

July 2015

**C-144 Permit Package for  
Cypress 34 Federal 10H  
Solids Burial Trench  
Sec 34 T23S R29E, Eddy Co.**



*View north toward potash tailings pond/playa lake. The solids disposal pit will lie north of the cellar shown in this image.*

**Prepared for:  
Oxy USA  
Houston, Texas**

**Prepared by:**

**R.T. Hicks Consultants, Ltd.  
901 Rio Grande NW  
F-142  
Albuquerque, New Mexico**

# R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745  
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

July 14, 2015

Ms. Heather Patterson  
Mr. Mike Bratcher  
NMOCD District 2  
811 S. First Street  
Artesia, New Mexico 88210  
Via E-mail and US Mail

RE: C-144 for Oxy USA Cypress 34 Federal 10H Burial Trench  
SHL Sec 34 T23S R29E,

Dear Ms. Patterson and Mr. Bratcher:

On behalf of Oxy USA, Inc., R.T. Hicks Consultants, Ltd. is pleased to submit the attached permit for a burial trench. Please note the following in the C-144 Package

1. The hydrogeologic data are quite good for the area; the location meets the setback distance to groundwater. Evidence shows that the shallow groundwater unit has a TDS concentration in excess of 10,000 mg/L.
2. My personal site inspection showed no signs of unstable ground within this medium cave/karst potential area.
3. With respect to nearby watercourses, the trench meets the setback criteria.
4. The burial trench generic plans are *almost* verbatim from previously-approved C-144 drilling pit permits. Note that
  - a. the design construction plan is very similar to a pit plan because we propose essentially the same protocols as we employ for temporary pits.
  - b. The Rule does not provide for an O&M Plan for a burial trench. We have provided an O&M plan in the event that OCD approves the variance request for limited discharge of fluids into the trench.
  - c. The closure plan meets the mandates of the Rule for a burial trench
5. This letter and application are copied to the surface owner (BLM) as notification of the intent to bury drilling solids on-site.
6. In order to maintain the drilling schedule, Oxy would like to begin construction of the trench next week or earlier.

Not described in the attached O&M plan are these protocols which may occur:

1. Solids from the shaker and centrifuge will fall into a 3-sided steel bin – as will excess grout/cement from circulation to surface during casing.
2. A backhoe, forklift or other equipment will remove and transport the solids to the trench. The backhoe will shift the solids discharge to avoid mounding of solids.
3. The trench will be lined with 30-mil LLDPE rather than the minimum 20-mil LLDPE required by the Rule in order to provide additional protection.

The purpose of the attached variance request is to address possible mounding of solids beneath the areas where the backhoe places solids. We propose to introduce water into the trench to cause distribution of solids and flow toward the low end of the trench. Introduction of fluid would mainly occur when the steel mud pits are emptied to change

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out drilling mud (e.g. from fresh water to brine). As outlined in the variance request and O&M plan, standing water will not remain in the trench for more than 72 hours.

Appendix B is an example set of Conditions of Approval recently provided to an operator by BLM as well as the Sundry Notice to BLM regarding the use of a pit at this well.

Please let me know if you have any questions or concerns.

Sincerely,  
R.T. Hicks Consultants

A handwritten signature in black ink, appearing to read "Randall H", written in a cursive style.

Randall Hicks

Copy: Oxy USA  
BLM Carlsbad (surface owner)

## Statement Explaining Why the Applicant Seeks a Variance

The prescriptive mandates of the Rule that are the subject of this variance request are the following:

(4) When closing a temporary pit the operator shall stabilize or solidify the remaining temporary pit contents to a capacity sufficient to support the final cover of the temporary pit. When transferring the waste contents from a drying pad and tank associated with a closed-loop system into a temporary pit or burial trench, the operator shall stabilize or solidify the waste contents to a capacity sufficient to support the final cover of the temporary pit or burial trench. The operator shall not mix the contents with soil or other material at a mixing ratio of greater than 3:1, soil or other material to contents. **The waste mixture must pass the paint filter liquids test (EPA SW-846, Method 9095 or other test methods approved by the division).**

Although the text can be read in a number of ways, we believe the intent of the Rule was to preclude storage of fluids in burial trenches. Oxy requests very limited introduction of fluids into the trench for the following reasons:

1. Periodic discharge of fluids into the trench will distribute the solids toward the deepest end of the trench. The distribution of solids using a liquid medium places less stress on the liner than moving the solids with a backhoe or other mechanical (steel) device.
2. Discharge of drilling mud from the steel pits into the trench promotes recycling of fluid. By allowing discharged fluids to settle for 24-48 hours, the clarified drilling muds can be more effectively recycled.
3. There is insufficient room on the existing location to construct a drying pad. Thus it is possible that the solids will not pass the paint filter test when initially placed in the trench.

## Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The alternatives to granting this variance are:

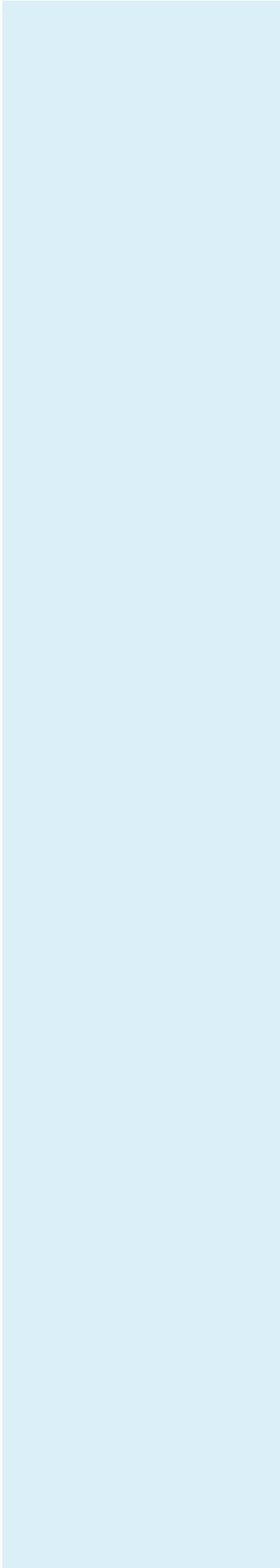
- Haul-off of the solids and liquids from the closed loop system to R360 or
- Extraordinary care in handling and drying the solids before transfer to the trench

There are two principal reasons that the Rule precludes discharge into a burial trench of solids that do not meet the paint filter test or fluids. The first reason is the setback to fresh groundwater is 25 feet. Thus, with only 25 feet between the bottom of a burial trench and fresh groundwater the restriction of placing fluids in a burial trench are justified. At this location, the depth to fresh water (if any exists) is at least 120 feet. OCD does allow storage of high chloride fluids in pits if the distance to groundwater is greater than 50 feet. Thus, from a groundwater protection standpoint, allowing introduction of fluids into the burial trench provides equal protection.

The second reason for the restriction on fluids in a burial pit is the setback distance to a significant watercourse is 200 feet for in-place closure or trench closure rather than a setback distance of 300 feet, as is the case for a drilling pit that holds high chloride fluid with a 2-foot freeboard. As described in the O&M plan for the burial trench:

1. **The trench will not store liquids for more than 72 hours.** Liquids may be discharged into the trench from the above-ground steel pits from time to time. This discharge can occur when the mud system changes from fresh water to brine and from brine to the mud system(s) proposed for below the salt.
2. During this 72 hour period, **fluid level in the pit will be 4 feet below the top of the liner** (3 feet below the elevation of the location).
3. Much of the material removed during excavation of the pit will be used to **build a 1-2 foot high berm around the north and east edges of the location.** The purpose of this berm is to direct surface runoff from the location to the southeast portion of the location and away from the nearest drainages/gullies north of the pit.

We believe these measures in addition to any recycling of fluids provide better protection of the environment as compared to hauling the waste solids and liquids to R360.



# **C-144 and Site Specific Information for Temporary Pit**

**R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142  
Albuquerque, NM 87104

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 June 6, 2013

**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 #: 160696  
Address: PO B o x 50250 Midland, TX 79710,  
Facility or well name: Cypress 34 Federal 10H  
API Number: 30-015-43076 OCD Permit Number: \_\_\_\_\_  
U/L or Qtr/Qtr \_\_\_\_\_ Section 34 Township 23S Range 29E County: Eddy  
Center of Proposed Design: Latitude 32.2678920 Longitude -103.9796248 NAD:  1927  1983  
Surface Owner:  Federal  State  Private  Tribal Trust or Indian Allotment

2.  
 **Pit- Trench:** Subsection K and/or F, G or J of 19.15.17.11 NMAC  
Temporary:  Drilling  Workover **XX Trench**  
 Permanent  Emergency  Cavitation  P&A  Multi-Well Fluid Management Low Chloride Drilling Fluid  yes  no  
 Lined  Unlined Liner type: Thickness 30 mil  LLDPE  HDPE  PVC  Other \_\_\_\_\_  
 String-Reinforced  
Liner Seams:  Welded  Factory  Other \_\_\_\_\_ Volume 6990 barrels Dimensions: L 150 x 45 x D 10 feet

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.*

**General siting**

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

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

- Yes  No
- NA

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

NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells **See Figures 1 & 2**

- Yes  No
- NA

Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. **(Does not apply to below grade tanks) See Figure 5**

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

- Yes  No

Within the area overlying a subsurface mine. **(Does not apply to below grade tanks) See Figure 7**

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

- Yes  No

Within an unstable area. **(Does not apply to below grade tanks) See Figure 8**

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

- Yes  No

Within a 100-year floodplain. **(Does not apply to below grade tanks) See Figure 9**

- FEMA map

- Yes  No

**Below Grade Tanks**

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

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

- Yes  No

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

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

- Yes  No

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

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

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

- Yes  No

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

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

- Yes  No

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

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

- Yes  No

<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 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). <b>See Figure 3</b></p> <ul style="list-style-type: none"> <li>- Topographic map; Visual inspection (certification) of the proposed site</li> </ul>	<input type="checkbox"/> Yes <input checked="" 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. <b>See Figure 4</b></li> </ul>	<input type="checkbox"/> Yes <input checked="" 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 <b>See Figures 1 &amp; 2</b></li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>Within 300 feet of a wetland. <b>See Figure 6</b></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>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 checked="" type="checkbox"/> No <input type="checkbox"/> NA
Ground water is more than 100 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Within 100 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed	<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
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 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
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

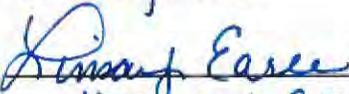
16. **On-Site Closure Plan Checklist:** (19.15.17.13 NMAC) *Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.*

- 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): Lindsay Earle Title: Drilling Engineer

Signature:  Date: July 13, 2015

e-mail address: lindsay.earle@oxy.com Telephone: 713-350-4921

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

**Operator Closure Certification:**

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

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

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

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

## Distance to Groundwater

**Figure 1, Figure 2, and the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 100 feet beneath the temporary pit/burial trench that will contain fluids that cannot be classified as “low-chloride.” Groundwater will be more than 100 feet below the bottom of the buried waste, meeting criteria for in-place closure.**

Figure 1 is a geologic/ topographic map that shows:

1. The location of staked well locations as hexagons.
2. Water wells from the OSE database are plotted as a blue triangle inside colored circles that indicate well depth, if such wells exist within the area of the map. OSE wells are often miss-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range.
3. Water wells from the USGS database as large green triangles, if such wells existed.
4. Water wells, which are not documented in the public databases but were identified by field inspection or other published reports as colored squares.
5. The depth-to-water from the most recent available measurement for each well is provided adjacent to the well symbol.

Our examination of the geology of the area near the proposed temporary pit/burial trench cause us to conclude that the uppermost water-bearing zone lay in Quaternary Alluvium, where present, and the underlying Rustler Formation, which is probably hydraulically connected to the Alluvium in this area. As discussed below, seepage from the potash mines tailings pond, formerly a playa lake, has caused significant salinity in the uppermost groundwater zone beneath the proposed pit/burial trench.

Figure 2 is an area topographic map that shows:

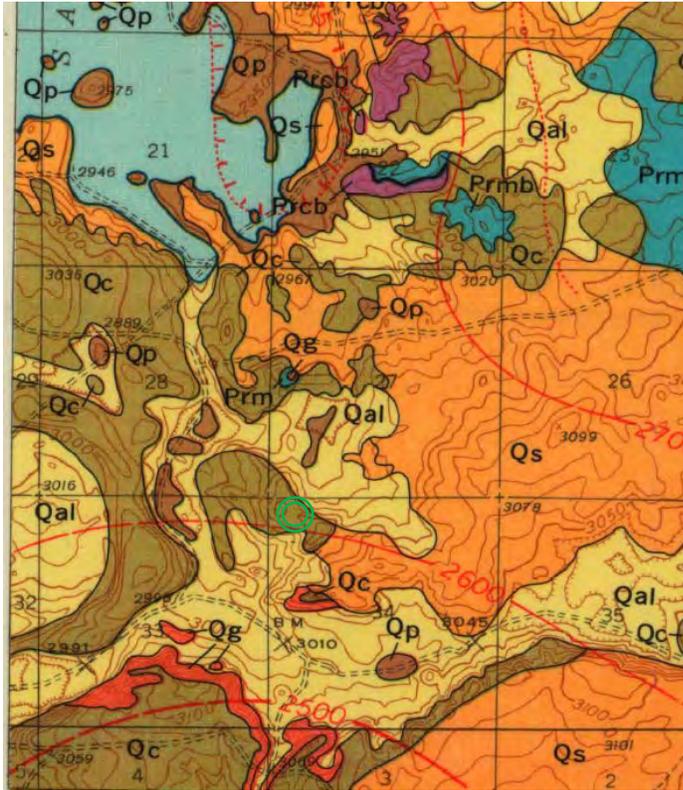
1. The location of the staked locations as hexagons.
2. Water wells measured by the USGS or other parties, the total depth of the well and the calculated elevation of the groundwater surface.

The Rustler Formation contains groundwater for beneficial use east of the area of the proposed pit/burial trench. On the eastern border of Figures 1 and 2, wells Misc-7, Misc-10 and Misc-165 are fresh water wells. Fresh water also exists in the Alluvium on the west side of the Pecos River (e.g. C-2182) about 1.5 miles west of the locations. Adjacent to and down-gradient from the former playa lake (tailings pond for potash mines), brine has seeped into the permeable units of the Alluvium and Rustler. We sampled well Misc-312, about 1-mile north of the proposed pit/burial trenches and the laboratory result showed 174,000 mg/L chloride. Misc-189 and Misc-190, which lie about two miles southwest of the Cypress locations, are background monitoring wells associated with the Malaga Salt facility. These wells exhibit TDS concentrations slightly above or slightly below 30,000 mg/ and chloride concentrations in excess of 10,000 mg/L. Finally, near Malaga Bend (in the area of wells Misc 204 and Misc. 188), the USGS and others<sup>1</sup>

<sup>1</sup> See [http://pecosbasin.tamu.edu/media/453325/malaga-bend-ppt\\_prc-meeting\\_april-2014.pdf](http://pecosbasin.tamu.edu/media/453325/malaga-bend-ppt_prc-meeting_april-2014.pdf) and <https://repository.tamu.edu/bitstream/handle/1969.1/86109/TR-315%20-Hydrology%2c%20Salinity%2c%20and%20Salinity%20Control.pdf?sequence=1&isAllowed=y>

have documented a pressurized brine zone leaking into the alluvium (and Pecos River) that caused widespread salinization of groundwater in the alluvium and bedrock units.

As shown in the graphic below extracted from <http://pubs.usgs.gov/bul/1141b/plate-1.pdf>, the location of the pit/burial trench (green circle) is about 1 mile south of the 1939 playa lake shoreline.



The location lies on a caliche unit (Qc) which in turn overlies Quaternary Alluvium (Qal). The bedrock beneath the alluvium is the Magenta Dolomite of the Rustler Formation (Prm due north and northeast of the location) or possibly the Quaternary Gautuna Formation (Qg) which crops out south of the location.

Based upon the outcrop pattern and topography, the Gautuna Formation probably lies above the water table in the area. The Magenta Dolomite may also lie above the water table, which would leave the underlying Culebra Dolomite (Prcb – the “b” signifies brecciation of the Culebra) as the uppermost permeable zone that contains groundwater. The Culebra is porous and would readily transmit water (brine) from the potash tailings pond down dip (south) toward

the location.

The map also shows that the top of the salt in the Salado Formation is at an elevation of 2600 feet asl, or about 450 feet beneath the pit/burial trench. The top of the Salado dips south in this area.

For Figure 2 we did not use any data from the OSE database as this data relies upon observed water levels by drillers during the completion of the water well. The OSE dataset provides some useful data in certain areas – but due to the intrusion of brine from the tailings pond into permeable zones, it is not surprising that water supply wells do not exist in this area. Therefore, we relied upon the best and nearest data available: Misc-312 (aka C-2702 north of the location), Misc 189 and 190 (southwest of the location) and the data from the publications referenced in the footnote.

From these data, we conclude::

- Beneath the proposed pit/burial trench, the elevation of the uppermost water bearing zone (Alluvium?) is less than 2940 (Misc-312) and higher than 2919 (Misc-290) – probably about 2935 feet asl

- Given the surface elevation of the location (3049) and a 10-foot deep temporary pit/burial trench, the distance between the bottom of the pit/burial trench and the groundwater surface is about 104 feet (3049-10-2935)
- However, the groundwater in this area is not fresh.

On July 2, Hicks Consultants logged the rathole for the conductor pipe and found no evidence of groundwater to a depth of 120 feet below land surface. The findings of this event are presented at the end of this section of the application.

### **Distance to Surface Water**

**Figure 3 and the site visit demonstrates that the location is not within 200 feet of a continuously flowing watercourse or any other significant watercourse or 200 feet from lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). This temporary pit/burial trench will also qualify for in-place closure as the location is not within 100 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).**

- No continuously flowing watercourses, significant watercourses, sinkhole or other water bodies, as defined by NMOCD Rules, exist within the prescribed setback criteria for the siting, trench burial, or in-place closure of a temporary pit/burial trench at this location.
- The area surrounding the proposed pit/burial trench location is a caliche topped hill with radial drainage in the form of small erosional gullies with no defined bank or bed that transmitting stormwater to mapped watercourses thence to nearby closed depressions
- The ephemeral watercourses are mapped about 500 feet west, south and east of the location (see also Figure 4, figure 4a and the discussion at the end of this section of the application)

### **Distance to Permanent Residence or Structures**

**Figure 4 and the site visit demonstrates that the location is not within 300 feet from an occupied permanent residence, school, hospital, institution, church, or other structure in existence at the time of initial application. This also qualifies the location for in-place closure.**

- The nearest structures are oil and gas wells and tank batteries.
- Also plotted on Figure 4 are the mapped watercourses shown in Figure 3.

### **Distance to Non-Public Water Supply**

**Figures 1 and Figure 2 demonstrates that the location is not within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1,000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. Additionally, this location is also not within 300 feet of a spring or private, domestic fresh water well used for domestic or stock watering purposes, thus qualifying for in-place closure.**

- Figure 1 shows the locations of all area water wells, active or plugged.

- The nearest active water well on the east side of the Pecos River is approximately 3 miles east (Misc-7).
- There are no known domestic wells within 1,000 feet of this location.
- No springs were identified within the mapping area (see Figure 3).

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

**Figure 5 demonstrates that the location is not within incorporated municipal boundaries or within defined municipal fresh water well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. This also qualifies the location for in-place closure.**

- The closest municipality is Loving, NM approximately 8 miles due west.
- The closest public well field is located approximately 24 miles to the west.

### **Distance to Wetlands**

**Figure 6 demonstrates the location is not within 300 feet of wetlands. This also qualifies the location for in-place closure.**

- The nearest designated wetlands are “freshwater pond” located approximately 2000 feet west of the location

### **Distance to Subsurface Mines**

**Figure 7 and our general reconnaissance of the area demonstrate that the nearest mines are caliche pits and underground potash mines. This location is not within an area overlying a subsurface mine.**

- The nearest mapped caliche pit is located approximately 3.5 miles north
- The pit/burial trench lies within the potash main district, but active subsurface mining is more than 3 miles northeast.

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

**Figure 8 shows the location of the temporary pit/burial trenches with respect to current BLM Karst areas.**

- The proposed temporary pit/burial trench is mapped as a “moderate” potential karst area.
- No evidence of solution voids were observed near the site during the field inspection.
- No evidence of unstable ground was observed
- The nearest high karst potential area lies about 2 miles east

### **Distance to 100-Year Floodplain**

**Figure 9 demonstrates that the location is within Zone X as designated by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.**

- Zone X for this map is described as areas with minimal flood hazards. However, no flood hazard analysis has been conducted.
- Our field inspection and examination of the topography permits a conclusion that the location is not within any floodplain and has low risk for flooding.

**Temporary Pit/burial trench Design**

Please refer to Plates 1 and 2 for the design of the temporary pit/burial trench and the Design and Construction Plan at the end of this application.

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## Memorandum

From: Kristin Pope

Date: July 6, 2015

**RE: Oxy USA, Cypress 34 Fed #10H Conductor Hole Evaluation**



The Cypress 34 Federal #10H well site has a surface elevation of 3,049 feet and is located about 1 mile south of the potash tailings pond. The uppermost water-bearing zone was expected at 2,940-2935 feet above sea level, or 109-114 feet below the location surface, in Quaternary Alluvium. Groundwater, if present, was not expected to be fresh due to brine seepage from the former playa (potash tailings pond).

On July 2, 2015 I witnessed the drilling of the conductor hole at the site, located in south-central Eddy County. Butch's Rat Hole & Anchor Service, Inc. of Levelland, Texas performed the work using a track-mounted Soilmecc SR-45 continuous-flight auger hydraulic drilling rig as shown in the adjacent photograph.

I arrived on site at 9:00 am and the depth of the hole was reported to be at 50 feet below surface. Several Oxy personnel were already on site to discuss the location of the proposed pit and left the location when the placement was resolved, at approximately 9:45 am. Prior to my arrival and beginning at 8:00 am, the drilling crew collected samples from upper strata beginning at 40 feet. Inspection of these samples revealed dry, fine, tan sand with soft pink sandstone to 52 feet. Continuous lithological inspection of returned samples occurred with each trip out of the hole.

Over the next 4.5 hours the boring was advanced to a total depth of 120 feet. In addition to lithology, I inspected the cuttings from each trip for moisture to indicate a groundwater formation, but all samples were dry. If any appreciable moisture would have been indicated,



*40-ft sample collected by drillers*

the operation would have been suspended to allow the water to accumulate and then measured and tested for salinity. At 1:30 pm, the hole was completed at 120 feet below surface. No water or drilling fluids were used to drill any portion of this conductor hole.

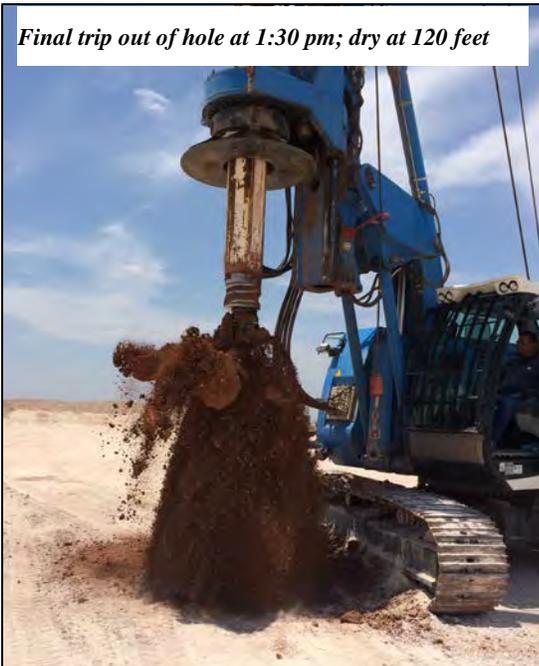
The following lithological descriptions were observed:

- 40-52 feet Sand, light brown, fine-grained, well-sorted with soft, pink sandstone; dry
- 52-67 feet Sand, light brown, extra fine-grained with hard, gray-brown dolomite; dry
- 67-80 feet Silt, light brown to light gray, medium-grained with soft, light brown siltstone and hard, gray-brown dolomite (0.5-1.0 inch diameter); dry
- 80-83 feet Silt, light gray, loose, medium-grained with hard, gray-brown dolomite (0.5-1.0 inch diameter); dry
- 83-88 feet Silt, light gray, loose, medium-grained with friable, pink siltstone; dry
- 88-96 feet Clay, red, massive, soft, platy, with 10-15% light gray silt; very slight moisture
- 96-110 feet Gypsum, white and pink, loose, very fine silt, with hard, gray dolomite pieces (0.5 inch diameter) and light gray gypsum pieces (1-2 inch diameter), dry



*Sample collected at 95 feet*

*Final trip out of hole at 1:30 pm; dry at 120 feet*



110-115 feet Clay (90%), red, massive, platy, soft, with gypsum and dolomite inclusions (0.5-3 inches diameter); dry

115-119 feet Sand, brown, loose, medium-grained, with 10% white gypsum (less than 1 inch diameter)

119-120 feet Sand, brown, loose, medium-grained, with 5% gypsum and dolomite (less than 1 inch diameter)

Based on my evaluation of the cuttings, I conclude that no groundwater is present below this site to at least 120 feet below ground surface (2,929 feet below sea level).

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Artesia ▲ Carlsbad ▲ Durango ▲ Midland

## Oxy USA, Cypress 34 Fed #10H, Watercourse Inspection

Kristin Pope arrived at the Cypress 34 Federal #10H well site at 9:00 am on July 2, 2015 and drilling of the conductor pipe hole was in progress. Travis Johnson, completions superintendent, as well as other Oxy personnel met me to discuss the location of the planned burial pit/trench. Oxy representatives decided that locating the pit/trench 65 feet due north and 10-15 feet west of the wellhead was the best scenario and this new location is presented in the Plates of the proposed minor modification to the C-144 application. Oxy representatives left the location at approximately 9:45 am. Randall Hicks performed an additional investigation on July 8 and with OCD representatives on July 9, 2015.

The well survey provided the latitude and longitude in NAD 27 coordinates and the Figures in the application show locations based upon NAD 83 datum. Thus, the location on the maps in the application is not exact. The foot survey described below with measured distances is exact.

Erosional features mapped by the USGS as an “intermittent stream” northwest of the location are shown on figure 4 of the C-144 application (attached). Figure 4a shows this same representation in greater detail. Uphill from the “blue-line arroyo: an erosional feature drains to the west and joins the drainage that is mapped by the USGS. In theory, the channel upstream from the mapped arroyo could be a significant watercourse as it is the next-order tributary to this blue-line arroyo<sup>1</sup>. The image below shows this erosional feature at the closest point to the proposed solids burial pit/trench where two smaller gullies join to form a slightly larger channel. Does this feature exhibit a bed and a bank? Is it a watercourse?



Some experts may say yes; Hicks Consultants believes the area in the photograph is not a true “next lower order tributary” of a blue-line arroyo. The location of the image above is 32 16 8.499, -103 58 50.62 and the measured ground distance from the northwest corner of the pit/trench footprint is 234 feet.

Below is a view west (down grade) showing the same erosional feature uphill from the junction of the two channels. From this perspective, we believe most professionals would not identify this feature as a “significant watercourse”.

<sup>1</sup> “Significant watercourse” means a watercourse with a defined bed and bank either named or identified by a dashed blue line on a USGS 7.5 minute quadrangle map or the next lower order tributary with a defined bed and bank of such watercourse.



Northeast of the northeast corner of the proposed solids burial pit/trench is a more pronounced erosional feature that is located at 32 16 7.089, -103 58 46.140 (GPS coordinates from site visit). In the center of this photograph is a measuring wheel at the junction of two channels that theoretically would form the next lower order tributary of a north-draining, mapped blue-line arroyo on a USGS map that lies west of the 10H location. Figure 4a shows this gully north-northwest of the plotted well and the blue line. The purple circle shows the area of the map that mistakenly connects two different arroyos<sup>2</sup>.

The Google Earth image below shows the location of the 10H well per the NAD 27 survey as converted to NAD 83. Also plotted on this image is the GPS location of the well (based upon a photograph of the cellar from 20 feet west). The



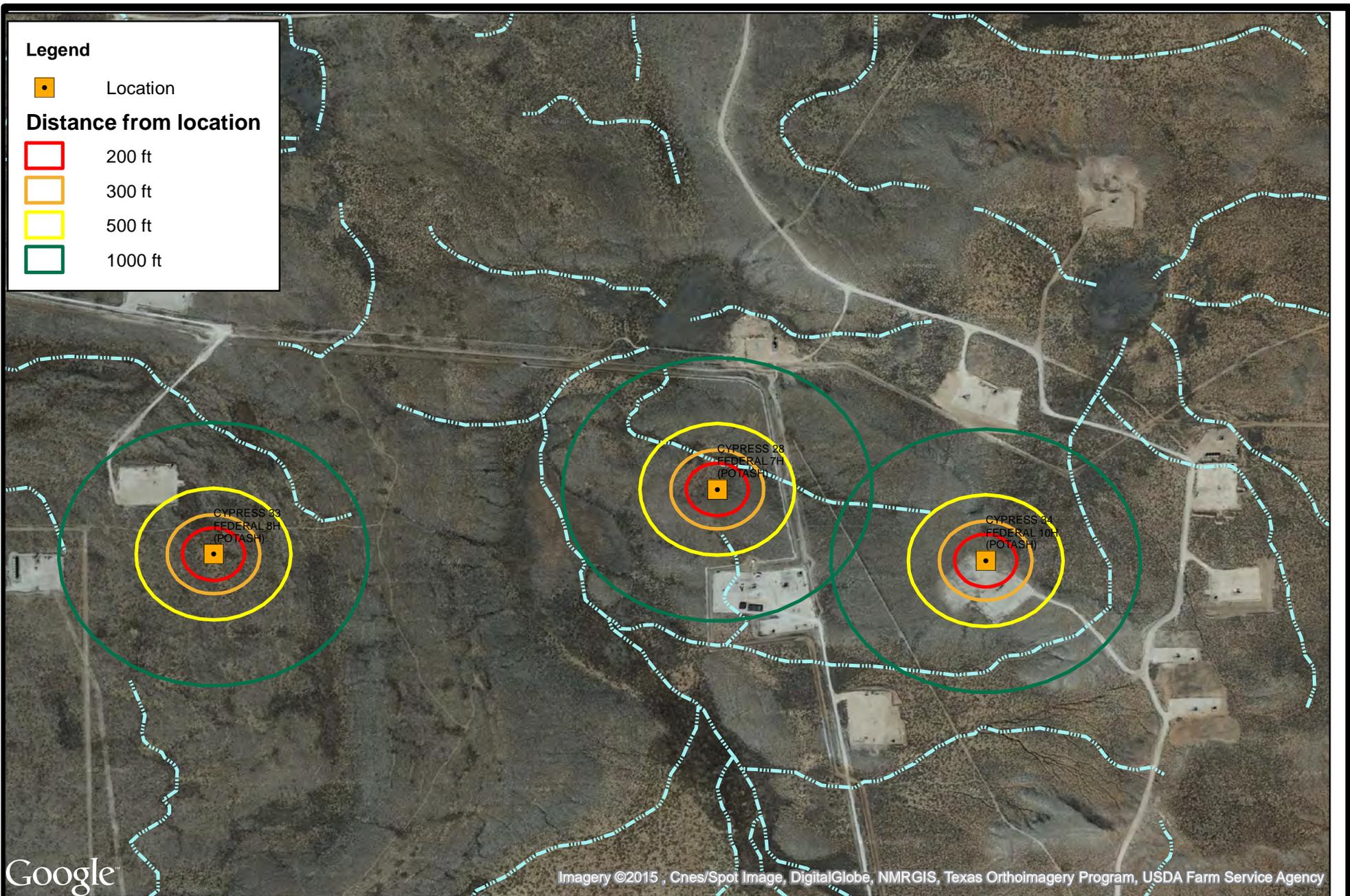
<sup>2</sup> The most recent USGS topographic map of the area of interest is in black and white. Therefore, we employ an overlay of watercourses from a US Hydrographic Survey to show the “blue line” watercourses. At this site, the data used in the Figures is not consistent with the black and white USGS map and connects two separate drainages.

Google Earth image shows the location of the measuring wheel in the photograph above. Also shown in this image is the channel of the blue-line arroyo to the west of the 10H location (blue dashed line just east of channel). Note that the trace of the arroyo in the Google Earth image (and the location on the ground) does not exactly agree with the alignment mapped by the USGS.



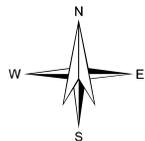
Regardless of the location of various features on different images, the following on-the-ground facts are clear with respect to this closest channel:

1. A junction of two channels that may or may not be a significant watercourse exists 205-210 feet from the proposed solids burial pit/trench
2. Northeast and downhill from the photograph, the channel effectively ends in a maze of brush where the topographic gradient lessens.
3. Significant watercourse or not, the channel observed in the photograph and plotted in the Google Earth image could convey any fluids released from the proposed pit/trench more quickly than a flat area with no such channels.
4. The distance from the proposed pit/trench to this channel that lies northeast of the well is more than 200 feet.
5. The distance from the pit/trench to the channel northwest of the well is about 230 feet.



Google

Imagery ©2015 , Cnes/Spot Image, DigitalGlobe, NMRGIS, Texas Orthoimagery Program, USDA Farm Service Agency



0 500  
Feet

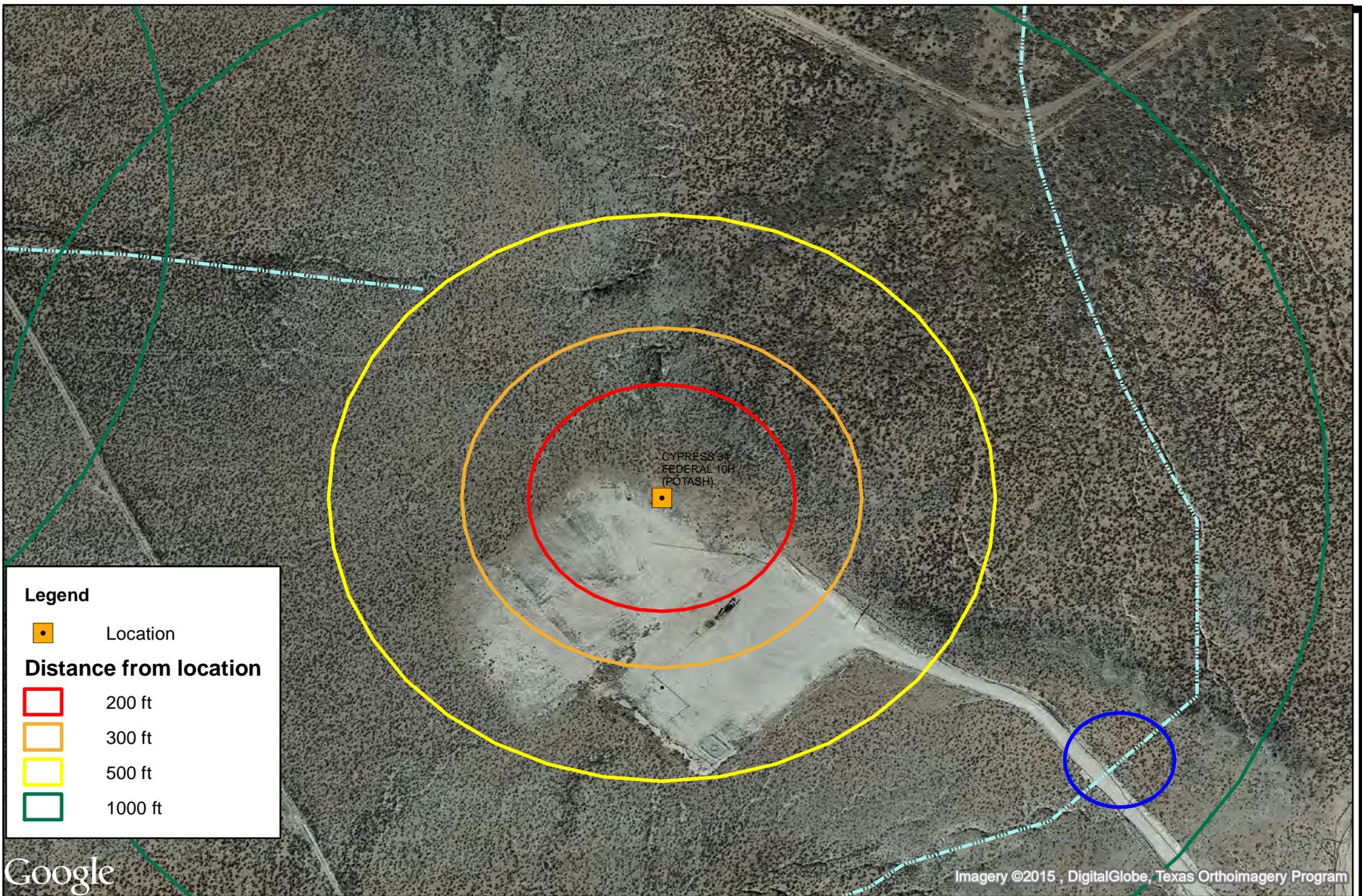
R.T. Hicks Consultants, Ltd  
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Nearby Structures and Surface Water

Figure 4

Oxy USA - Cypress Federal Wells

June 2015



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Nearby Structures and Surface Water

Oxy USA - Cypress Federal Wells

Figure 4a

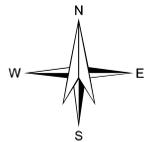
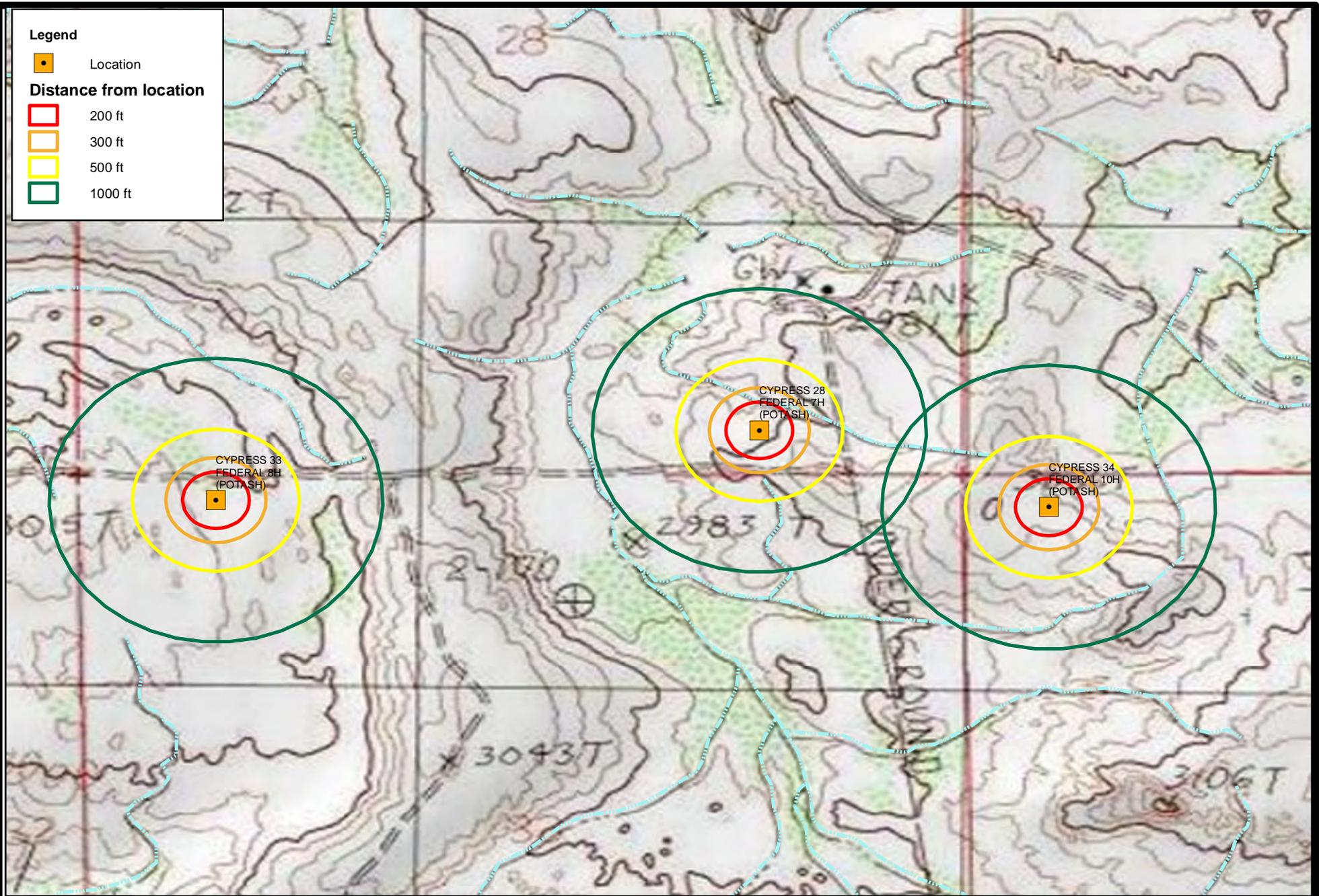
June 2015

**Legend**

■ Location

**Distance from location**

- 200 ft
- 300 ft
- 500 ft
- 1000 ft



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Surface Water and Topography

Oxy USA - Cypress Federal Wells

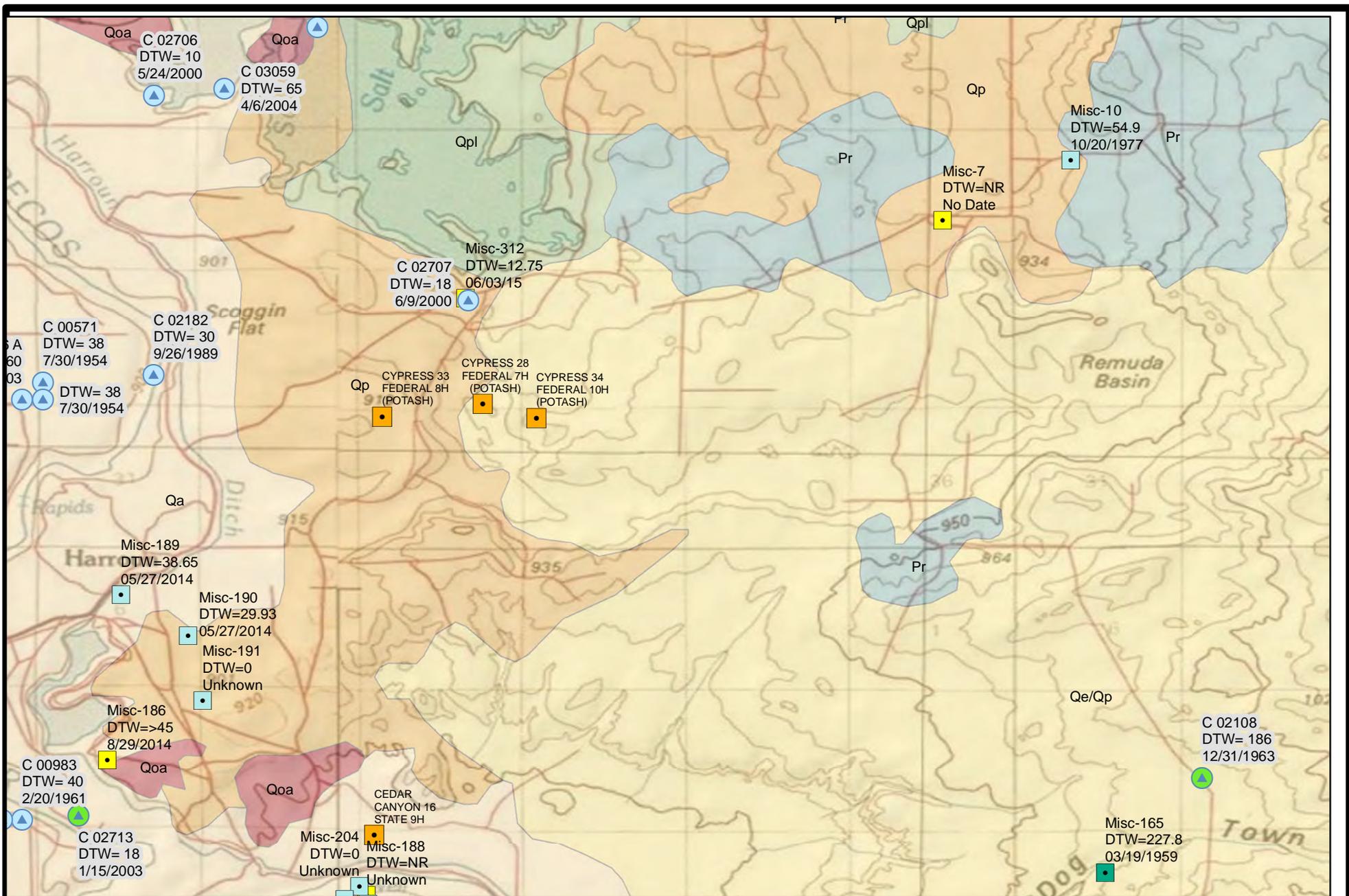
Figure 3

June 2015

# Site Specific Information Figures

**R.T. Hicks Consultants, Ltd.**

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Depth to Groundwater and Geology  
 Oxy USA - Cypress Federal Wells

Figure 1  
 June 2015

**Legend**

 Location

**OSE Water Wells**

**Well Depth (ft)**

 <= 150

**NM Geology**

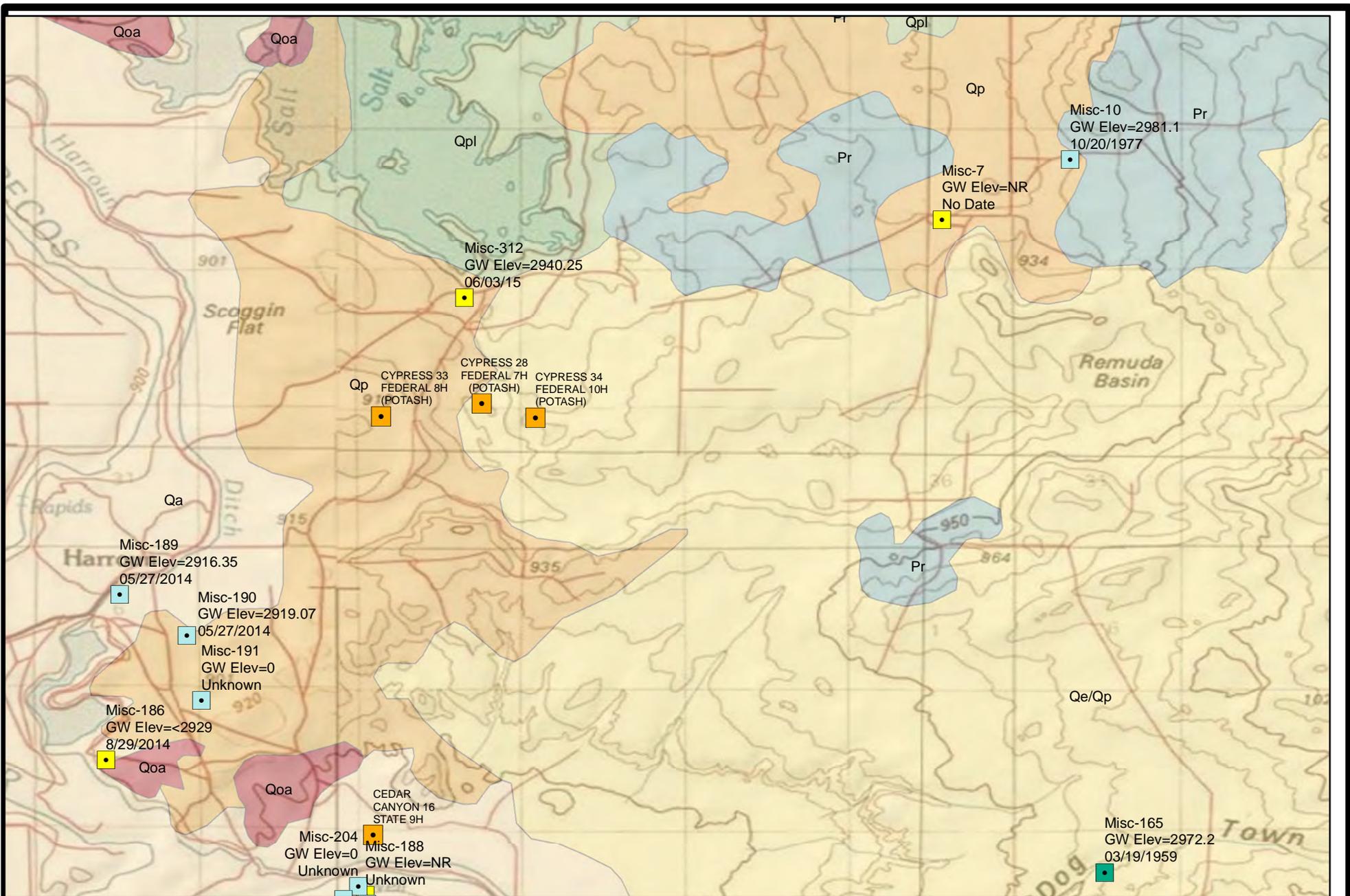
**Map Unit, Description**

-  Pc, Paleozoic-Castile Formation; anhydrite sequence
-  Pr, Paleozoic-Ruster Formation; siltstone, gypsum, sandstone, and dolomite; Upper Permian
-  Psl, Paleozoic-Salado Formation; evaporite sequence; Upper Permian
-  Qa, Quaternary Alluvium
-  Qp, Quaternary-Piedmont Alluvial Deposits

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Legend  
 Depth To Water and Geology

Figure 1  
 Legend



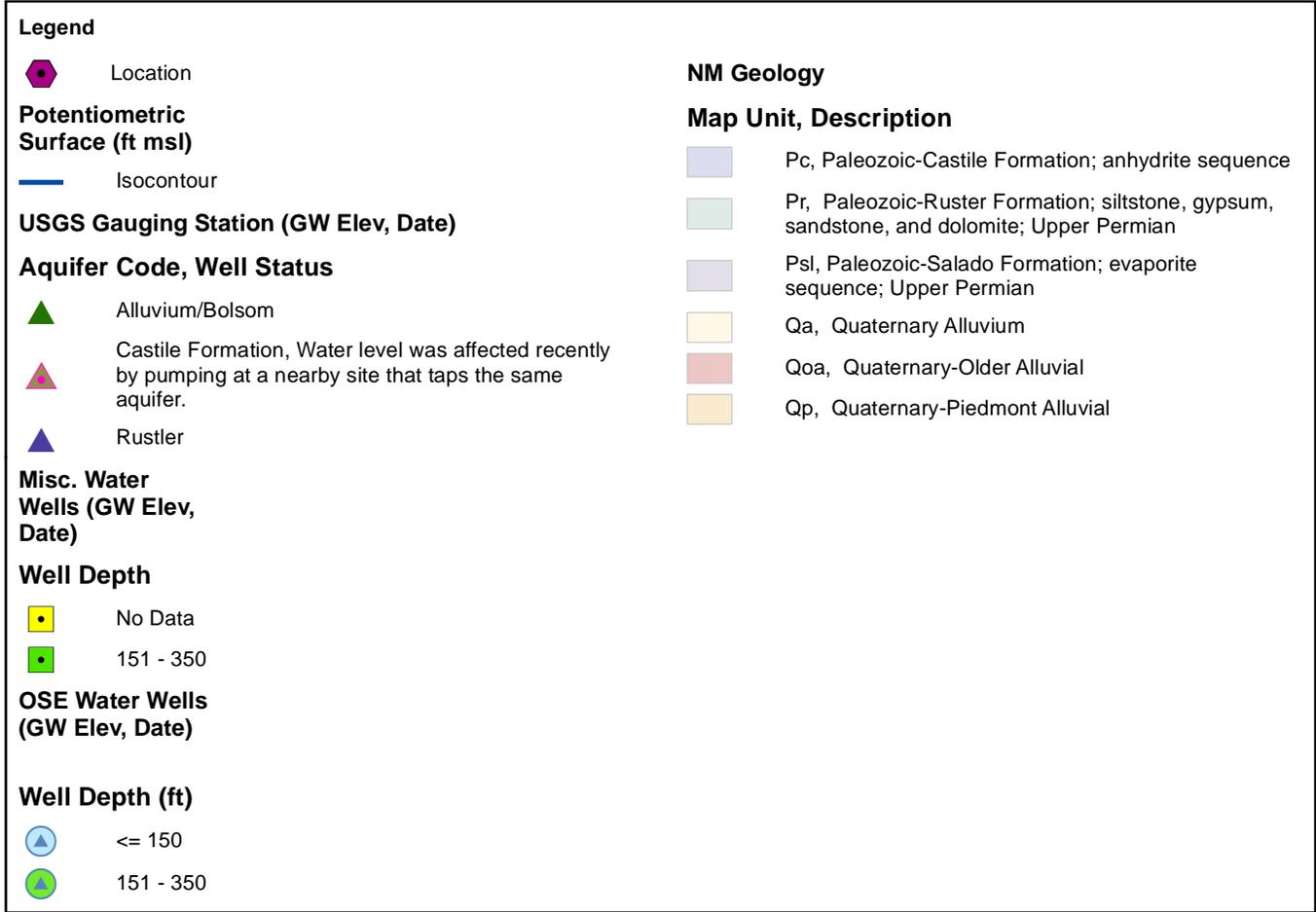
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Groundwater Elevations

Oxy USA - Cypress Federal Wells

Figure 2

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Potentiometric Surface and Groundwater Elevation  
 at Nearby Water Wells

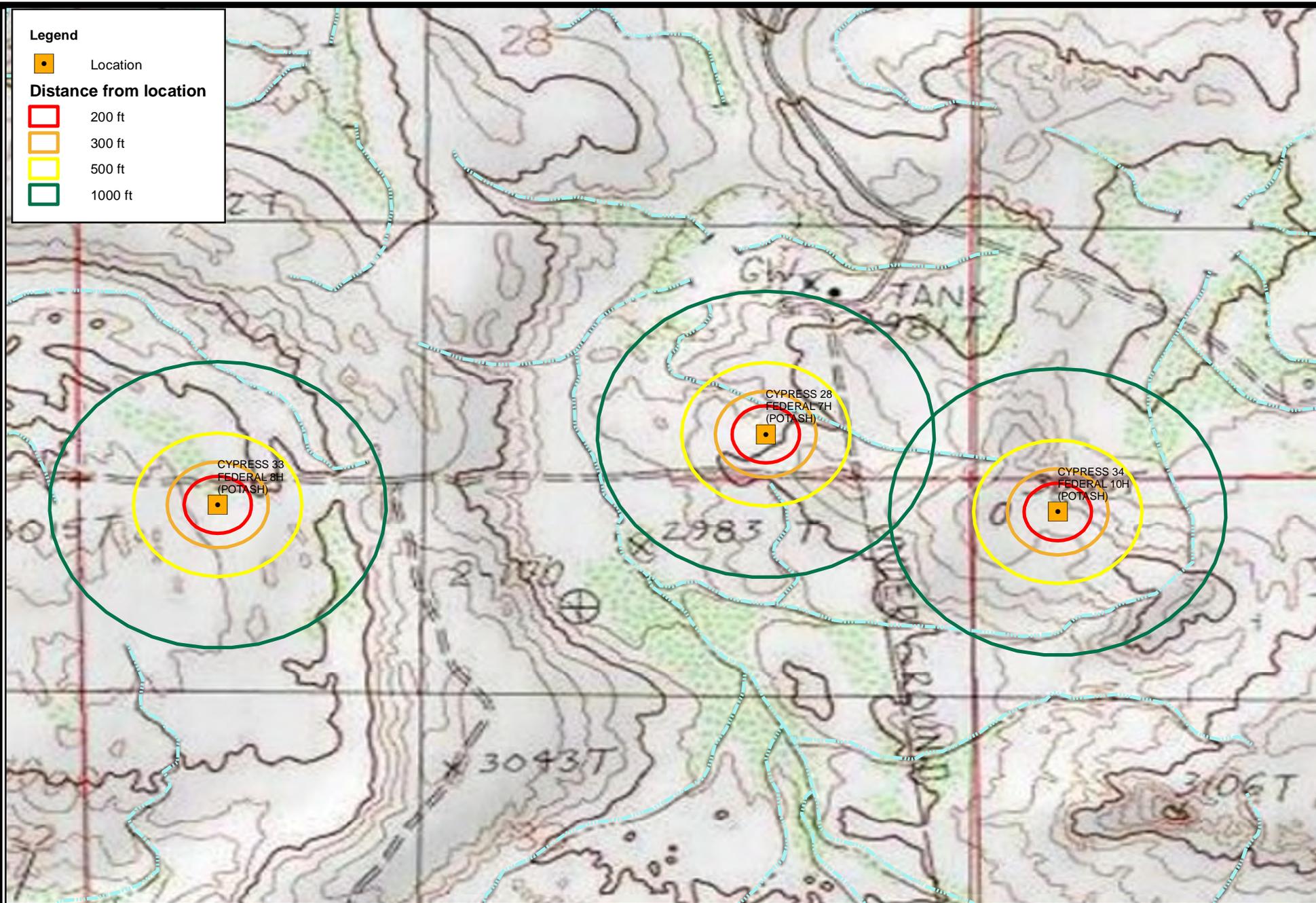
Figure 2  
 Legend

**Legend**

Location

**Distance from location**

-  200 ft
-  300 ft
-  500 ft
-  1000 ft



0 500  
Feet

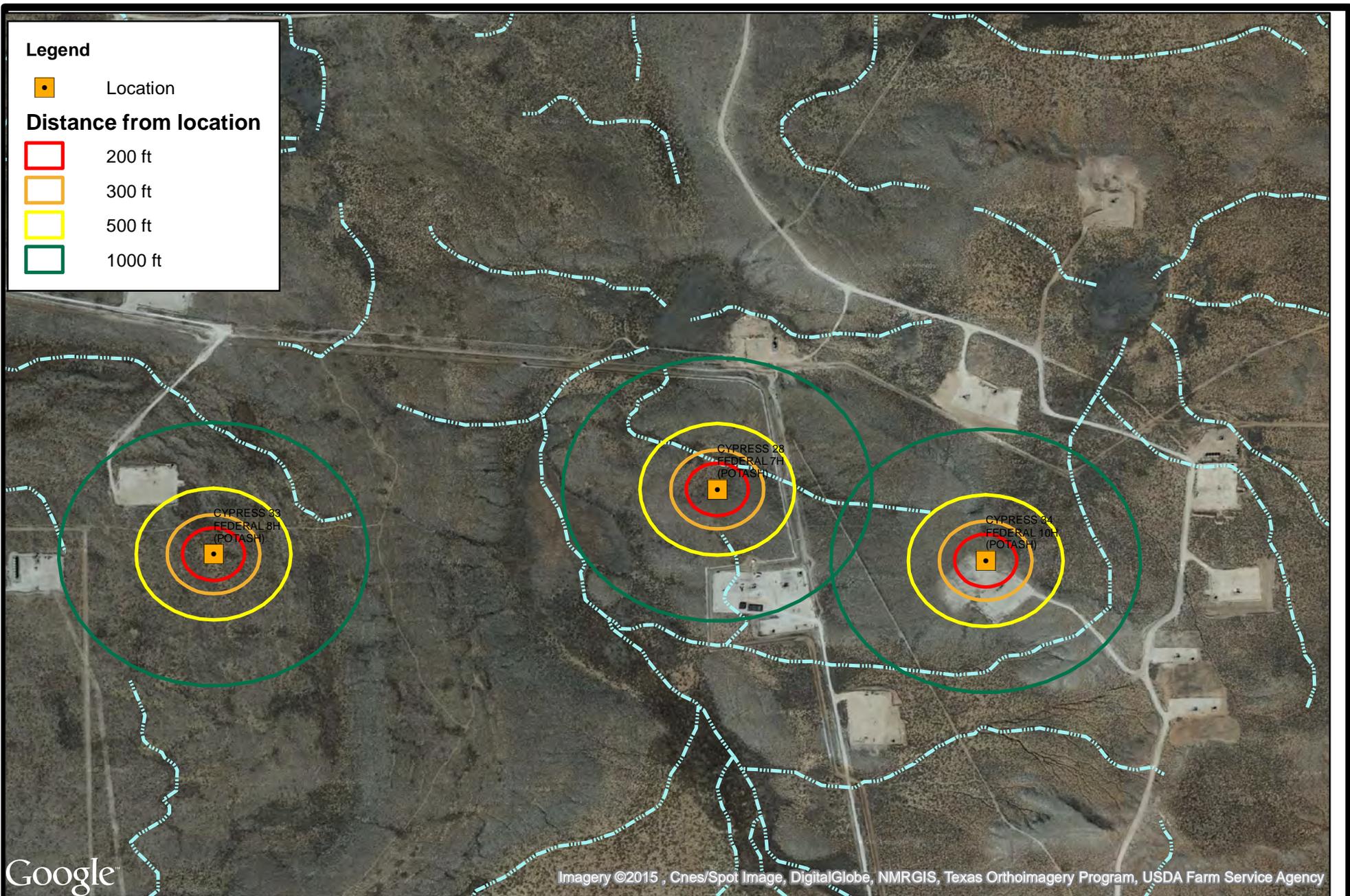
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Surface Water and Topography

Oxy USA - Cypress Federal Wells

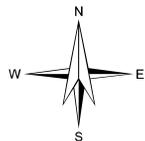
Figure 3

June 2015



Google

Imagery ©2015 , Cnes/Spot Image, DigitalGlobe, NMRGIS, Texas Orthoimagery Program, USDA Farm Service Agency



0 500  
Feet

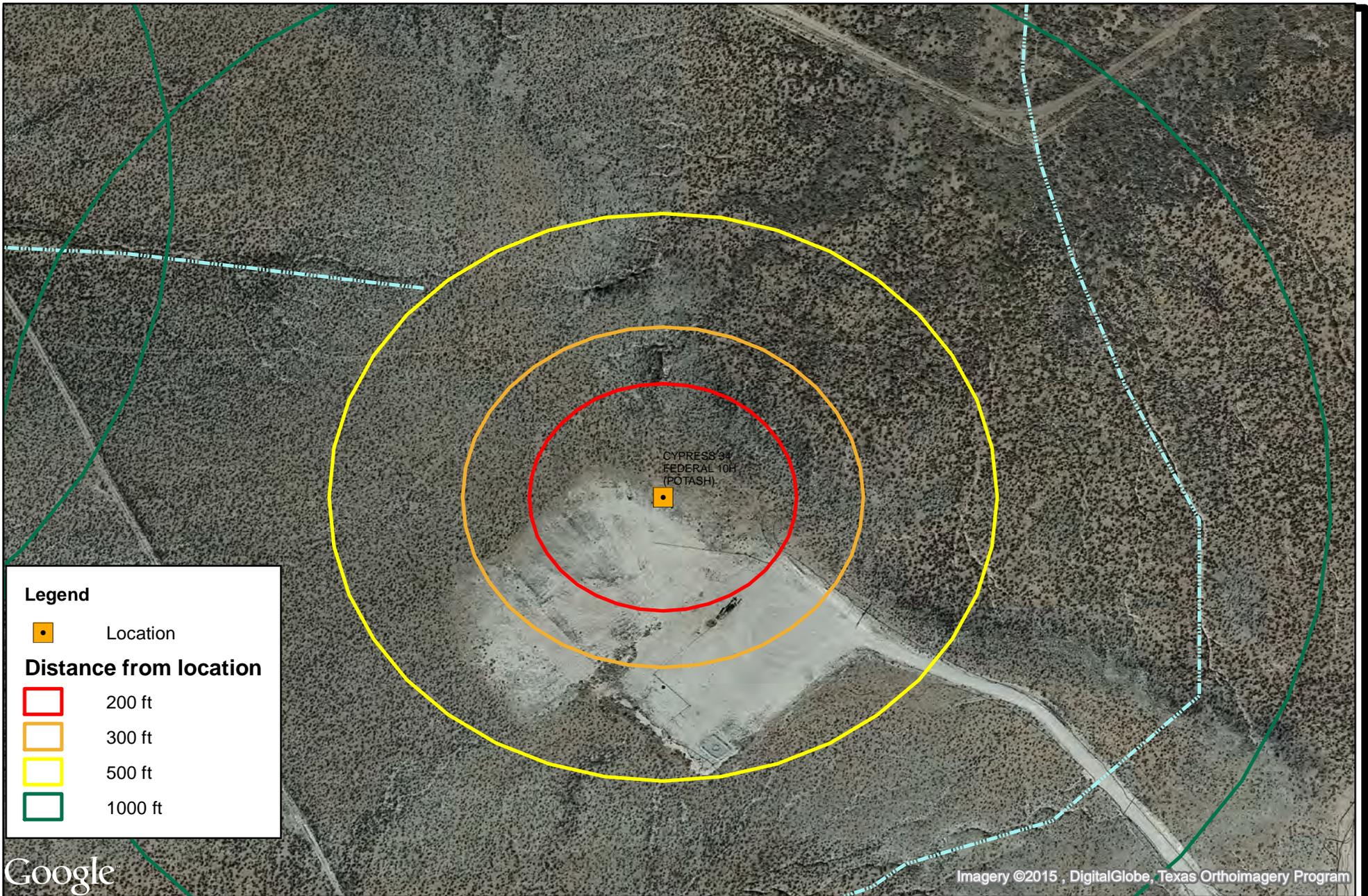
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Nearby Structures and Surface Water

Oxy USA - Cypress Federal Wells

Figure 4

June 2015



Google



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Nearby Structures and Surface Water

Figure 4a

Oxy USA - Cypress Federal Wells

June 2015

**Legend**

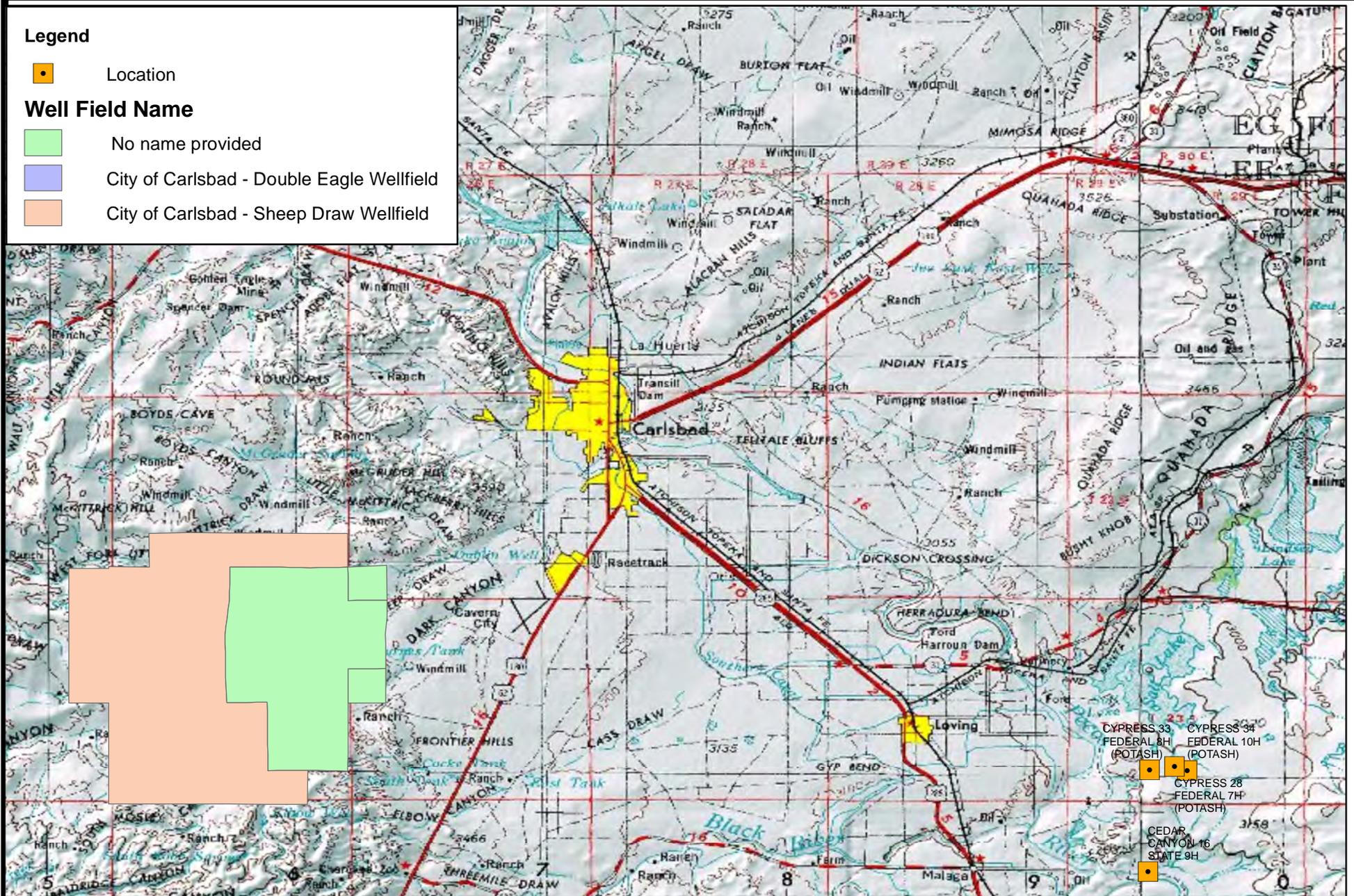
● Location

**Well Field Name**

■ No name provided

■ City of Carlsbad - Double Eagle Wellfield

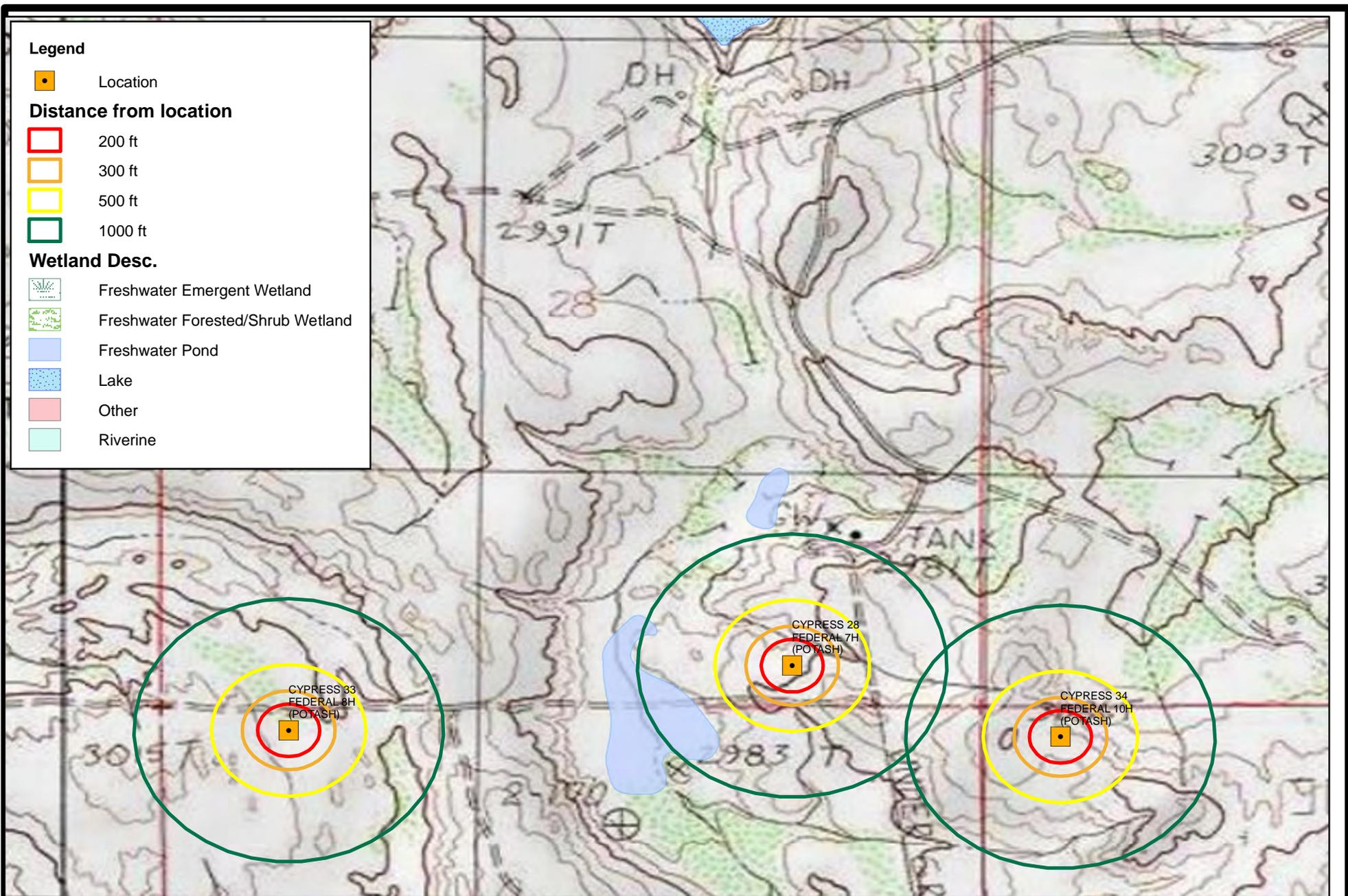
■ City of Carlsbad - Sheep Draw Wellfield



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Nearby Municipalities and Well Fields  
 Oxy USA - Cypress Federal Wells

Figure 5  
 June 2015



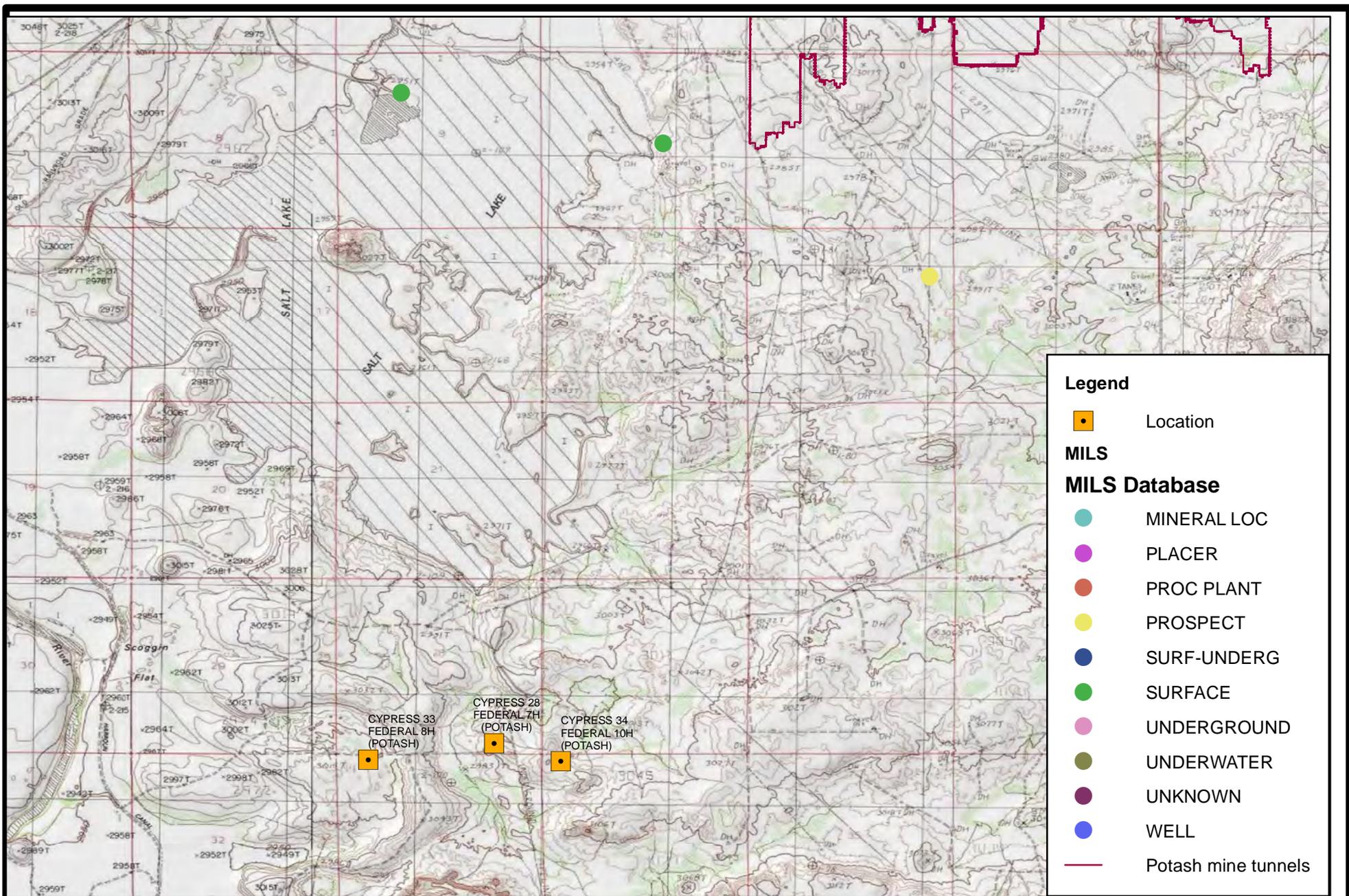
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Nearby Wetlands

Oxy USA - Cypress Federal Wells

Figure 6

June 2015



**Legend**

- Location

**MILS**

**MILS Database**

- MINERAL LOC
- PLACER
- PROC PLANT
- PROSPECT
- SURF-UNDERG
- SURFACE
- UNDERGROUND
- UNDERWATER
- UNKNOWN
- WELL
- Potash mine tunnels



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Nearby Mines

---

Oxy USA - Cypress Federal Wells

Figure 7

---

June 2015

**Legend**

■ Location

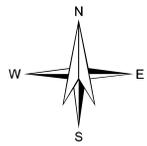
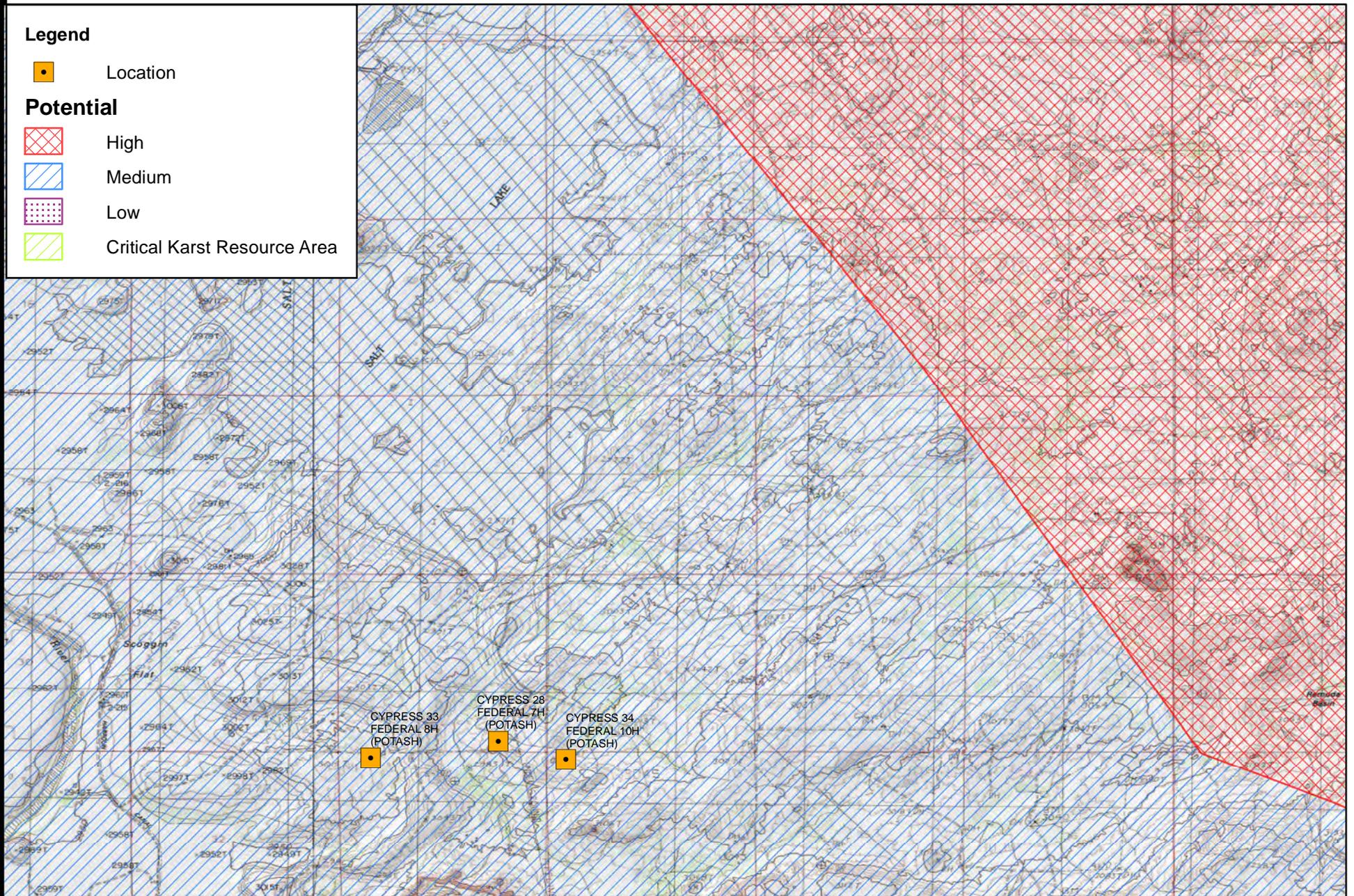
**Potential**

▨ High

▨ Medium

▨ Low

▨ Critical Karst Resource Area

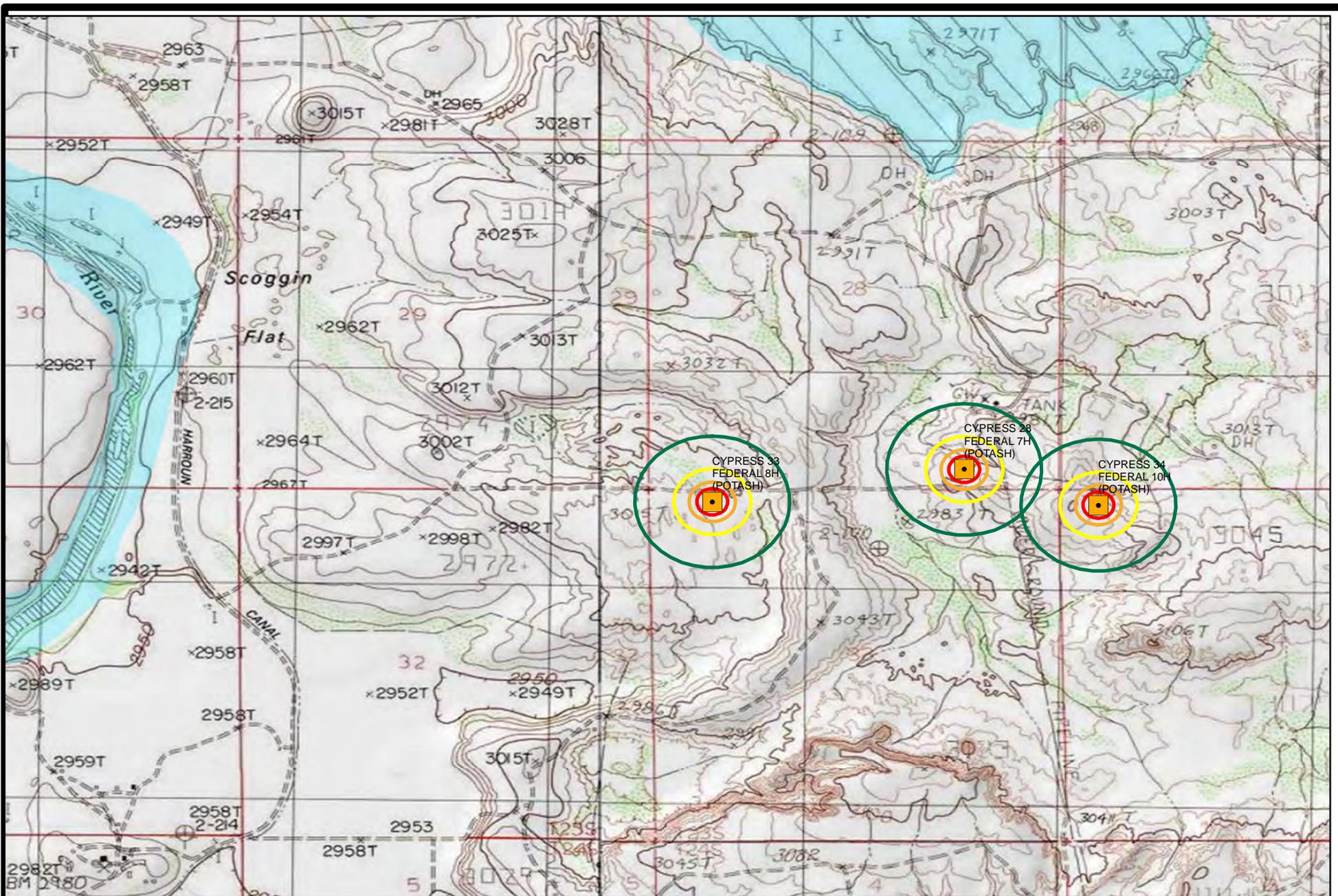


0 2,000  
Feet

R.T. Hicks Consultants, Ltd  
901 Rio Grande Blvd NW Suite F-142  
Albuquerque, NM 87104  
Ph: 505.266.5004

Karst Potential  
Oxy USA - Cypress Federal Wells

Figure 8  
June 2015

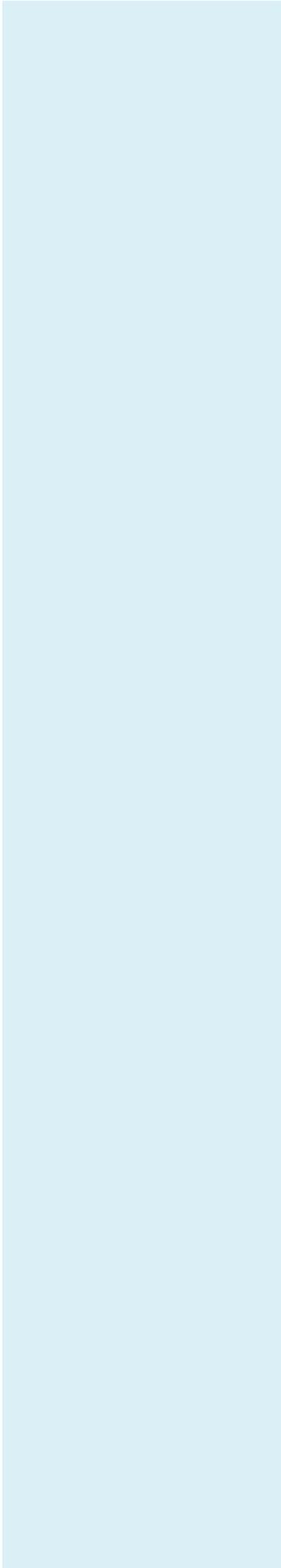


0 1,000  
 Feet

R.T. Hicks Consultants, Ltd  
 901 Rio Grande Blvd NW Suite F-142  
 Albuquerque, NM 87104  
 Ph: 505.266.5004

FEMA Flood Map  
 Oxy USA - Cypress Federal Wells

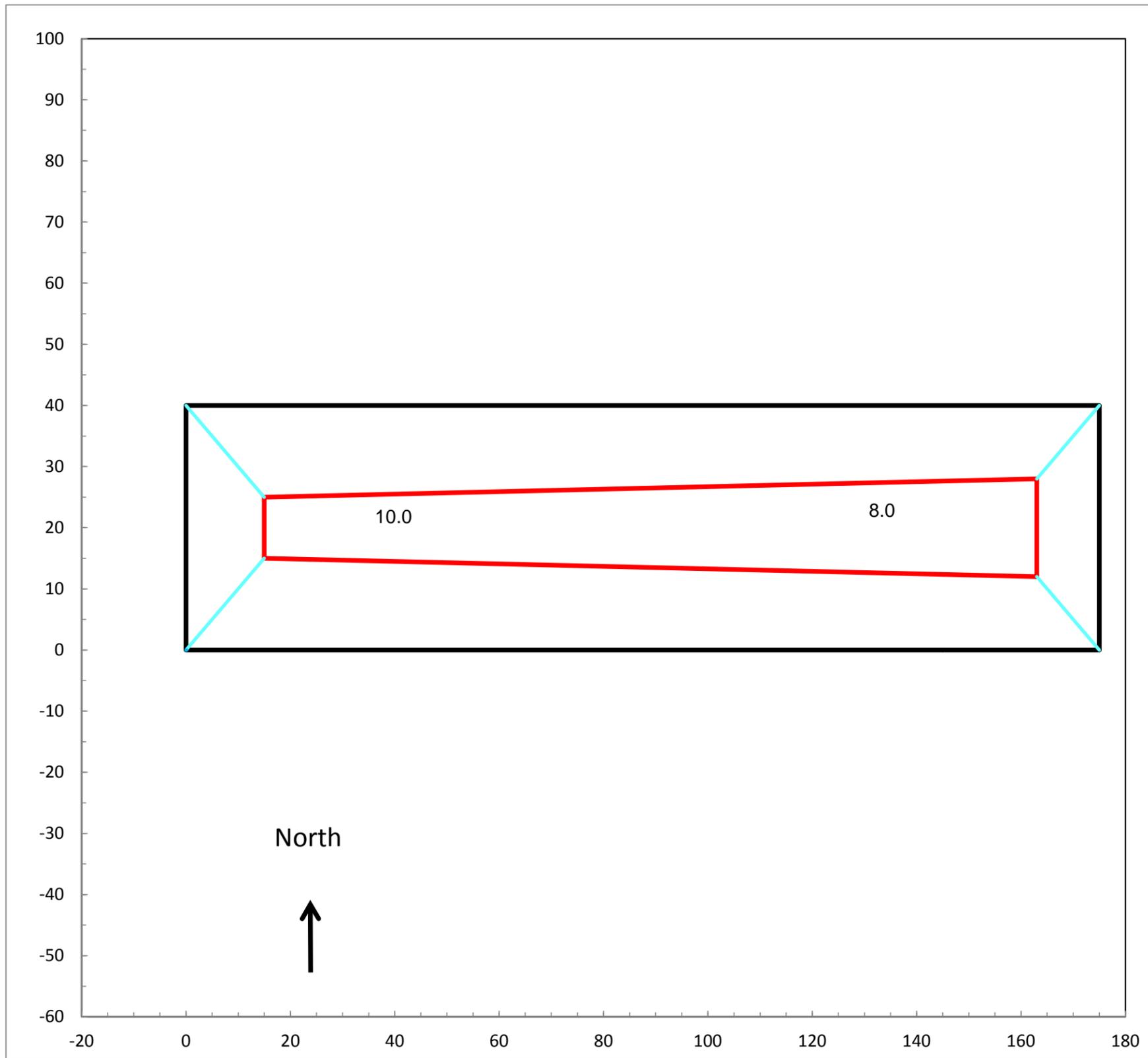
Figure 9  
 June 2015



# **Site Specific Information Plates**

**R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142  
Albuquerque, NM 87104



**Solids Burial Pit**  
 Total Width 175.0 Ft  
 Total Length 45.0 Ft  
**Slope Dimensions**  
 Pit Slopes (Rise to Run) 1.00 to 1.50

	Depth below location	Depth below top liner
Depth Discharge Side	8.0	10.0
Depth Far Side (Discharge)	8.0	10.0
Depth Deep Side	10.0	10.0
Depth Suction Side	10.0	10.0

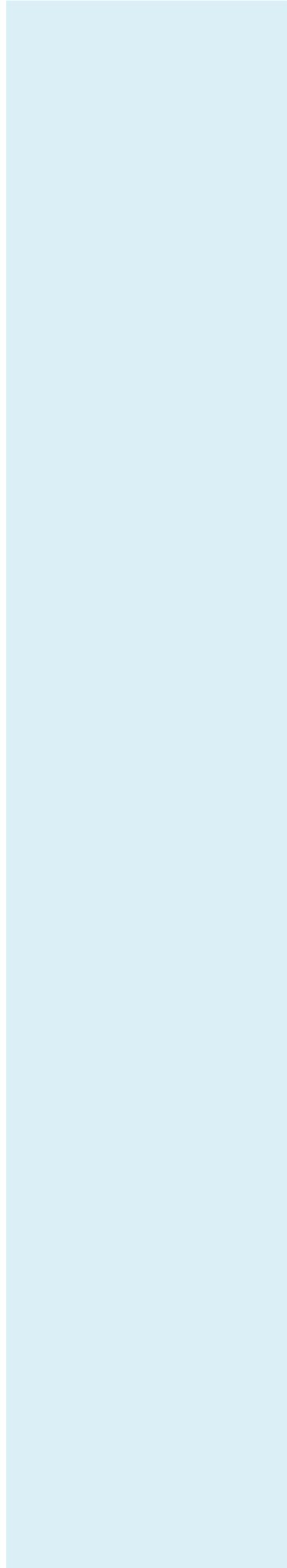
Discharge Side N-S Bottom Dimension 16.0 Ft.  
 Low End Side N-S Bottom Dimension 10.0 Ft.  
 E-W Dimension Bottom 148.00 Ft.

**Total Capacity 6958 bbls**

<b>RT Hicks Consultants</b> 901 Rio Grande Blvd. NW Suite F-142 Albuquerque, N. M. 87104	<b>Solids Burial Trench</b>	<b>Plate 1</b>
	<b>Oxy - Cypress 34 Fed 10H</b>	<b>July 2015</b>



<b>R.T. Hicks Consultants</b> 901 Rio Grande Blvd. NW Suite F-142 Albuquerque, N. M. 87104	<b>Drawing of Burial Trench</b> (overlay of pad locations approximate)	<b>Plate 2</b>
	<b>Oxy - Cypress 34 Fed 10H</b>	<b>July 2015</b>



# Generic Plans for Temporary Pits

**R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142  
Albuquerque, NM 87104

## **Burial Trench Design/Construction Plan**

Plates 1 and 2 show 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/burial trench, which will consist of single cell for the burial of drilling solids derived from a closed-loop system.

The operator may install a system that can drain water entrained in the drilling waste of the drilling pit/burial trench. 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/burial trench over the liner. The system will drain to the lowest corner of pit/burial trench 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/burial trench 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/burial trench 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/burial trench, 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/burial trench Stockpile Topsoil***

Prior to constructing the pit/burial trench 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/burial trench 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/burial trench adjacent to the drilling or workover rig.

As the pit/burial trench is not located within 1000 feet of a permanent residence, school, hospital, institution or church, the operator will fence the pit/burial trench 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/burial trench 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/burial trench will be no steeper than 1.5 horizontal feet to one vertical foot (1.5H:1V).

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

If the transmittal letter identifies concerns relating to the presence of karst and associated instability, during construction of the pit/burial trench the contractor will compact the earth material that forms the foundation for the pit/burial trench 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/burial trench
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/burial trench.

A berm or ditch will surround the temporary pit/burial trench to prevent run-on of surface water. During drilling operations, the operator may elect to remove run-on protection on the pit/burial trench edge adjacent to the drilling or workover rig provided that the pit/burial trench 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/burial trench.

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

## **Temporary Pit/Burial Trench O&M Plan**

The Pit Rule does not require an O&M plan for a burial trench. The plan described below relates to OCD's approval of a variance that would allow some fluids to be temporarily placed in the trench. Specifically

1. **The trench will not store liquids for more than 72 hours.** Liquids may be discharged into the pit from the above-ground steel pits from time to time. This discharge can occur when the mud system changes from fresh water to brine and from brine to the mud system(s) proposed for below the salt.
2. During this 72 hour period, **fluid level in the trench will be 4 feet below the top of the liner** (3 feet below the elevation of the location).
3. Much of the material removed during excavation of the trench will be used to **build a 1-2 foot high berm around the north and east edges of the location.** The purpose of this berm is to direct surface runoff from the location to the southeast portion of the location and away from the nearest drainages/gullies north of the pit.

The operator will maintain and operate the pit/burial trench 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/burial trench 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/burial trench.

If the pit/burial trench develops a leak or if any penetration of the pit/burial trench 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/burial trench develops a leak or if any penetration of the pit/burial trench 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/burial trench 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/burial trench as necessary to prevent the collection of surface water run-on. As

C-144 SUPPLEMENTAL DOCUMENTATION FOR TEMPORARY PIT/BURIAL TRENCH  
SOLIDS BURIAL

outlined in the Construction and Design Plan, during drilling operations, the edge of the temporary pit/burial trench adjacent to the drilling or workover rig may not have run-on protection if the operator is using the temporary pit/burial trench to collect liquids escaping from the drilling or workover rig and run-on will not result in a breach of the temporary pit/burial trench.

The operator will maintain on site an oil absorbent boom to contain and remove oil from the pit/burial trench'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/burial trench.

The operator will maintain the temporary pit/burial trench 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/burial trench.

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

The operator will inspect the temporary pit/burial trench 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/burial trench weekly as long as liquids are present in the pit/burial trench. 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 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/burial trench life span (Subsection R of 19.15.17.7 NMAC).

## **Burial Trench Closure Plan**

The wastes in the burial trench are destined for burial at the location proposed, which is in the same unit where the drilling wastes are generated.

The operator will not begin closure operations without approval of the closure plan submitted with the permit application.

### **Siting Criteria Compliance Demonstration**

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

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

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

### **Construction/Design Plan of Burial Trench**

The design and construction protocols for the burial trench are provided in the design and construction plan and in Plate 1.

### **General Protocols and Procedures**

- All free liquids from the burial trench will be recycled or disposed in a manner consistent with OCD Rules.
- No free fluids (e.g. precipitation or minimal drilling fluids) will remain in the burial trench for more than 72 hours.
- The residual drilling mud and cuttings will be stabilized to a capacity sufficient to support the 4-foot thick soil cover prior to placement into the trench. This will be accomplished by drying via evaporation or will adding dry material to the top of the solids to facilitate stabilization.
- The solids will not be mixed at a ratio greater than 1 part burial trench 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 the 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 (not the surface of the drilling or production pad).

### **Waste Material Sampling Plan**

Prior to closure, a five-point (minimum) composite sample of the solids derived from each well 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. The composite samples of solids will be obtained from the drying pad prior to any mixing with dry earth material. A sample of clean earth material that may be mixed with the drilling solids will be obtained for laboratory testing. When the trench will no longer accept solids (due to the time limits in the Rule or because the trench is at capacity, the laboratory results will be mathematically mixed (3 parts clean mixing dirt to the average concentration of the drilling waste samples) to determine compliance with the standards of Table II.

## Burial Trench Closure Plan

If a concentration of a constituent 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. If the concentration of a constituent in the drilling solids prior to mixing with earth material is less than the concentrations given in Table I of the Pit Rule, the operator may submit a variance request to allow closure pursuant to an alternative method.

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

Disposal Facility Name: R360

Permit Number: NM 01-0006

### Protocols and Procedures for Earthwork

Stabilization of the residual cuttings and mud is accomplished by allowing the solids to dry in the pit/trench and, if necessary, placing dry earth material over the solids. After stabilization the operator or qualified contractor will:

1. Fold the outer edges of the trench liner over the solids
2. Place a geomembrane cover over the sloping surface of 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.
3. Use a geomembrane cover made of 20-mil string reinforced LLDPE liner
4. Over the sloping, stabilized material and liner, 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.
  - c. The stabilized material must lie 4-feet below natural grade (not 4-feet below the production/drilling pad surface)
5. 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 names, API numbers, and location of the burial trench.

After approval for on-site 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 burial trench. 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. 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 burial trench location on form C-105 if
- iv. 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 burial trench within 6 months from the date the first drilling rig was released from the first well using the burial trench. 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 on-site burial, the operator will reclaim the surface impacted by the burial trench, including access roads associated with the burial trench, 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 burial trench 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 on-site

- A. consists of a minimum of three feet of non-waste containing,

## Burial Trench Closure Plan

- 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.

# **Appendix A**

## **Site Inspection Photographs & Survey Information**

**R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142  
Albuquerque, NM 87104



View to southeast showing Cypress Federal 34 4H pump jack and lease road to location



View north showing area of proposed solids burial pit. Potash tailings pile and tailings pond/playa are in background.

District I  
1625 N. French Dr., Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720  
District II  
811 S. First St., Artesia, NM 88210  
Phone: (575) 748-1283 Fax: (575) 748-9720  
District III  
7000 Rio Brazos Road, 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 30-05-43076	Pool Code 11520	Pool Name Cedar Canyon Bone Spring
Property Code 304798	Property Name CYPRESS "34" FEDERAL	Well Number 10H
OGRID No. 16696	Operator Name OXY USA INC.	Elevation 3049.8'

**Surface Location**

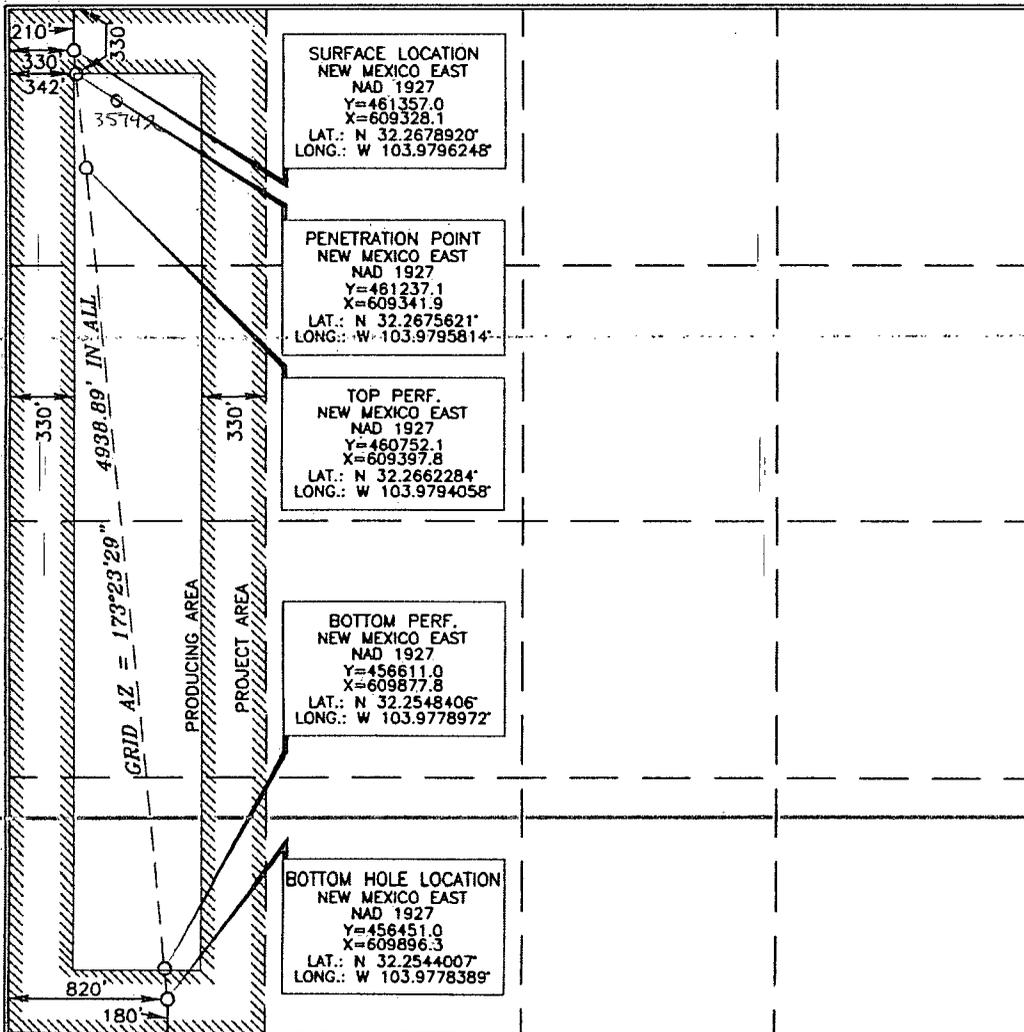
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	34	23 SOUTH	29 EAST, N.M.P.M.		210'	NORTH	330'	WEST	EDDY

**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
M	34	23 SOUTH	29 EAST, N.M.P.M.		180'	SOUTH	820'	WEST	EDDY

Dedicated Acres 160	Joint or Infill N	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.



**OPERATOR CERTIFICATION**

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature: *David Stewart* Date: 7/18/14  
Printed Name: David Stewart - Sp. Reg. ALC.  
E-mail Address: david\_stewart@oxy.com

**SURVEYOR CERTIFICATION**

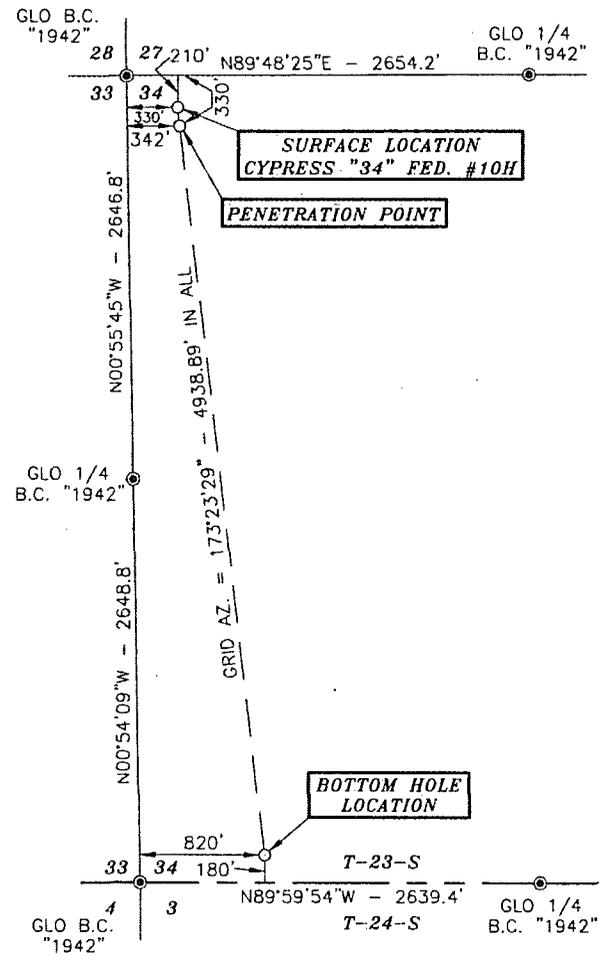
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Date of Survey: NOVEMBER 15, 2013  
Signature and Seal: *Terry J. Paul*  
Professional Surveyor

Certificate Number: 15079

Loc Plat

SECTION 34, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.,  
EDDY COUNTY  
NEW MEXICO



Basis of Bearings - GPS Geodetic Measurements  
 NM East Zone (83) North American Datum of 1983

**DIRECTIONS:**  
 BEGINNING AT THE INTERSECTION OF  
 HWY. #128 AND HWY. #31, GO EAST ON  
 HWY. #128 FOR 4.5 MILES, TURN SOUTH  
 ON EDDY CO. ROAD #793 (RAWHIDE  
 ROAD) FOR 4.1 MILES, TURN WEST ON  
 LEASE ROAD FOR 3.5 MILES, TURN  
 SOUTH FOR 1.4 MILES, TURN RIGHT AND  
 GO NORTHWEST FOR 0.2 MILES TO  
 LOCATION.

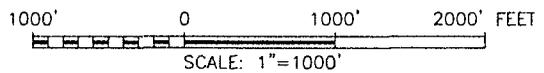


**LEGEND**  
 ● - DENOTES FOUND MONUMENT AS NOTED

**SURVEYORS CERTIFICATE**

I, TERRY J. ASEL, NEW MEXICO PROFESSIONAL SURVEYOR  
 NO. 15079, DO HEREBY CERTIFY THAT I CONDUCTED AND AM  
 RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS  
 TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND  
 BELIEF, AND MEETS THE "MINIMUM STANDARDS FOR  
 SURVEYING IN NEW MEXICO" AS ADOPTED BY THE NEW  
 MEXICO STATE BOARD OF REGISTRATION FOR  
 PROFESSIONAL ENGINEERS AND SURVEYORS.

*Terry J. Asel* 2/25/2014  
 Terry J. Asel N.M. R.P.L.S. No. 15079



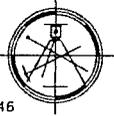
**OXY USA INC.**

CYPRESS "34" FED. #10H LOCATED AT  
 210' FNL & 330' FWL IN SECTION 34,  
 TOWNSHIP 23 SOUTH, RANGE 29 EAST,  
 N.M.P.M., EDDY COUNTY, NEW MEXICO

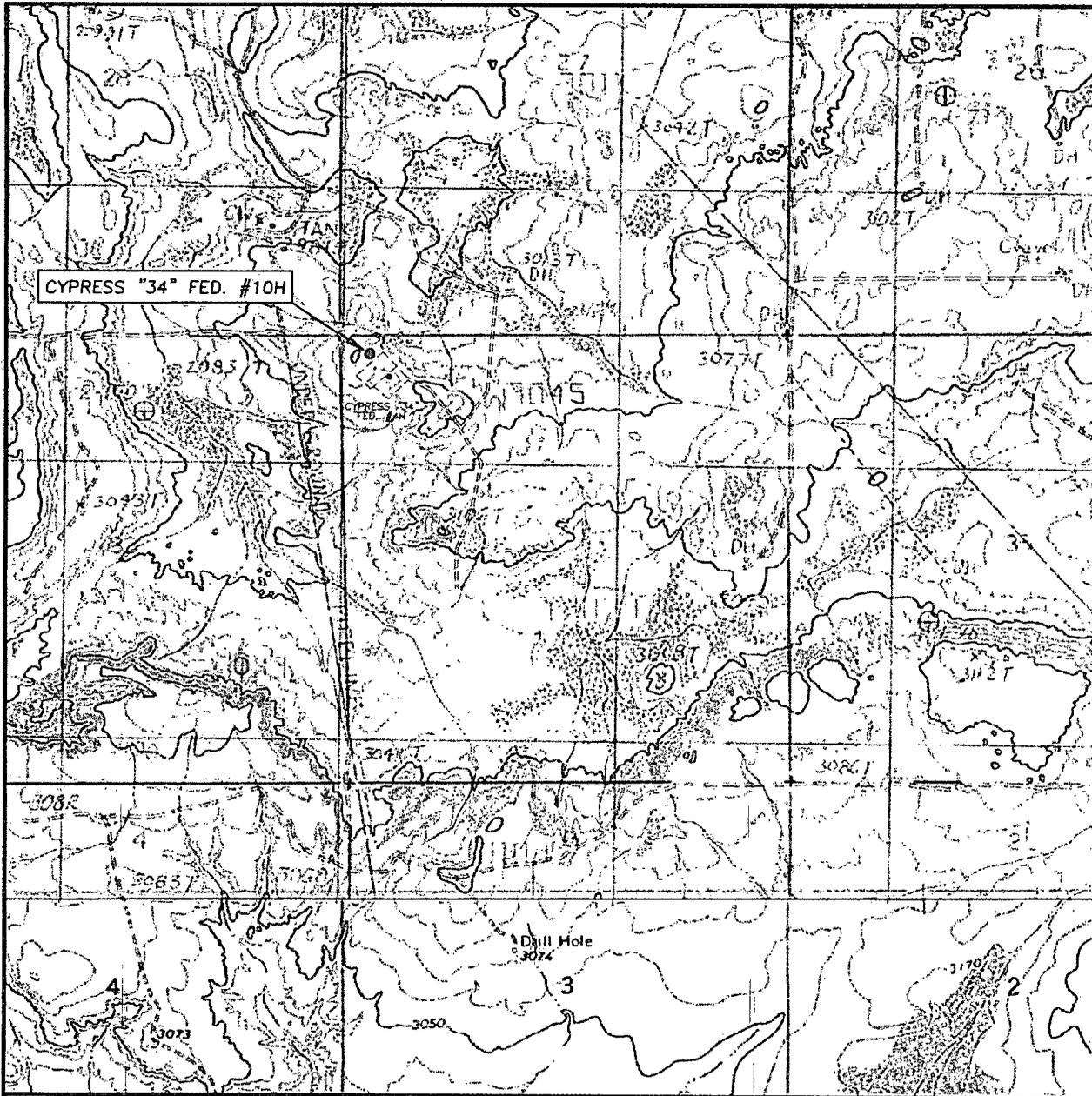
Survey Date: 11/15/13	Sheet 1 of 1 Sheets
W.O. Number: 131115WL-c (Rev. B)	Drawn By: KA Rev: B
Date: 02/24/14	131115WL-c Scale: 1"=1000'

Asel Surveying

P.O. BOX 393 - 310 W. TAYLOR  
 HOBBS, NEW MEXICO - 575-393-9146



# LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL: 10'

SEC. 34 TWP. 23-S RGE. 29-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 210' FNL & 330' FWL

ELEVATION 3049.8'

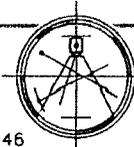
OPERATOR OXY USA INC.

LEASE CYPRESS "34" FED. #10H

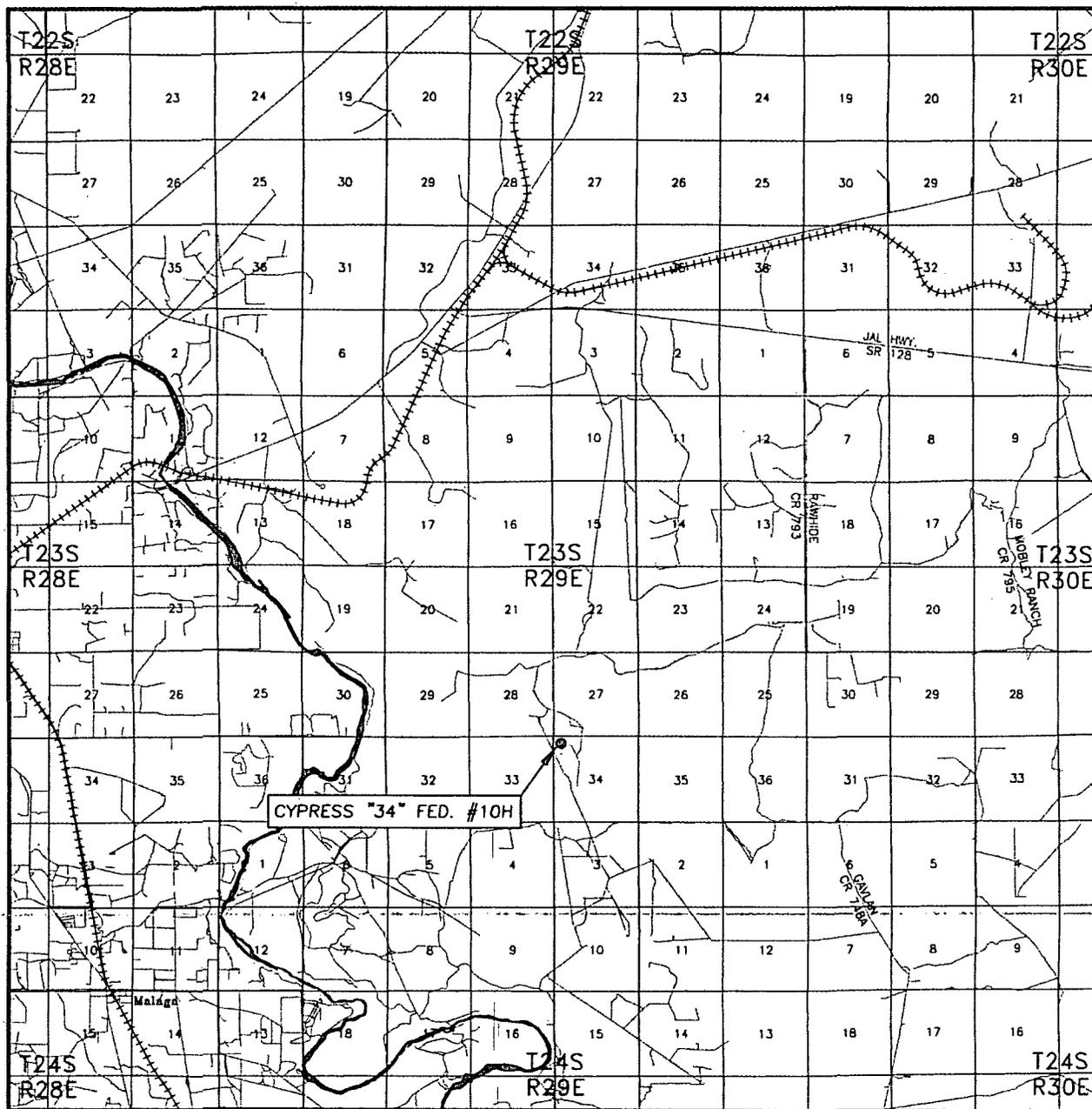
U.S.G.S. TOPOGRAPHIC MAP  
REMUDA BASIN, N.M.

Asel Surveying

P.O. BOX 393 - 310 W. TAYLOR  
HOBBS, NEW MEXICO - 575-393-9146



# VICINITY MAP



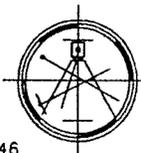
CYPRESS "34" FED. #10H

SEC. 34 TWP. 23-S RGE. 29-E  
 SURVEY N.M.P.M.  
 COUNTY EDDY  
 DESCRIPTION 210' FNL & 330' FWL  
 ELEVATION 3049.8'  
 OPERATOR OXY USA INC.  
 LEASE CYPRESS "34" FED. #10H

SCALE: 1" = 2 MILES

Asel Surveying

P.O. BOX 393 - 310 W. TAYLOR  
 HOBBS, NEW MEXICO - 575-393-9146



DIRECTIONS BEGINNING AT THE INTERSECTION OF HWY. #128 AND HWY. #31, GO EAST ON HWY. #128 FOR 4.5 MILES, TURN SOUTH ON EDDY CO. ROAD #793 (RAWHIDE ROAD) FOR 4.1 MILES, TURN WEST ON LEASE ROAD FOR 3.5 MILES, TURN SOUTH FOR 1.4 MILES, TURN RIGHT AND GO NORTHWEST FOR 0.2 MILES TO LOCATION.

# **Appendix B**

**Gi bXfmBchjW**

**BLM Approved Conditions and  
Sundry Modification of COAs**

**R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142  
Albuquerque, NM 87104

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0135  
Expires: July 31, 2010

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*

5. Lease Serial No.  
NMNM86024

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

**SUBMIT IN TRIPLICATE - Other instructions on reverse side.**

1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		8. Well Name and No. CYPRESS 34 FEDERAL 10H
2. Name of Operator OXY USA INC.		9. API Well No. 30-015-43076
3a. Address P.O. BOX 50250 MIDLAND, TX 79710		10. Field and Pool, or Exploratory CEDAR CANYON BONE SPRING
3b. Phone No. (include area code) Ph: 432-685-5717 Fx: 432-685-5742		
4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  Sec 34 T23S R29E NWNW 210FNL 330FWL 32.267892 N Lat, 103.979624 W Lon		11. County or Parish, and State  EDDY COUNTY, NM

**12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA**

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	Change to Original APD
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

OXY USA Inc. respectfully requests approval for the following changes to the drilling plan:

Pending NMOCD approval of a C-144 permit application and BLM approval, OXY plans to change from a closed-loop/haul-off protocol for drilling waste management (solids and liquids) to a temporary pit with on-site burial of dry waste solids. The location of the proposed pit lies within the permitted location footprint. OXY understands the COA's associated with the use of drilling pits and on-site burial on Federal wells.

If OXY cannot gain BLM/NMOCD approval for the temporary pit, drilling of this well will proceed as currently approved for closed-loop/haul-off.

R.T Hick Consultants (Randall Hicks, 505-266-5004) will provide a copy of the C-144 permit

14. I hereby certify that the foregoing is true and correct.		<b>Electronic Submission #308022 verified by the BLM Well Information System For OXY USA INC., sent to the Carlsbad</b>	
Name (Printed/Typed)	LINDSAY EARLE	Title	DRILLING ENGINEER
Signature	(Electronic Submission)	Date	07/06/2015

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved By _____	Title _____	Date _____
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.		Office _____

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**\*\* OPERATOR-SUBMITTED \*\* OPERATOR-SUBMITTED \*\* OPERATOR-SUBMITTED \*\***

**Additional data for EC transaction #308022 that would not fit on the form**

**32. Additional remarks, continued**

application and additional information that might be required.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB No. 1004-0137  
Expires: July 31, 2010

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.*

5. Lease Serial No.  
SHL: NM 34461 BHL: NM 30752

6. If Indian, Allottee or Tribe Name

**SUBMIT IN TRIPLICATE** – Other instructions on page 2.

7. If Unit of CA/Agreement, Name and/or No.  
n/a

8. Well Name and No.  
War Horse Federal Com 1H

9. API Well No.  
30-015-41013

10. Field and Pool or Exploratory Area  
Wildcat G-04 5182927m; B.S.

11. Country or Parish, State  
Eddy, NM

1. Type of Well  
 Oil Well     Gas Well     Other

2. Name of Operator  
Murchison Oil and Gas, Inc.

3a. Address  
1100 Mira Vista Blvd.  
Plano, TX 75093

3b. Phone No. (include area code)  
(972) 931-0700

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  
Surface Location 350 FNL, 175 FEL  
Unit A, Section 21, T18S, R29E

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other _____
	<input checked="" type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

The current APD for this well allows for the use of a reserve pit and on-site disposal burial of drilling waste. BLM approved a previous sundry notice (update to match new NMOCD Pit Rule) for this well on 11/7/2013 and issued new COAs. On 1/13/2014, NMOCD approved the C-144 application for a temporary pit and on-site closure of the pit in accordance with the NMOCD Pit Rule. After discussing these COAs with BLM in meetings and in the field, Murchison requests the following VARIANCES from the existing COAs:

(1) ENCLOSURE NETTING: After the well is drilled, 24-hour activity typically continues on site for approximately 15-25 days for fracturing, flowback, and monitoring of the well. Murchison will remove free fluids from the pit during this time. If this cannot be achieved, Murchison will install netting that is protective of humans, wildlife, and livestock over remaining free fluids after 24-hour activity has ceased.

(2) ESCAPE RAMPS: In lieu of escape ramps described in the COA and to prevent entrapment of livestock, humans, and wildlife, a felt-like geotextile fabric is proposed to be installed over the liner across the entire rig side of the pit, at the far corners of the outer horse shoe cell, and in the center of the outside walls of the discharge and suction legs of the outer cell.

14. I hereby certify that the foregoing is true and correct.

Name (Printed/Typed)

Chace Walls

Title Production Foreman

Signature



Date 03/14/2014

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved by

*Carly D. Loytko*

Title

*MRS*

Date

*04/25/14*

Office

*CFO*

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

## GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations and reports of such operations when completed as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local area or regional procedures and practices, are either shown below, will be issued by or may be obtained from the local Federal office.

## SPECIFIC INSTRUCTIONS

*Item 4* - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

*Item 13* - Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or present productive zones or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to the top of any tubing left in the hole; method of closing top of well and date well site conditioned for final inspection looking for approval of the abandonment.

## NOTICES

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

**AUTHORITY:** 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.

**PRINCIPAL PURPOSE:** The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3, and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c) and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.

**ROUTINE USES:** Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.

**EFFECT OF NOT PROVIDING THE INFORMATION:** Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3-2, 3162.3-3, 3162.3-4.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM collects this information to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.

Response to this request is mandatory.

The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

**BURDEN HOURS STATEMENT:** Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C St., N.W., Mail Stop 401 LS, Washington, D.C. 20240

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB No. 1004-0137  
Expires: July 31, 2010

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.*

5. Lease Serial No.  
SHL NM067132 BHL: NM30752

6. If Indian, Allottee or Tribe Name

**SUBMIT IN TRIPLICATE** - Other instructions on page 2.

7. If Unit of CA/Agreement, Name and/or No.  
N/A

1. Type of Well

Oil Well     Gas Well     Other

8. Well Name and No.  
War Horse Fed Com 3H

2. Name of Operator  
Murchison Oil and Gas, Inc

9. API Well No.  
30-015-41227

3a. Address  
1100 Mira Vista Blvd. Plano, Texas 75093

3b. Phone No. (include area code)  
972-931-0700

10. Field and Pool or Exploratory Area  
Wildcat G-04 5182927m; B.S.

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  
Surface Location 2290 F&L & 175 F&L, Section 21, T19S R29E

11. Country or Parish, State  
Eddy

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other _____
	<input checked="" type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplate horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 90 days following completion of the involved operations. If the operation results in a multiple completion or recomplate in a new interval, a Form 3160-3 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

Today, BLM recieved an email-transmission of a C-144 Permit for a reserve pit at this location. The current APD for this well did not allow reserve pits and on-site burial of drilling waste - probably due to the lack of a surface use agreement with the surface owner (Concho Oil and Gas). The surface use agreement between Murchison and Concho is now in place and provides for the use of reserve pits with on-site burial of waste. Note that this sundry notice and the C-144 application was also transmitted to Concho.

BLM approved the use of a reserve pit for War Horse Fed Com 1H, which lies about 1/2 mile north of this well. The current C-144 for the War Horse Fed Com 3H conforms with the 2013 NMOCD Pit Rule and is nearly identical to the previously approved pit permit for the War Horse Fed Com 1H, which was submitted under the 2012 Pit Rule.

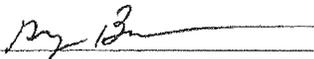
OK CRL \* see new Coa's Attached \*

14. I hereby certify that the foregoing is true and correct.

Name (Printed/Typed)  
Greg Boans

Title Production Superintendent

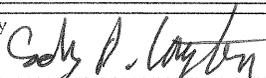
Signature



Date 10/21/2013

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved by



Title

MRS

Date

11/04/13

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

CFO

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

# PECOS DISTRICT CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	Murchison Oil & Gas, Inc.
<b>LEASE NO.:</b>	NMNM-030752
<b>WELL NAME &amp; NO.:</b>	War Horse Fed Com 3H
<b>SURFACE HOLE FOOTAGE:</b>	2290' FSL & 0175' FEL
<b>BOTTOM HOLE FOOTAGE:</b>	2290' FSL & 0330' FWL
<b>LOCATION:</b>	Section 21, T. 18 S., R 29 E., NMPM
<b>COUNTY:</b>	Eddy County, New Mexico

## TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
  - Communitization Agreement
- Construction**
  - Notification
  - Topsoil
  - Reserve Pits
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- Road Section Diagram**
- Drilling**
  - H2S requirements
  - Logging Requirements
  - Waste Material and Fluids
- Production (Post Drilling)**
  - Well Structures & Facilities
- Interim Reclamation**
- Final Abandonment & Reclamation**

## **I. GENERAL PROVISIONS**

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

## **II. PERMIT EXPIRATION**

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

## **III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

## **IV. NOXIOUS WEEDS**

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

## V. SPECIAL REQUIREMENT(S)

### Communitization Agreement

A Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the BLM. The effective date of the agreement shall be prior to any sales.

### Communitization Agreement Wells

The well sign for a communitization agreement (CA) wells shall include the CA number in addition to the surface and bottom hole lease numbers.

## VI. CONSTRUCTION

### A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

### B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

### C. RESERVE PITS

The pit will be closed in accordance with NMOCD pit rules, with the following additional stipulations:

#### **Construction:**

#### Burial

The reserve pit shall be constructed, so that upon completion of drilling operations, the dried pit contents shall be buried a minimum depth of four (4) feet below ground level. Should the pit content level not meet the four foot minimum depth requirement, the excess contents shall be removed until the required minimum depth of four feet below ground level has been met. The operator shall properly dispose of the excess contents at an authorized disposal site.

#### **Below Ground Level**

The reserve pit will be constructed entirely below ground level (as opposed to pushing up dirt to form the sides of the pit).

#### **Liner and Contents**

All pits that may contain liquid material shall be lined with a 20 ml liner or greater to prevent seepage into the ground. The pit liner shall be maintained in good working condition, with no tears or holes, until the pit is closed. No trash, pipe, barrels, wireline, or metal equipment is permitted in the pit.

#### **Freeboard**

Pits shall be constructed to preclude the accumulation of precipitation runoff and maintain a minimum of 2 feet of freeboard between the maximum fluid level and the lowest point of containment at all times. If pit fluids threaten to rise to a level allowing less than 2 feet of freeboard, steps shall immediately be taken to prevent introduction of additional fluids until sufficient pit capacity has been restored through fluid removal or an alternative containment method is approved and installed.

#### **Exclosure Netting**

The operator will prevent humans, wildlife (*including avian wildlife*), and livestock access to fluid pits that contain or have potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will install approved netting in accordance with the requirements below. (**Note:** *The BLM does not approve of the use of flagging, strobe lights, metal reflectors, or noise makers as techniques for deterring wildlife.*)

Minimum Netting Requirements - The operator will:

- Construct a rigid structure made of steel tubing or wooden posts with cable strung across the pit at no more than seven (7) foot intervals along the X- and Y-axes to form a grid of 7 foot squares.
- Suspend netting a minimum of 4 to 5 feet above the fluid surface.
- Use a maximum netting mesh size of 1 ½ inches to exclude most birds.
- Cover the top and all sides of the netting support frame with netting and secure the netting at the ground surface around the entire pit to prevent wildlife entry at the netting edges. (**Note:** *Hog wire panels or other wire mesh panels or fencing used on the sides of the netting support frame is ineffective in excluding small wildlife and birds unless covered by the smaller mesh netting.*)
- Monitor and maintain the netting sufficiently to ensure the netting is functioning as intended, has not entrapped wildlife, and is free of holes and gaps greater than 1 ½ inches.

#### **Exclosure Fence**

The operator will install and maintain exclosure fencing on all sides of the reserve pit to prevent access to public, livestock, and large forms of wildlife. Only one side of the

reserve pit fence may be set aside during drilling or fracturing operations, but must be reconstructed when these operations are not being performed.

- The fence shall be installed at least two (2) feet from the edge of the pit.
- Construction of the fence shall consist of steel and/or wooden posts set firmly into the ground.
- All corners shall be braced.
- Use a fence with five separate wires (smooth or barbed) or hog panel (16 ft. length by 50 in. height) with connectors such as fence staples, clips, hog rings, hose clamps, twisted wire, etc. The fencing must be secured to the posts.
- The wire (if used) must be stretched tightly and spaced evenly to effectively exclude animals.
- Do not use electric fences.
- The erected fence shall be maintained in adequate condition until the dried reserve pit undergoes backfilling.
- (For examples of enclosure fencing design, refer to BLM's Oil and Gas Gold Book, Enclosure Fence Illustrations, Figure 1, Page 18.)

#### **Escape Ramps**

The operator will construct and maintain reserve pits to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or other methods of avian and terrestrial wildlife escape in reserve pit. Escape ramps must be installed at every corner of the reserve pit and in the center of each side if that side exceeds 100 feet in length. Escape ramps must be in contact with the side of the reserve pit, bottom of the reserve pit, and the top of the reserve pit berm. Escape ramps cannot be made of metal and cannot be steeper than a 3:1 slope (Horizontal Distance: Vertical Distance) or 30% slope. (*Examples of escape ramps: 12" wide wooden planks wrapped in matting, felt lining, etc.*)

#### **Maintenance:**

##### **Hydrocarbons**

Any hydrocarbons (condensate, paraffin, diesel, etc.) introduced to the reserve pit shall be removed within 24 hours.

#### **Closure:**

##### **NMOCD**

The pit will be closed in accordance with NMOCD pit closure rules, with the following additional stipulations:

##### **Drying**

When drilling is completed, the fluids must be drawn off the pit within 30 days and the pit reclaimed within six months. The pit should also be fully enclosed with fencing on 4 sides during the drying process.

##### **Notificaiton**

The operator will notify a BLM Environmental Protection Specialist (575-234-5972) three days prior to beginning closure operations.

##### **Sampling**

The BLM may wish to witness the sampling of the pit contents and excavation bottoms. The operator will notify a BLM Environmental Protection Specialist three days prior to sampling pit contents or excavation bottoms.

**Solidifying Pit Contents**

Only mineral materials can be used to solidify pit contents. The operator is prohibited from using topsoil materials stockpiled on location for this purpose.

**Burial (Onsite)**

If onsite burial is approved by the NMOCD, the pit liner sides will be folded over the pit contents and a separate liner installed atop the encapsulated pit materials. The top liner must be located four feet below the natural ground surface. Should the pit content level not meet the four foot minimum depth requirement, the excess contents shall be removed until the required minimum depth of four feet below ground level has been met. The operator shall properly dispose of the excess contents at an authorized disposal site.

**Burial (Trench)**

If trench burial is elected as a closure method, the trench burial must be located within the confines of the approved pad. The operator should consider where the trench burial will be located in advance of pad and facility construction in order to accommodate this requirement. The trench will be fully lined, the reserve pit materials fully encapsulated, and liner installed over the top of the containment. The top liner must be located four feet below the natural ground surface.

**Surface Restoration:**

**Backfilling**

For both onsite and trench burials: clean mineral materials may be used to backfill on top of the liner installation or to backfill excavated pit areas to a backfill level that reaches the natural topsoil depth of the surrounding terrain or 1 foot below surface level, whichever is greater. (In sandy soils, 2 feet of topsoil material is required.) Clean and viable topsoil must be used as the top fill on the excavations and reclamation areas in order to establish vegetation. Topsoil materials must be a good match to that of the surrounding terrain.

**Contouring**

The surface of the reserve pit reclamation and/or trench burial should be recontoured to match that of the native terrain.

**Erosion Control**

Erosion control measures must be installed to ensure that reclamation stabilizes and establishes vegetation. If erosion issues develop, the erosion issues must be addressed immediately by bringing in additional backfill material and re-establishing erosion control measures.

**Seeding**

The location must be seeded with an appropriate BLM seed mix for the soil type of the area.

**D. FEDERAL MINERAL MATERIALS PIT**

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

#### **E. WELL PAD SURFACING**

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation.

The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

#### **F. EXCLOSURE FENCING (CELLARS & PITS)**

##### **Exclosure Fencing**

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

#### **G. ON LEASE ACCESS ROADS**

##### **Road Width**

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

##### **Surfacing**

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

### Crowning

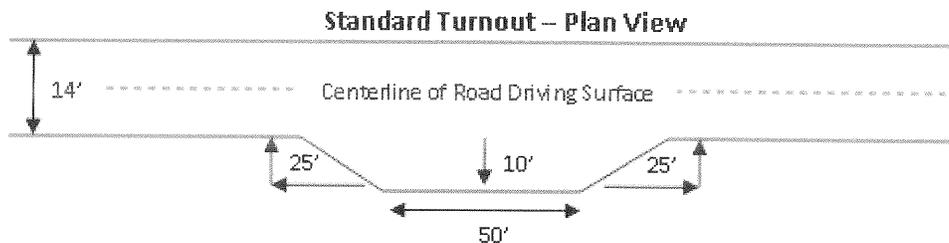
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

### Ditching

Ditching shall be required on both sides of the road.

### Turnouts

Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:

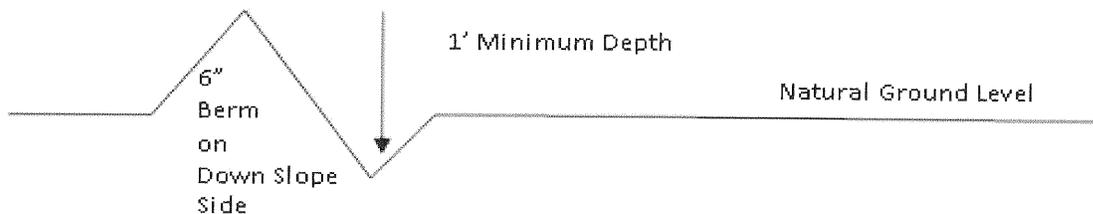


### Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill out sloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

### Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

### **Formula for Spacing Interval of Lead-off Ditches**

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

### **Culvert Installations**

Appropriately sized culvert(s) shall be installed at the deep waterway channel flow crossing.

### **Cattleguards**

An appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s).

Any existing cattleguard(s) on the access road shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguard(s) that are in place and are utilized during lease operations.

A gate shall be constructed and fastened securely to H-braces.

### **Fence Requirement**

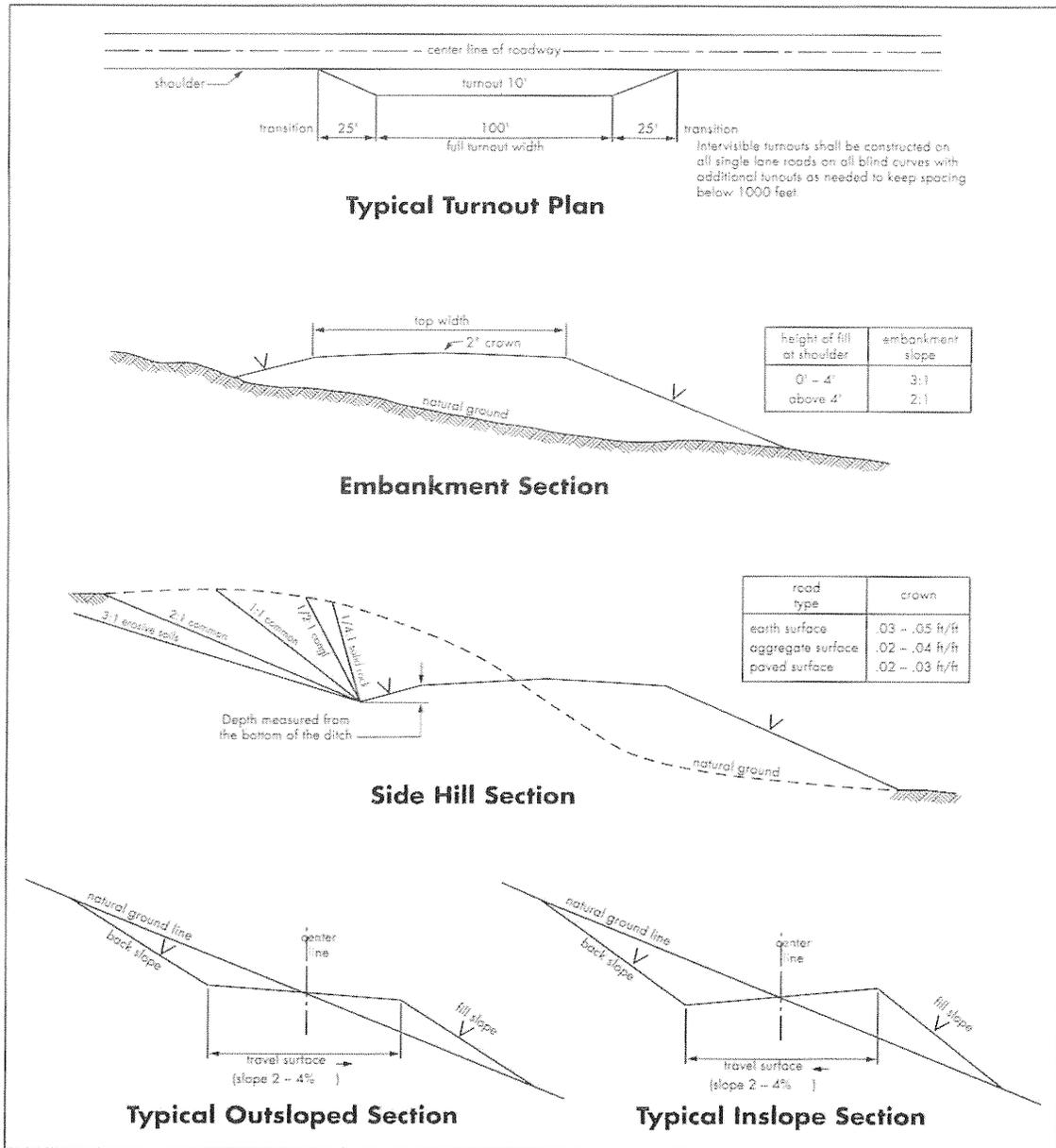
Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

### **Public Access**

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

**Figure 1 – Cross Sections and Plans For Typical Road Sections**



## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

- a. Spudding well
- b. Setting and/or Cementing of all casing strings
- c. BOPE tests

**Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(575) 361-2822

1. **A Hydrogen Sulfide (H<sub>2</sub>S) Drilling Plan shall be activated prior to drilling out the surface shoe. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.
4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

## **B. CASING**

**Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.).**

**Centralizers required on surface casing per Onshore Order 2.III.B.1.f.**

**Wait on cement (WOC) time prior to drilling out for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.**

**No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.**

**Possibility of water and brine flows in the Salado and Artesia Groups.  
Possibility of lost circulation in the Grayburg and San Andres formations.**

1. The 13-3/8 inch surface casing shall be set at approximately 280 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.

**Formation below the 13-3/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight anticipated to control the formation pressure to the next casing depth. Report results to BLM office.**

2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing is:

Cement to surface. If cement does not circulate see B.1.a, c-d above.

**Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight anticipated to control the formation pressure to the next casing depth. Report results to BLM office.**

**Centralizers required through the curve and a minimum of one every other joint.**

3. The minimum required fill of cement behind the 7 inch production casing is:

Cement to surface. If cement does not circulate see B.1.a, c-d above.

**Formation below the 7" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight anticipated to control the formation pressure to the next casing depth. Report results to BLM office.**

4. Cement not required on the 4-1/2" casing. **Packer system being used.**

5. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

## **C. PRESSURE CONTROL**

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M) psi. 5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**
3. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
  - b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer.**
  - c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock.
  - d. The results of the test shall be reported to the appropriate BLM office.
  - e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
  - f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

#### **D. DRILL STEM TEST**

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

**E. WASTE MATERIAL AND FLUIDS**

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

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## VIII. PRODUCTION (POST DRILLING)

### A. WELL STRUCTURES & FACILITIES

#### **Placement of Production Facilities**

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

#### **Exclosure Netting (Open-top Tanks)**

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

#### **Chemical and Fuel Secondary Containment and Exclosure Screening**

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

#### **Open-Vent Exhaust Stack Exclosures**

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

#### **Containment Structures**

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the

largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

#### **Painting Requirement**

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

### **IX. INTERIM RECLAMATION**

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

### **X. FINAL ABANDONMENT & RECLAMATION**

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by

drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Seed Mixture 2, for Sandy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)\* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed\* per acre:

<u>Species</u>	<u>lb/acre</u>
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	1.0
Sand love grass ( <i>Eragrostis trichodes</i> )	1.0
Plains bristlegrass ( <i>Setaria macrostachya</i> )	2.0

\*Pounds of pure live seed: Pounds of seed x percent purity x percent germination = pounds pure live seed

ALL 11/4/13