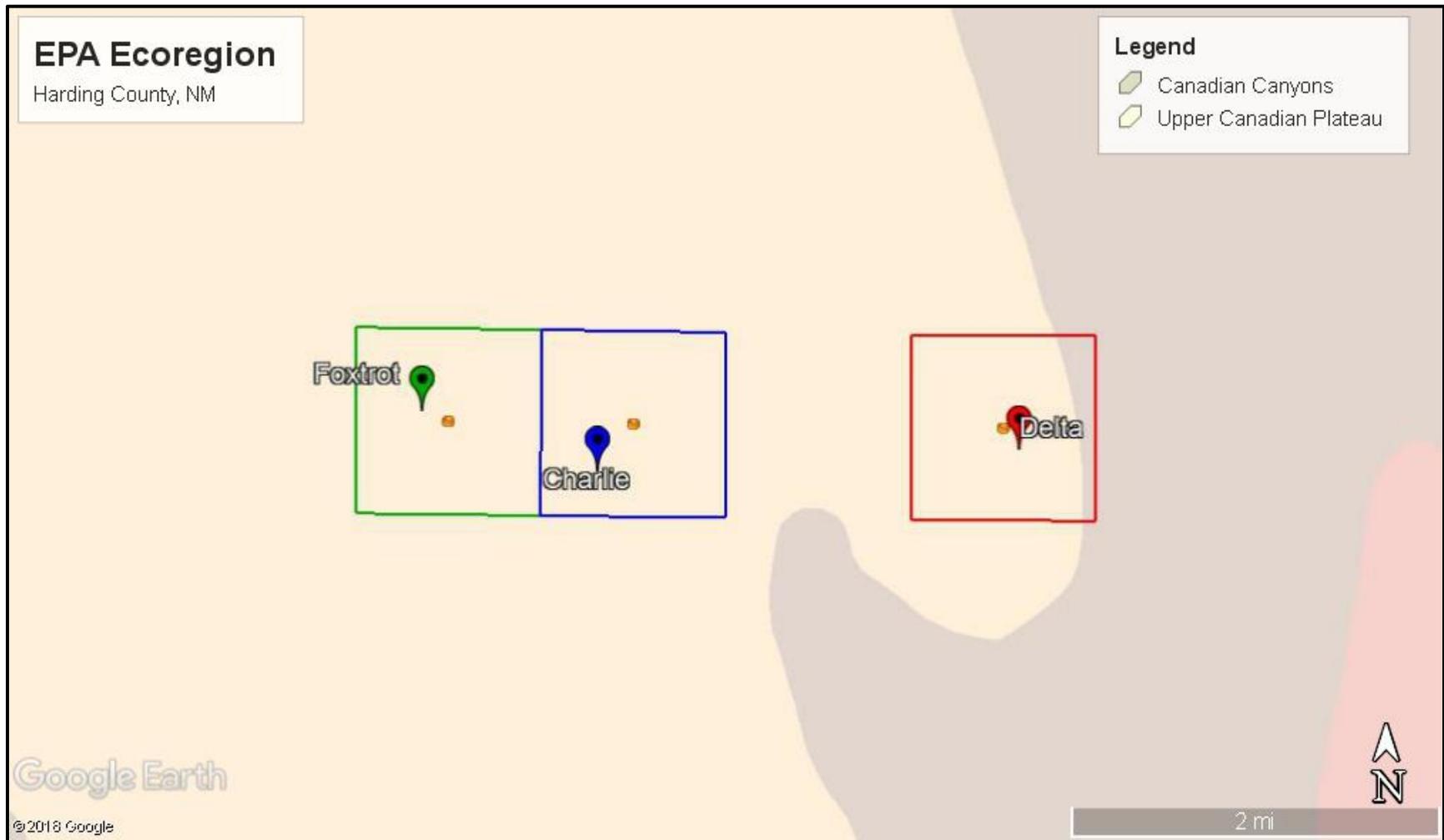
Source: NMCRIS 2018

## **Soils**

According to the Natural Resources Conservation Service (2018a), 23 mapped soil types are present with the proximity of the proposed project areas (Appendix A). All of the soil units within the proposed development area are considered well-drained or somewhat excessively-drained soils. The soil units are not hydric, although some are considered farmland of statewide importance (NRCS 2018). See Appendix A for map and table of soil units of the proposed project area and vicinity.

## **Vegetation**

The proposed project area is primarily located within the Southwestern Tablelands: Canadian Plateau with the eastern edge of the section containing project point Delta occurring within the Southwestern Tablelands: Canadian Canyon U.S. Environmental Protection Agency Level IV and III ecoregions (Griffith et al. 2006)(Plants 2018b.)(Figure 7). A biological survey of the proposed project areas would be required to determine vegetation communities.



**Figure 7. Ecoregion of the Proposed Project Area.**

(Griffith et al. 2006)

## **Wildlife**

A review the US Fish and Wildlife Service's (USFWS) resulted in no listed as endangered, threatened, or proposed have the potential to occur in Harding Country (USFWS 2018a). Eight species with protections under the Migratory Bird Treaty Act are described below (IPaC 2018a).

### ***Migratory Bird Treaty Act***

Most bird species are protected by the Migratory Bird Treaty Act (MBTA). The MBTA implements various treaties and conventions between the United States and other countries for the protection of migratory birds. Under the MBTA, unless permitted by regulations, it is unlawful to 1) pursue, hunt, take, capture, or kill; 2) attempt to take, capture or kill; and 3) possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. USFWS regulations broadly define "take" under the MBTA to mean "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." Under the MBTA, "take" does not include habitat loss or alteration.

After review utilizing the IPAC database it was determined that eight species protected under the MBTA with known range overlapping the proposed project area (Table 5) (IPaC 2018a). A biological survey would be required to determine species presence/absence and/or determine if the proposed project area contains species' required habitat.

### ***Bald and Golden Eagle Protection Act***

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the MBTA and the Bald and Golden Eagle Protection Act. Bald eagles are found typically in association with water and nest and breed from October to July throughout the state. Golden eagles nest primarily on rock ledges or cliffs and occasionally in large trees at elevations ranging from 4,000 to 10,000 feet amsl. Golden eagles are typically found in mountainous regions of open country, prairies, arctic and alpine tundra, open wooded areas, and barren areas. Both bald and golden eagles are carnivores. Bald eagles prey on fish but also on mammals, especially prairie dogs (*Cynomys* sp.). Golden eagles feed mainly on small mammals, as well as invertebrates, carrion, and other wildlife (BISON-M 2018; Stahlecker and Walker 2010).

Bald eagles could occur in the proposed project area due to the presences of water resources. Golden eagles could also occur in the proposed project area, especially outside the breeding season when they can perch on utility poles far from cliffs and other rugged terrain.

### ***Special Status Species***

The special status species evaluated in this desktop review consist of 1) federally protected (endangered and threatened) species, 2) additional species listed by the USFWS as candidate and proposed species (USFWS 2018b), and ); 3) state-listed endangered and threatened species (BISON-M 2018).

There is no USFWS critical habitat within or adjacent to the proposed project area (USFWS 2018b, 2018c).

**Table 5. List of Migratory, USFWS and State-listed Species with the Potential to Occur in the Proposed Project Area**

Common Name (Species Name)	Status	Range or Habitat Requirements
<b>Birds</b>		
Baird's sparrow ( <i>Ammodramus bairdii</i> )	NM T	This species is a winter resident in New Mexico. It has been found on Otero Mesa and in the Animas Valley and may occur in other areas of suitable winter habitat, particularly in the southeast portion of state. Generally prefers dense, extensive grasslands with few shrubs. Avoids heavily grazed areas.
Bald Eagle ( <i>Haliaeetus leucocephalus alascanus</i> )	NM T	Occurs in New Mexico year-round. Breeding is restricted to a few areas mainly in the northern part of the state along or near lakes. In migration and during winter months the species is found chiefly along or near rivers and streams and in grasslands associated with large prairie dog colonies. Typically perches in trees.
Cassin's Sparrow ( <i>Aimophila cassinii</i> )	BCC-BCR	North American migratory species, primarily present in the eastern half of New Mexico during breeding season (May-August). Found in ecotypes ranging from desert grassland to desert shrubland with high brush composition. Nest sites are found from ground level up to 12" within brush or low shrubs.
Chesnut-collard Longspur ( <i>Calcarius ornatus</i> )	BCC-CON	Migratory species, with migratory and wintering habitat occurring in eastern New Mexico. Found in grasslands and open shrubland determined by seed diet availability from grasses and weeds.
Burrowing owl ( <i>Athene cunicularia hypugaea</i> )	BCC-BCR	Present mainly during the breeding season in the northern half of the state and present year-round in the southern half. Found in grasslands, especially in association with prairie dog ( <i>Cynomys</i> sp.) colonies, in desert scrub, and in agricultural and semi-urban environments. Depends on prairie dogs, rock squirrels ( <i>Otospermophilus variegatus</i> ), and other fossorial mammals for the availability of nest burrows.
Golden Eagle ( <i>Aquila chrysaetos</i> )	BCC-BCR	Habitat is widespread throughout central and western North America, with the species commonly occurring in New Mexico year-round. Nesting sites occur primarily on rock ledges, cliffs, or occasionally in large trees at elevations from 4,000 to 10,000 feet amsl. Annual habitat range type exists within mountainous regions, prairies, arctic and alpine tundra, as well as wooden and barren areas.
Lark Bunting ( <i>Calamospiza melanocorys</i> )	BCC-BCR	Migratory species, present in northeastern New Mexico during migration and breeding season (April to September). Habitat ranges from grasslands to open shrubland. Nest sites occur on the ground within grassy areas.
Long-billed Curlew ( <i>Numenius americanus</i> )	BCC-CON	Present in Northeastern New Mexico during the breeding season (April-July). Found in high plains and rangeland habitat, as well as marshes. Breeding season habitat consists of sagebrush prairie or dry grasslands, often in proximity to water sources. Nesting sites include pastures and less often agricultural fields.
Mccown's Longspur ( <i>Calcarius mccownii</i> )	BCC-CON	Migratory species occurring in eastern New Mexico primarily during the winter months. Winter habitat preference consists of shortgrass prairies and dry fields, dependent on seed diet availability from grasses, shrubs and weeds.
Peregrine Falcon ( <i>Falco peregrinus</i> ; <i>F. p. tundrius</i> )	NM T	Found in New Mexico year-round. All nests in New Mexico are found on cliffs. In migration and during winter months New Mexico's peregrine falcons are typically associated with water and large wetlands.
Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	USFWS E NM E	In New Mexico, this species is known to breed only along the Gila River and Rio Grande. Associated with moist riparian areas throughout the year. Breeding habitat requirements vary by region. In migration, may be associated with willows ( <i>Salix</i> sp.) along ditches, cottonwood ( <i>Populus</i> sp.) woodlands, and saltcedar ( <i>Tamarix</i> sp.) stands.
Willow Flycatcher ( <i>Empidonax traillii</i> )	BCC-BCR	Migratory species with potential to occur within northeastern New Mexico during annual migration. Habitat primarily consists of vegetation adjacent to water sources such as riparian corridors or marshes.

Common Name (Species Name)	Status	Range or Habitat Requirements
<b>Reptiles</b>		
Arid land ribbonsnake ( <i>Thamnophis proximus diabolicus</i> )	NM T	The arid land ribbonsnake is found throughout New Mexico and is highly adaptable in terms of climatic regimes. This snake is found primarily around water sources such as rivers, ponds, and stock tanks. This species proximate vegetation includes willows, cattails ( <i>Typha</i> spp.), and bulrushes ( <i>Scripus</i> spp.). This snake feeds primarily on small frogs.
<b>Fish</b>		
Suckermouth Minnow ( <i>Phenacobius mirabilis</i> )	NM T	This species can be found in northwest New Mexico within creeks and small to medium rivers. This species is tolerant of moderate turbidity.
<b>Invertebrates</b>		
Paper Pondshell ( <i>Utterbackia imbecillis</i> )	NM E	This species is strictly aquatic bivalves that inhabit mud, sand, and gravel substrates of lakes and rivers. This species can be found inbedded in substrates or at the surface of substrates, depending on the turbidity of the water.

Federal (USFWS) Status: E = Endangered; New Mexico State Status NM E = Endangered, NM T = Threatened; MTBA Bird of Conservation Concern (BCC) Protection Status: BCR= Bird Conservation Regions, CON= Range wide Conservation

Sources: Sources: Except where otherwise noted, range or habitat information for wildlife species is taken from the Biota Information System of New Mexico (2018), USFWS Information for Planning and Consultation (USFWS 2018), NatureServe (2018), and Cartron (2010).

## **Special Designations**

The proposed development areas are located entirely within private land boundaries; thus the project(s) would not cross any special designation areas including wilderness, wilderness study areas, national conservation areas, areas of critical environmental concern, special management areas or areas managed for recreation.

## **Grazing**

During the staking of the proposed project, range improvements such as corrals, water troughs, and other integral range features should be avoided. The use of the proposed private land for grazing purposes is unknown.

## **CONCLUSION OF SIGNIFICANT FINDINGS**

### **Water Resources**

A biological survey would be required to identify potentially jurisdictional surface water features within the boundaries of the proposed development areas. Several NHD lines, including the Alamocita Creek, and NWI wetlands are known to occur within the development areas and it is recommended that these be avoided during the development of final project footprint.

If potentially jurisdictional surface water features cannot be avoided during project planning, SWCA would need to investigate the amount of impacts with potential to occur to determine if the project falls within the parameters of the Nationwide Permit program or if further consultation with the USACE would be needed.

### **Cultural Resources**

Three cultural sites are within or adjacent to the Charlie development area (Figure 6). In addition, previous cultural resources surveys have been conducted within the Charlie and Foxtrot development areas (Figure 6 [purple and tan polygons]). As the lead agency for the undertaking, the USACE would determine if a Class III cultural resources inventory would be required for the permit area pursuant to 33 CFR Appendix C – Procedures for the Protection of Historic Properties (USACE 2011).

### **Special Status Species**

A fish species, an invertebrate species, and a reptile species were identified with potential to occur in the proposed project areas (BISON-M 2018). If necessary, mitigation measures could be developed to avoid impacts to water resources near the potential development areas.

Eight migratory bird species were identified with potential to occur within the area of the proposed project (BISON-M 2018 and USFWS 2018). In general, no major or long-term effects on migratory birds are anticipated from the implementation of the proposed project. Incidental mortality or displacement of migratory bird species is possible on a local scale due to construction disturbance. However, many birds occurring locally would move into adjacent habitats in response to habitat loss. Adult migratory birds would not likely be directly harmed by the proposed project because of their mobility and ability to avoid areas of human activity.

If feasible, vegetation removal associated with the proposed project should occur outside the migratory bird breeding season (March 1–August 31). Any vegetation removal during the breeding bird season

could be preceded by pre-construction nesting surveys up to 2 weeks prior to vegetation removal to identify any occupied nests and establish avoidance buffers until the young have fledged.

Additionally, because of the abundance of similar habitat in the surrounding area, the impact to the bird populations that would utilize that habitat type within the proposed project area would be low.

### **Bald and Golden Eagle Protection Act**

Activities in the proposed development areas are not expected to directly impact bald or golden eagles. However, the biological survey would help determine if the proposed project area could directly impact bald or golden eagle nesting or foraging habitat, including the present and absence of trees, water resources, and preferred prey. The proposed project is not anticipated to cause take of individual bald or golden eagles, their nests, or eggs because mitigation measures, including avoidance, could be applied. Adult eagles would not likely be directly harmed by the proposed project because of their mobility and ability to avoid areas of human activity.

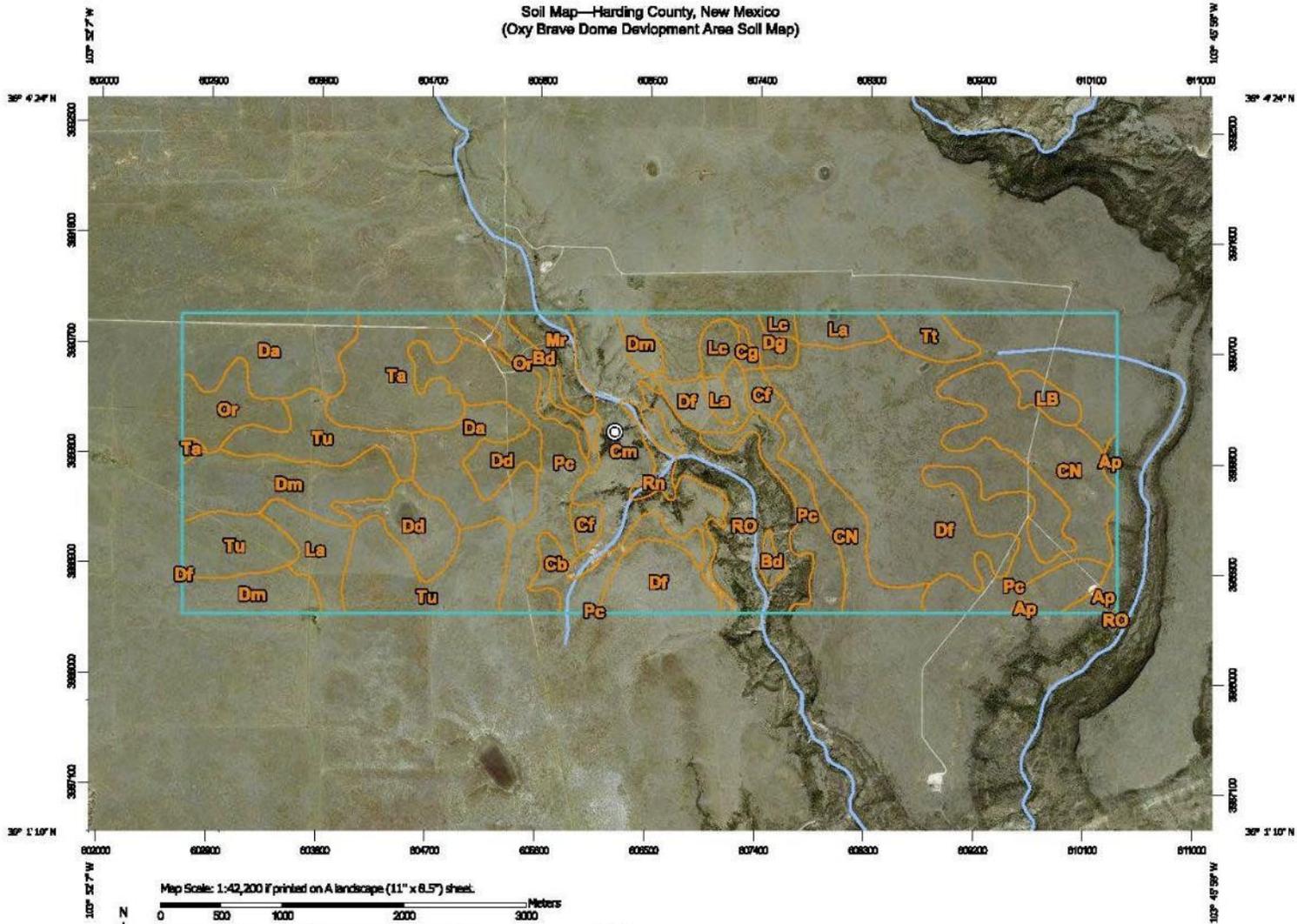
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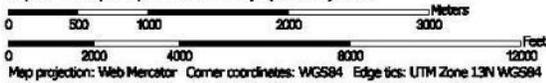
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## **APPENDIX A: SOIL MAP**

Soil Map—Harding County, New Mexico  
(Oxy Brave Dome Development Area Soil Map)



Map Scale: 1:42,200 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

USDA  
Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

6/19/2018  
Page 1 of 3

Soil Map—Harding County, New Mexico  
(Oxy Brave Dome Development Area Soil Map)

**MAP LEGEND**

<b>Area of Interest (AOI)</b>		 Spot Area
 Area of Interest (AOI)		 Stony Spot
<b>Soils</b>		 Very Stony Spot
 Soil Map Unit Polygons		 Wet Spot
 Soil Map Unit Lines		 Other
 Soil Map Unit Points		 Special Line Features
<b>Special Point Features</b>		<b>Water Features</b>
 Blowout		 Streams and Canals
 Borrow Pit		<b>Transportation</b>
 Clay Spot		 Ralls
 Closed Depression		 Interstate Highways
 Gravel Pit		 US Routes
 Gravelly Spot		 Major Roads
 Landfill		 Local Roads
 Lava Flow		<b>Background</b>
 Marsh or swamp		 Aerial Photography
 Mine or Quarry		
 Miscellaneous Water		
 Perennial Water		
 Rock Outcrop		
 Saline Spot		
 Sandy Spot		
 Severely Eroded Spot		
 Sinkhole		
 Slide or Slip		
 Sodic Spot		

**MAP INFORMATION**

The soil surveys that comprise your AOI were mapped at 1:31,700.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Harding County, New Mexico  
Survey Area Data: Version 15, Sep 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2010—Oct 26, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ap	Apache stony loam, 1 to 9 percent slopes	40.1	0.9%
Bd	Berthoud loam	57.5	1.2%
Cb	Campus loam, 0 to 3 percent slopes	86.5	1.9%
Cf	Campus loam, 3 to 9 percent slopes	42.9	0.9%
Cg	Campus loam, 3 to 9 percent slopes, eroded	11.2	0.2%
Cm	Campus gravelly loam, 1 to 25 percent slopes	280.8	6.0%
CN	Campus-Dean association, gently sloping	431.8	9.3%
Da	Dalhart fine sandy loam	359.5	7.7%
Dd	Dean soils, 0 to 9 percent slopes	144.6	3.1%
Df	Dioxice loam, 0 to 3 percent slopes	1,001.2	21.5%
Dg	Dioxice loam, 0 to 3 percent slopes, eroded	84.8	1.8%
Dm	Dumas loam, 0 to 3 percent slopes	302.4	6.5%
La	La Brier loam	143.9	3.1%
LB	La Brier loam	34.6	0.7%
Lc	La Brier loam, eroded	42.8	0.9%
Mr	Manzano loam, wet variant	58.7	1.3%
Or	Otero loamy fine sand, 1 to 9 percent slopes	137.3	2.9%
Pc	Pastura loam	449.3	9.6%
Rn	Rough broken and stony land	29.5	0.6%
RO	Rough broken and Stony land	242.4	5.2%
Ta	Tapia complex	205.9	4.4%
Tt	Tricon loam	53.1	1.1%
Tu	Tricon complex	417.8	9.0%
<b>Totals for Area of Interest</b>		<b>4,658.7</b>	<b>100.0%</b>

**From:** Allen, Dylan L  
**To:** [Jones, William V, EMNRD](#); [Lowe, Leonard, EMNRD](#)  
**Cc:** [Giussani, Alberto P](#)  
**Subject:** Oxy - C-144 Permit Package - BDCDU T21N R30E #181J  
**Date:** Friday, June 29, 2018 8:57:39 AM  
**Attachments:** [Bravo Dome - C-144 - 181J.PDF](#)

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Mr. Lowe and Mr. Jones,

In accordance with NMAC 19.15.17, Oxy USA Inc. requests the approval of the attached C-144 Permit Package. This low chloride temporary pit will service the Bravo Dome Carbon Dioxide Gas Unit #181 (soon to be submitted). This pit will be located in Harding County – T21N R30E – Section 18 – U/L: J (36.046893, -103.785035). Oxy requests approval of on-site trench burial described in the C-144 permit package.

Oxy is in the process of performing a site specific boring to confirm groundwater depth – once the report is completed, I will send a copy for NMOCD review. As discussed, construction of the pit is scheduled for mid-July. As this is a tight schedule – please let me know how I can help expedite the approval process. I appreciate the guidance on this permit package – if there are any questions or additional information is needed, please reply to this email.

A copy of the C-147 will be submitted to the land owner (Miller Feed Yard Inc.).

Thanks,

Dylan Allen  
Environmental Specialist  
Oxy USA, Inc.  
O: 432-685-5614  
C: 432-312-4530

**From:** [Lowe, Leonard, EMNRD](#)  
**To:** "[Albert\\_Giussani@oxy.com](mailto:Albert_Giussani@oxy.com)"  
**Cc:** [Dylan\\_Allen@oxy.com](mailto:Dylan_Allen@oxy.com); [Jones, William V, EMNRD](#); [Brent Falkenbury@oxy.com](mailto:Brent_Falkenbury@oxy.com); [Bayliss, Randolph, EMNRD](#)  
**Subject:** C-144 Approved for BDCD GU Well No. 181  
**Date:** Friday, July 20, 2018 1:23:00 PM  
**Attachments:** [APPROVED C-144 OXY Well. No. 181.pdf](#)  
**Importance:** High

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The OCD has reviewed and approved the C-144 for the temporary pit and deep trench burial for the Bravo Dome Carbon Dioxide Gas Unit Well No. 181.

OXY USA INC shall adhere to all applicable rules and regulations NMAC 19.15.17.9. pertaining to their drilling pit and deep trench.

The approved C-144 in its entirety will be located on the Wells Imaging page, under Well API number.

<https://wwwapps.emnrd.state.nm.us/OCD/OCDPermitting/Data/Wells.aspx>

**Leonard Lowe**

Engineering Bureau

**Oil Conservation Division**

**Energy Minerals and Natural Resources Department**

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