Received 7/25/2017
NMOCD Dist 2

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: Murchison Oil & Gas, Inc. OGRID #: 15363

Address: 7250 Dallas Parkway, Suite 1400, Plano, TX 75024

Facility or well name: Jawbone State temporary pit

API Number: 30-015-43985 OCD Permit Number: 2-13-0034

U/L or Qtr/Qtr C Section 2 Township 25S Range 26E County: Eddy

Center of Proposed Design: Latitude 32.165971° Longitude -104.265214° NAD: ☐ 1927 ☒ 1983

Surface Owner: ☐ Federal ☒ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.

☒ **Pit:** Subsection F, G or J of 19.15.17.11 NMAC

Temporary: ☒ Drilling ☐ Workover

☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A ☐ Multi-Well Fluid Management Low Chloride Drilling Fluid ☐ yes ☒ no

☒ Lined ☐ Unlined Liner type: Thickness 20 mil ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other _____

☒ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 20,698 bbl Dimensions: L 120 x W 170 x D 7-12 ft

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.

Variances and Exceptions:

Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance.

Please check a box if one or more of the following is requested, if not leave blank:

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

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

9.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

Instructions: The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. **Siting criteria does not apply to drying pads or above-grade tanks.**

General siting	
Ground water is less than 25 feet below the bottom of a low chloride temporary pit or below-grade tank. - ☐ NM Office of the State Engineer - iWATERS database search; ☐ USGS; ☐ Data obtained from nearby wells	☐ Yes ☐ No ☒ NA
Ground water is less than 50 feet below the bottom of a Temporary pit, permanent pit, or Multi-Well Fluid Management pit . NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells **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

Within 100 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Temporary Pit Non-low chloride drilling fluid	
Within 300 feet of a continuously flowing watercourse, or any other significant watercourse, or within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). **See Figure 3** - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image. **See Figure 4**	☐ Yes ☒ No
Within 500 horizontal feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or 1000 feet of any other fresh water well or spring, in the existence at the time of the initial application; - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site **See Figures 1 & 2**	☐ Yes ☒ No
Within 300 feet of a wetland. **See Figure 6** - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Permanent Pit or Multi-Well Fluid Management Pit	
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☐ No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No

10.

Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC

Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

☐ Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
☒ Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC
☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
☒ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

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

11.

Multi-Well Fluid Management Pit Checklist: Subsection B of 19.15.17.9 NMAC

Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
☐ A List of wells with approved application for permit to drill associated with the pit.
☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC
☐ Hydrogeologic Data - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC

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

12.

Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC

Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Climatological Factors Assessment
- ☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Quality Control/Quality Assurance Construction and Installation Plan
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Nuisance or Hazardous Odors, including H_2S, 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	☐ Yes ☒ No ☐ 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	☐ Yes ☒ No ☐ NA
Ground water is more than 100 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Within 100 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☒ No
Within 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	☐ Yes ☒ No
Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within 300 feet of a wetland. US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance	

adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	☐ Yes ☒ No
Within a 100-year floodplain. - FEMA map	☐ Yes ☒ No

16.

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

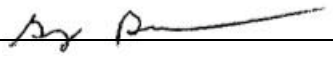
- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection E of 19.15.17.13 NMAC
- ☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of Subsection K of 19.15.17.11 NMAC
- ☒ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☒ Waste Material Sampling Plan - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)
- ☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

17.

Operator Application Certification:

I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name (Print): Greg Boans Title: Production Superintendent

Signature:  Date: February 8, 2017

e-mail address: gboans@jdmii.com Telephone: (575) 361-4962

18.

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

OCD Representative Signature: Jim Griswold **Approval Date:** 9/21/2017

Title: OCD Environmental Bureau Chief **OCD Permit Number:** 2-13-0034

19.

Closure Report (required within 60 days of closure completion): 19.15.17.13 NMAC

Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☐ **Closure Completion Date:**

20.

Closure Method:

☐ Waste Excavation and Removal ☐ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)

☐ If different from approved plan, please explain.

21.

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

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

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

22.

Operator Closure Certification:

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

Name (Print): _____ Title: _____

Signature:_____ Date: _____

e-mail address:_____ Telephone: _____

R. T. HICKS CONSULTANTS, LTD.

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

July 25, 2017

Mr. Mike Bratcher
Mr. Bradford Billings
NMOCD District 2
811 S. First Street
Artesia, New Mexico 88210
VIA EMAIL

RE: Murchison Oil and Gas, Inc. - Jawbone State Com
C-144 temporary pit application

Dear Mr. Bratcher and Mr. Billings:

On behalf of Murchison Oil and Gas, Inc., R. T. Hicks Consultants re-submits the attached C-144 temporary pit application for the Jawbone State Com wells 1H, 3H, and 4H. This application was originally submitted to the District on February 8, 2017 and was automatically denied by NMOCD after 60 days of inaction. The application was for a temporary pit for solids only and would not be used for circulation. After NMOCD stated that approval would not be possible within the 60-day timeline, we then informed the District that the site would be used as drying pad with construction and operation in accordance with the submitted plan for the temporary pit. This solution appeared to work for all parties.

With the intent of converting the drying pad to a pit, thereby allowing in-place burial of the cuttings, we called a meeting with NMOCD to discuss concerns with the original pit application. On April 27, 2017, NMOCD, Murchison, and Hicks Consultants representatives met on location and agreed upon the following additions to the C-144 application submitted herein:

- A survey of the cuttings to confirm that the buried cuttings would be at least 4 feet below the surface of the surrounding grade
- The cuttings would be solidified using cement kiln dust (CKD) or fly ash before burial
- An erosion control plan that includes post-closure monitoring

NMOCD was notified of Hicks Consultants sampling the cuttings on May 10, 2017. Analysis revealed that the cuttings meet Table II criteria and we conveyed these results to NMOCD during a meeting at the District office on May 23, 2017. NMOCD advised to re-submit the application with the addendums stated above.

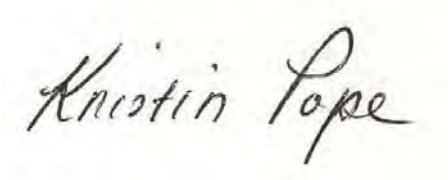
The design/construction, operation/maintenance and closure plans have been reviewed by a Registered Professional Engineer and the amendments to these plans are stamped. Please note the following additional elements of this application:

- A variance request is included in this application to allow the siting at the surface mapped as "high karst potential" by BLM.
- Although soluble bedrock (Salado and Castile Formation) exist at the location, there is no evidence at the site of karstic topographic features. A registered Professional Geologist familiar with mapping and karst features and the Professional Engineer agree that the ground is sufficiently stable for the burial of cuttings as proposed. Thus, the pit location meets setback requirements.
- We propose in-place closure of cuttings; **Murchison agrees to solidify with CKD or fly ash.**
- I certify that Randall Hicks and I performed visual inspections of the site.
- This letter and application are copied to the surface owner (State Land Office) as notification of the intent to bury drilling solids on-site.

Murchison is prepared to begin closure as soon as NMOCD approves this application. Please contact me if you have any questions regarding this application or if I can assist in your review in any way.

Sincerely,

R.T. Hicks Consultants



Kristin Pope
Project Geologist

Enclosures: Transect survey, erosion control plan, original C-144 application package

Copy: Murchison Oil and Gas,
Pettigrew & Associates,
Ed Martin (NM State Land Office)

PETTIGREW & ASSOCIATES PA

ENGINEERING | SURVEYING | TESTING

DEFINING QUALITY SINCE 1965

Project: **Murchison Oil & Gas, Inc.**
Jawbone State COM 3H
Proposed Temporary Solids Pit
Section 2, T25S, R26E
Eddy County, New Mexico

Date: **July 21, 2017**

Subject: **Post-Closure Erosion Control Plan_REV2**

This Post-Closure Erosion Control Plan will serve as a supplement to the Closure Plan prepared by R.T. Hicks Consultants.

Site Description and Location

The project site is located in Section 2, T25S, R26E, in Eddy County, NM. The approximate pit dimensions are 160' x 150' and the approximate depth is 10'.

Figure 1 - Site Location (Madron Surveying Inc., No. 4939A 12-9-16)

Recommendations

Restoration of Drainage

According to aerial images, two natural drainage features cross the site. The drainage pattern to the east of the pit shall be returned to the original condition. The drainage pattern through the center of the pit shall be redirected around the west side of the closure and reconvene with the southern portions of the channel as depicted in Figure 2 below.

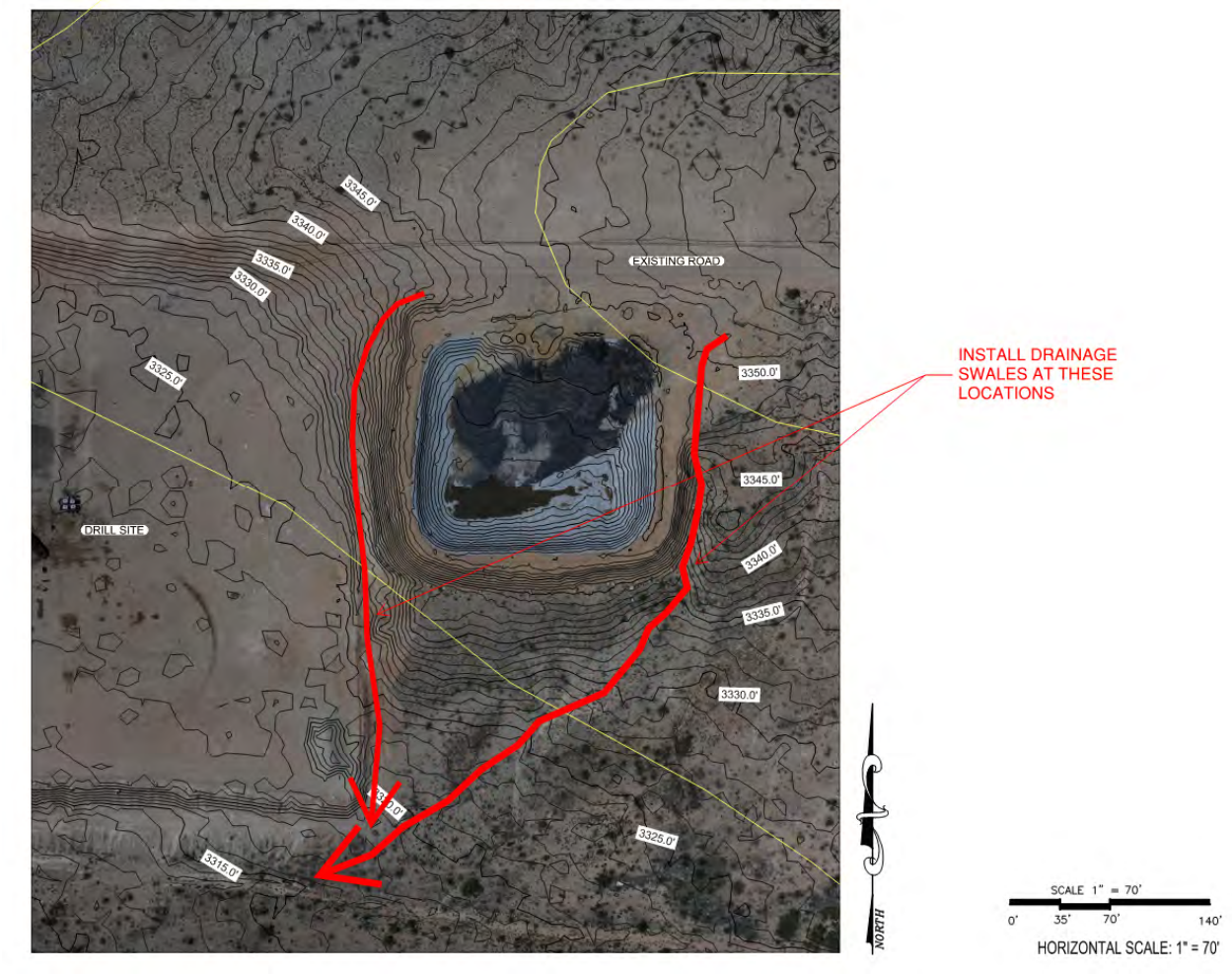


Figure 2 - Drainage Features

As-Built Survey and Erosion Control Methods

An as-built survey was conducted by Pettigrew & Associates, P.A. (*As-Built Survey Jawbone Site 6/16/17, Appendix A*) following the deposition of cuttings into the pit during its use as a drying pad. Utilizing the survey and aerial images, estimations for cuttings volume, approximate pit profile and the approximate original surface profile were prepared (See cross sections in Appendix A). It was determined there will be sufficient coverage (> 4 feet) over the cuttings after the surface profile is restored.

Restore the surface profile by placing and compacting natural material over the cuttings until the surface of the backfill is 12 inches below the proposed surface profile. Backfilling of the uppermost 12 inches of the soil cover should be accomplished by placing moisture conditioned fill, free of rocks and deleterious material, in 8" loose lifts and compacting until final grade has been reached. Once completed, the southern slope of the reclaimed site shall be the slope shown on profiles A-F (Appendix A), which should approximate the original grade shown on profiles A-F on the as-built survey. The site shall then be covered with Landlok® Erosion Control Blankets from Propex (Appendix B). These blankets should be installed in accordance with manufacturer recommendations as outlined in Appendix B. The blanket shall then be reseeded in accordance with the New Mexico Department of Transportation Zone 5 Seed List for the Southern Desertic Basins, Plains, and Mountains. A list of acceptable seeding is shown in Appendix C. Upon completion, R.T. Hicks Consultants will inspect the completed surface.

In an effort to maintain erosion control, during the first post-closure year, Murchison Oil and Gas, Inc. should visually inspect the reclaimed surface on a quarterly basis and after each significant rain event. During the second and subsequent years, inspections shall take place on a bi-annual basis. If any significant erosion is observed, Murchison shall evaluate a need for a remedy. A report of findings should be provided to the New Mexico Oil Conservation Division (OCD) on an annual basis.

Should any questions or concerns arise with regard to the recommendations provided herein, do not hesitate to contact our office.

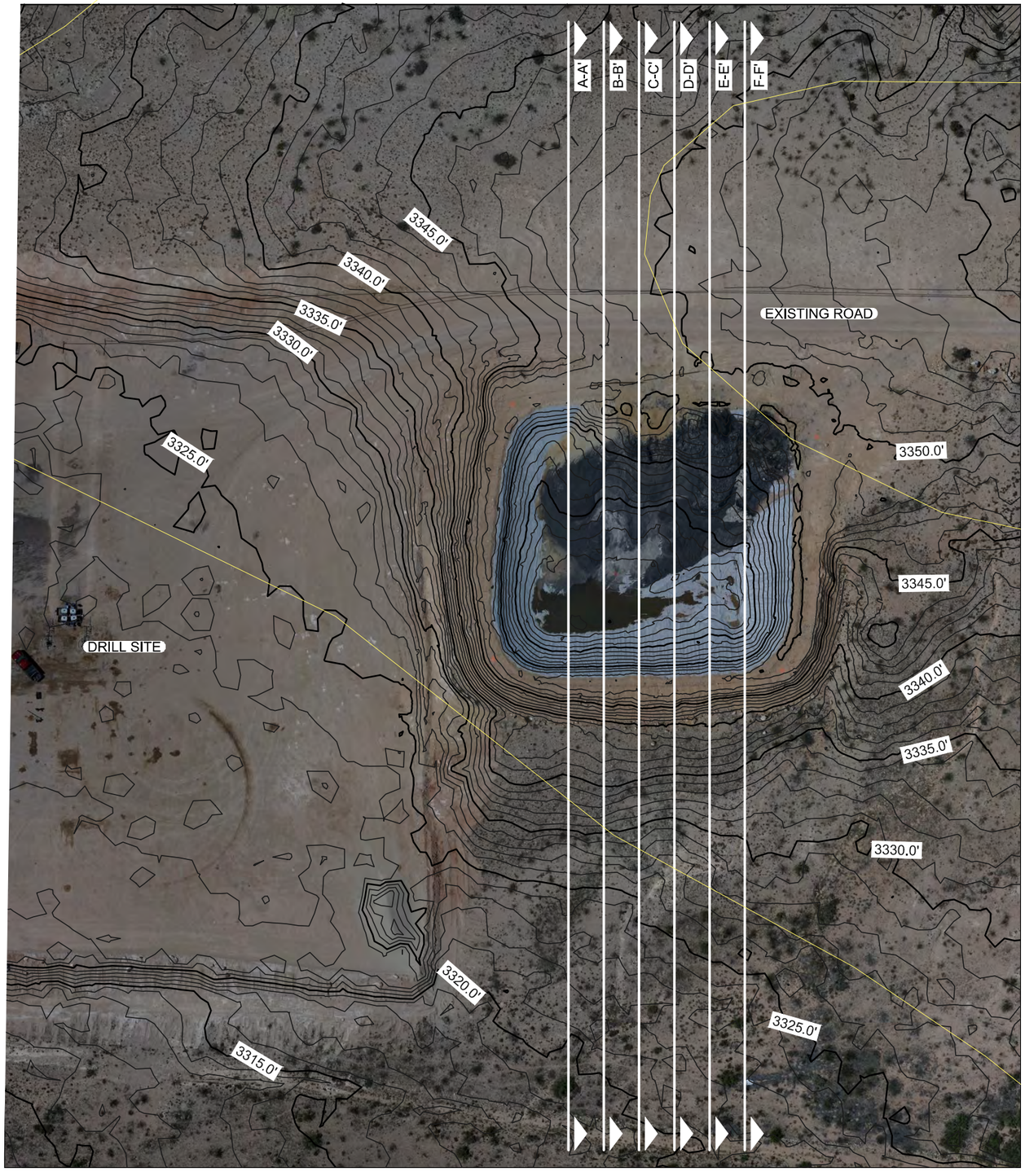
Regards,

Claudius Sanchez Czyzewska, PE NM No. 22897

07/21/2017

Appendix A

As-Built Survey Jawbone Site 6/16/17



AREA	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'
ESTIMATED AREA AVAILABLE 4 FEET BELOW APPROXIMATE ORIGINAL GROUND (FT^2) PER CROSS SECTION	309	403	611	596	669	485
ESTIMATED AREA OF CUTTINGS (FT^2) PER CROSS SECTION	231	307	402	337	368	357
LENGTH	**A-A'**	**B-B'**	**C-C'**	**D-D'**	**E-E'**	**F-F'**
ESTIMATED LENGTH (FT) PER CROSS SECTION	20	20	20	20	20	25
VOLUMES	**A-A'**	**B-B'**	**C-C'**	**D-D'**	**E-E'**	**F-F'**
ESTIMATED VOLUME OF CUTTINGS (FT^3) PER CROSS SECTION	4611	6148	8037	6750	7360	8936
TOTAL ESTIMATED VOLUME OF CUTTINGS (YD^3) USING THE CROSS SECTION METHOD	1550					
TOTAL ESTIMATED VOLUME OF CUTTINGS (YD^3) USING CIVIL 3D SOFTWARE	1410					

NORTH

SCALE 1" = 70'

0' 35' 70' 140'

HORIZONTAL SCALE: 1" = 70'

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER

06/16/2017

PROJECT ENGINEER:
Claudius Sanchez Czyzewska ,PE

REVISIONS

No.	DATE	DESCRIPTION

SITE PLAN

AS-BUILT SURVEY
JAWBONE SITE

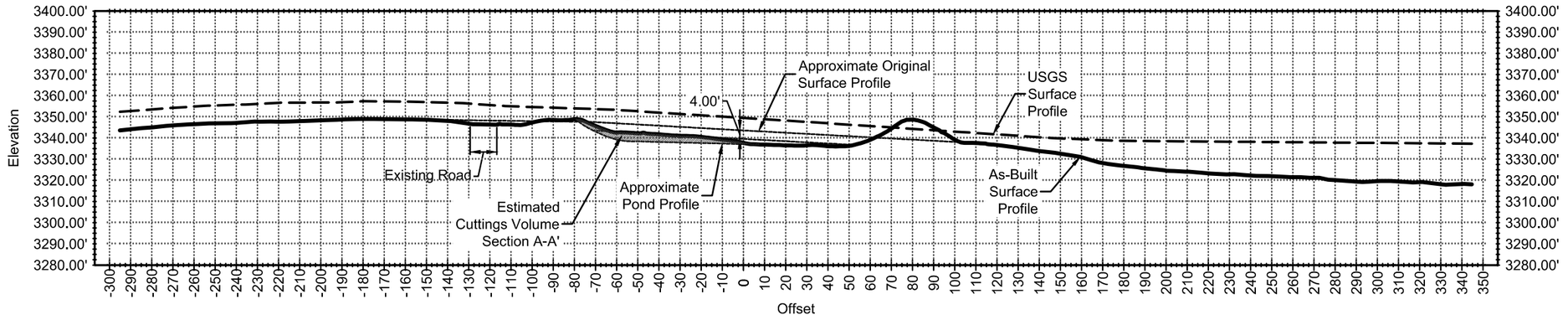
MURCHISON OIL AND GAS INC.
EDDY COUNTY, NEW MEXICO

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1985
100 E. Navajo Drive Suite 100 Hobbs New Mexico 88240
T 575 393 9827 F 575 393 1543
Pettigrew.us

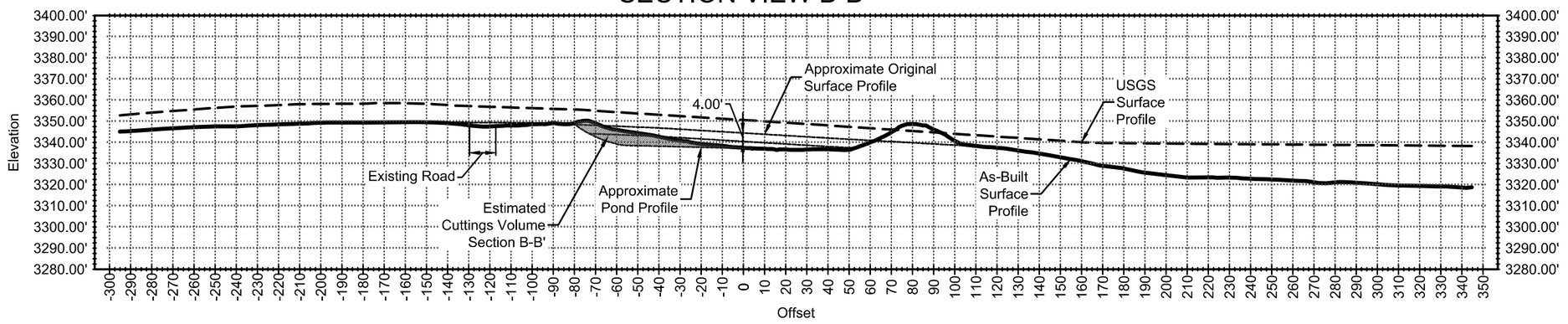
PROJECT NUMBER: 2017.1019

SHEET C-100

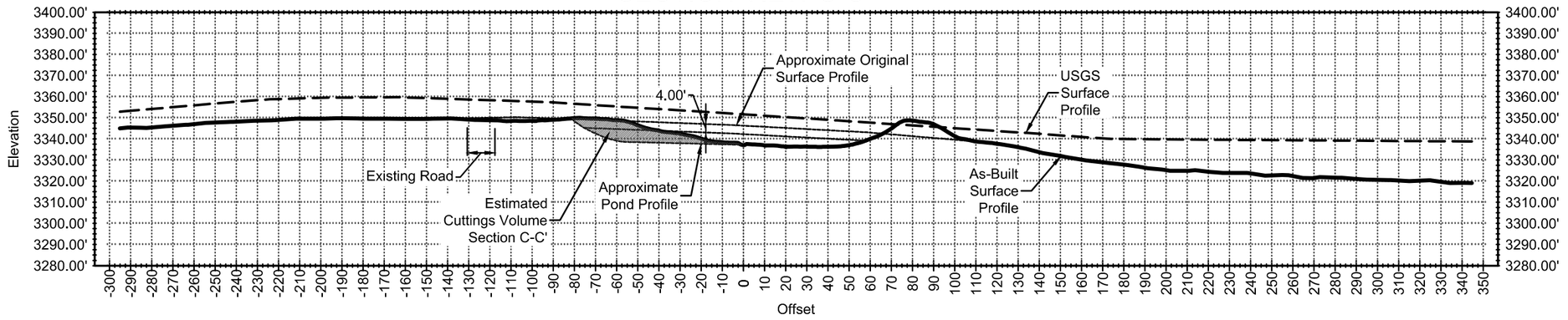
SECTION VIEW A-A'



SECTION VIEW B-B'



SECTION VIEW C-C'



HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 60'

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER

06/16/2017

PROJECT ENGINEER:
Claudius Sanchez Czyzewska ,PE

REVISIONS

No.	DATE	DESCRIPTION

SECTION VIEWS

AS-BUILT SURVEY
JAWBONE SITE

MURCHISON OIL AND GAS INC.
EDDY COUNTY, NEW MEXICO

PETTIGREW & ASSOCIATES PA
ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965
100 E. Navajo Drive Suite 100 Hobbs New Mexico 88240
T 575 393 9827 F 575 393 1543
Pettigrew.us

PROJECT NUMBER: 2017.1019

SHEET C-101

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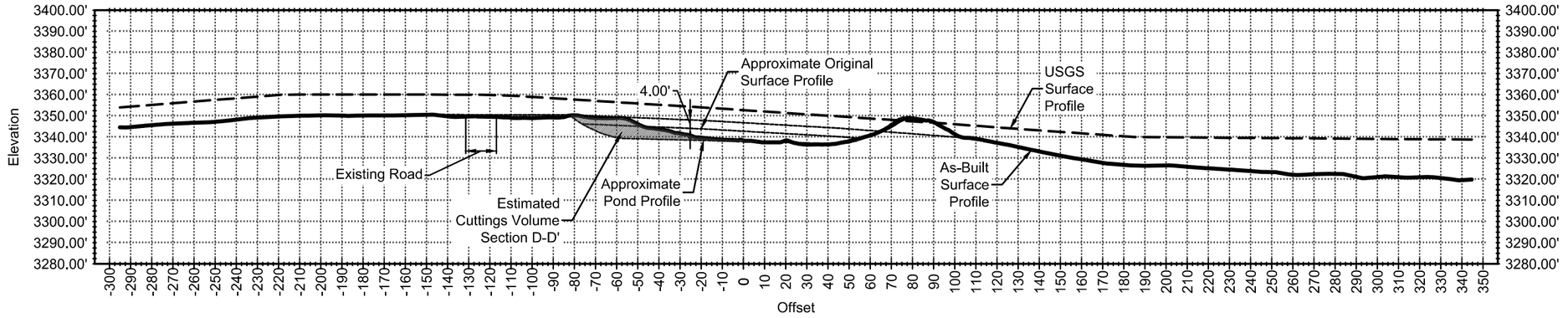
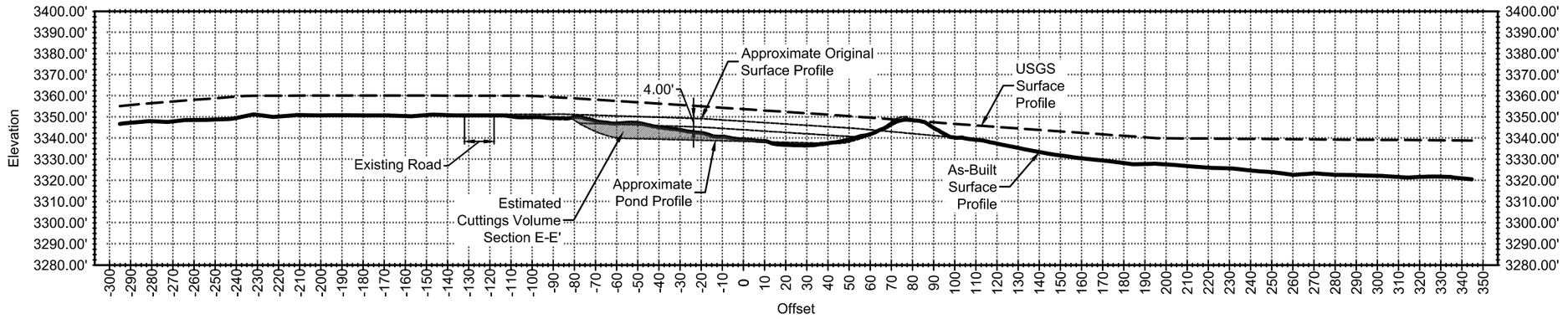
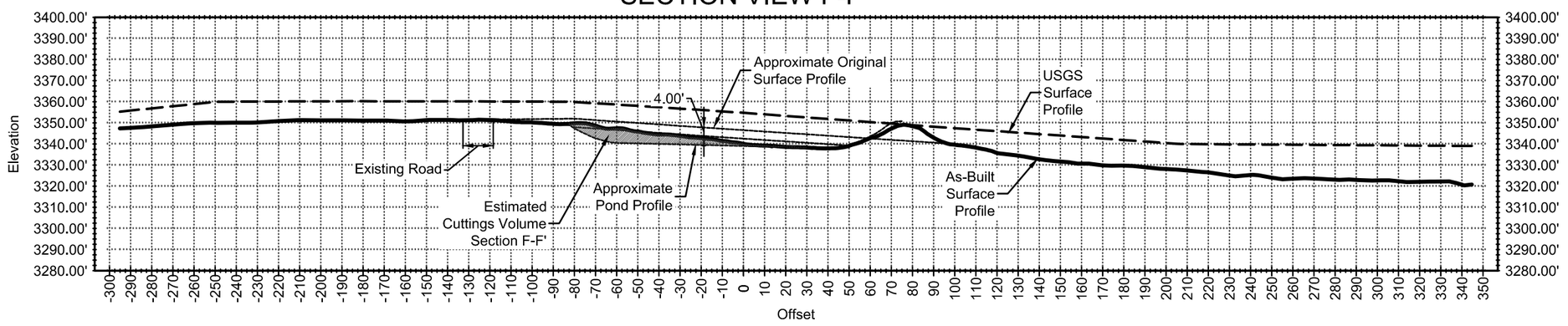
SECTION VIEW D-D'



SECTION VIEW E-E'



SECTION VIEW F-F'



HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 60'

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER
06/16/2017

PROJECT ENGINEER:
Claudius Sanchez Czyzewska ,PE

REVISIONS

No.	DATE	DESCRIPTION

SECTION VIEWS

AS-BUILT SURVEY
JAWBONE SITE

MURCHISON OIL AND GAS INC.
EDDY COUNTY, NEW MEXICO

PETTIGREW & ASSOCIATES PA
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Pettigrew.us

PROJECT NUMBER: 2017.1019

SHEET C-102

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Appendix B

Landlok® Erosion Control Blankets from Propex

INSTALLATION GUIDELINES

FOR LANDLOK® ECBs

BEFORE YOU BEGIN

Thank you for purchasing high quality Landlok® Erosion Control Blankets (ECBs) from Propex. We're committed to offering the best erosion control blankets in the industry.

It is important to follow these installation guidelines for a successful project. (Note: Construction shall be performed in accordance with the specific project bid documents, construction drawings and specifications.)

SITE PREPARATION

- Grade and compact area of ECB installation as directed and approved by Engineer. Subgrade shall be uniform and smooth. Remove all rocks, clods, vegetation or other objects so the installed blanket will have direct contact with soil surface.
- Prepare seedbed by loosening the top 2-3 in (50-75 mm) minimum of soil.
- Incorporate amendments such as lime and fertilizer and/or wet the soil, if needed.
- Do not mulch areas where blanket is to be placed.

SEEDING

- Apply seed to soil surface before installing blanket. Disturbed areas shall be reseeded.
- Consult project plans and/or specifications for seed types and application rates.

INSTALLATION ON SOIL SLOPES

- Excavate a 12 x 6 in (300 x 150 mm) minimum longitudinal anchor trench 2-3 ft (600-900 mm) over crest of slope (see Figure 1).
- Install top end of blanket into trench and secure to bottom of trench using ground anchoring devices spaced every 12 in (300 mm) minimum. Backfill and compact soil into trench.
- Unroll blanket down slope. Landlok® S1 should have net on top. Landlok CS2 should have black net on top.

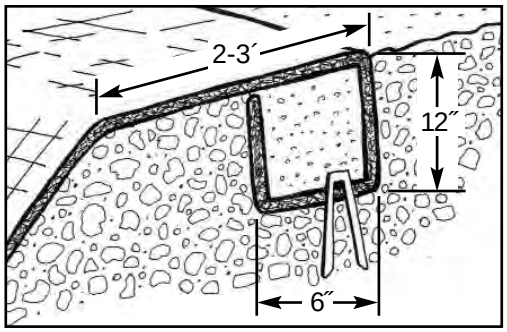


FIGURE 1 Longitudinal anchor trench at top of slope

- Overlaps of adjacent rolls shall be 3 in (75 mm) minimum and anchor every 18 in (450 mm) minimum along the overlap. Secure using ground anchoring devices at the appropriate frequency and pattern shown below. Overlaps are shingled away from prevailing winds (see Figure 2).
- Unroll blanket in a manner to maintain direct contact with soil. Do not pull blanket taut. Secure blanket to ground surface using anchoring devices.
- Excavate a 12 x 6 in (300 x 150 mm) minimum anchor trench at toe of slope (see Figure 3).
- Install bottom end of blanket into trench and secure to bottom of trench using ground anchoring devices spaced every 12 in (300 mm) minimum. Backfill and compact soil in trench (see Figure 3).
- Irrigate as necessary to establish/maintain vegetation. Do not over-irrigate.

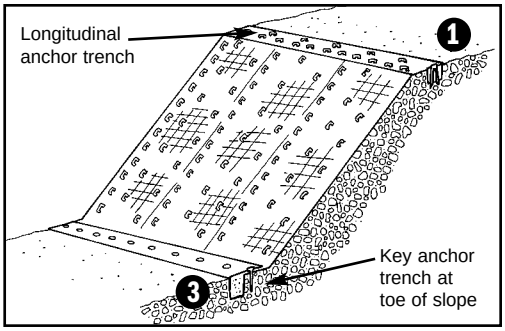


FIGURE 2 Erosion Control Blanket on slope

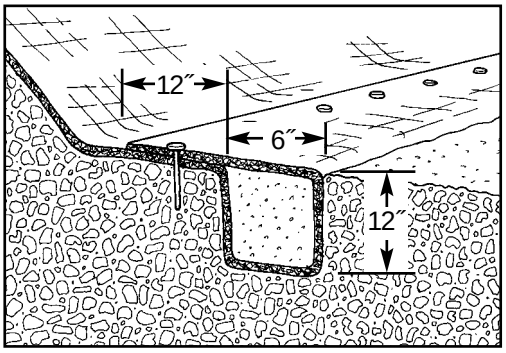


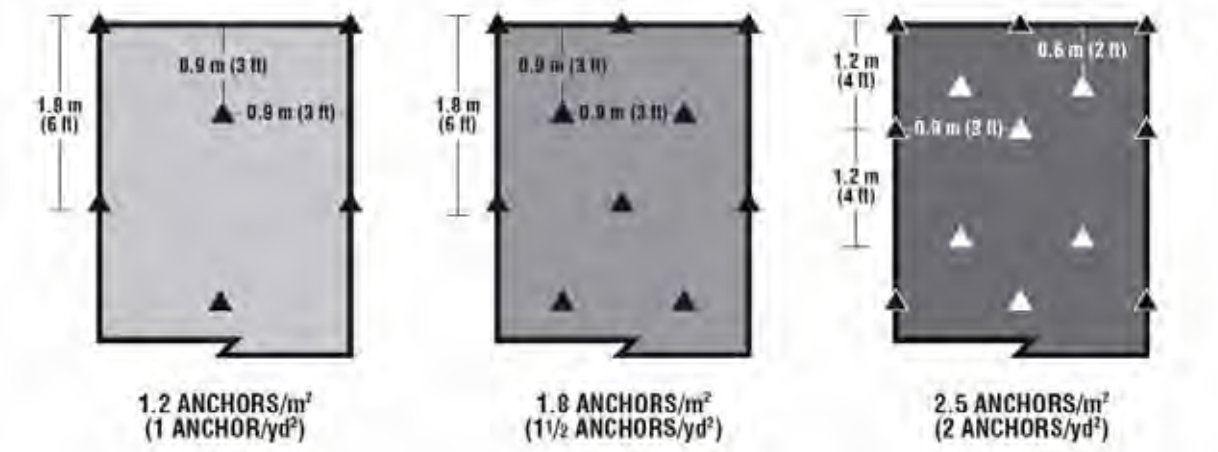
FIGURE 3 Key anchor trench at toe of slope (mat)

GROUND ANCHORING DEVICES

- U-shaped wire staples or metal geotextile pins can be used to anchor blanket to the ground surface. Wire staples should be a minimum thickness of 8 gauge (4.3 mm). Metal pins should be at least 0.20 in (5 mm) diameter steel with a 1 ½ in (38 mm) steel washer at the head of the pin. Wire staples and metal pins should be driven flush to the soil surface. All anchors should be between 6-18 in (150-450 mm) long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils. Heavier metal stakes may be required in rocky soils.

ANCHOR PATTERN GUIDE

- The shaded areas in the diagram provide anchor suggestions based on slope gradient and/or anticipated flow conditions. When the correct number of anchors has been evaluated, refer to the three illustrations below to establish anchor pattern. Increased anchoring may be required depending upon site conditions.



PROPEX | THE ADVANTAGE CREATORS.™
GEOSYNTHETICS

Propex Inc.
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Chattanooga, TN 37422

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Appendix C

New Mexico Department of Transportation

2017 Zone 5 Seed List: Southern Desertic Basins, Plains, and Mountains

2017 Zone 5 Seed List: Southern Desertic Basins, Plains, and Mountains

Common Name	Botanical Name	Lbs of PLS*/Acre
Annual quick-cover grasses		
Oats	*Avena sativa*	0.50
Sterile triticale	*Triticum aestivum X Secale cereale'Quickguard'*	0.50
Cool-season grasses		
Bottlebrush squirreltail	*Elymus elymoides*	1.75
New Mexico feathergrass	*Hesperostipa neomexicana*	1.00
Western wheatgrass	*Agropyron smithii*	1.75
Warm-season grasses		
Alkali sacaton	*Sporobolus airoides*	0.20
Black grama	*Bouteloua eriopoda*	0.20
Little bluestem	*Schizachyrium scoparium*	0.50
Needle grama	*Bouteloua aristidoides*	0.30
Sand dropseed	*Sporobolus cryptandrus*	0.08
Sideoats grama	*Bouteloua curtipendula var. Vaughn***	0.75
Wildflowers		
Blanket flower	*Gaillardia pulchella*	0.30
Desert marigold	*Baileya multiradiata*	0.10
Desert zinnia	*Zinnia acerosa*	0.20
Hairy golden aster	*Heterotheca villosa*	0.20
Lewis flax	*Linum lewisii*	0.20
Prairie aster	*Machaeranthera tanacetifolia*	0.20
Wild four o'clock	*Mirabilis multiflora*	0.30
White prairie clover	*Dalea candida*	0.30
Scarlet globemallow	*Sphaeralcea coccinea*	0.30

Woody Shrubs

Four-wing saltbush	*Atriplex canescens*	0.40
Sand sage	*Artemisia filifolia*	0.05
Winterfat	*Krascheninnikovia lanata*	0.20

***PURE LIVE SEED/ACRE TOTAL**	**10.58**

**** Local, wild-sourced genotypes preferred. Provide specified registered variety only if wild-sourced seed is unavailable.**

February 2017

C-144 Permit Application Package for

Jawbone Temporary Pit

SHL Unit C, Section 2, T25S, R26E, Eddy County

View southwest: Well stakes for Jawbone St 3H and 4H in the center of the photograph; El Capitan and Guadalupe Peak visible in background; 1/5/2017

Prepared for
Murchison Oil and Gas, Inc.
Plano, Texas

Prepared by
R.T. Hicks Consultants, Ltd.
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

February 8, 2017

Mr. Mike Bratcher
NMOCD District 2
811 S. First Street
Artesia, New Mexico 88210
VIA EMAIL to mike.bratcher@state.nm.us

RE: Murchison Oil and Gas, Inc. - Jawbone State
C-144 temporary pit application

Dear Mr. Bratcher:

On behalf of Murchison Oil and Gas, Inc., R. T. Hicks Consultants submits the attached C-144 temporary pit application for the Jawbone State Com wells 1H, 2H, 3H, and 4H. The 2H is the first well and currently drilling at this time. The pit is designed to accept cuttings from all 4 wells, if the schedule permits. We respectfully request your timely review of this application as utilizing one pit for these cuttings reduces the environmental impact of hauling cuttings to disposal.

This is not a reserve pit. Murchison will employ a solids control system that will result in near-dry cuttings, therefore, this pit is designed for cuttings only and not for fluids circulation. The cuttings/mud slurry will distribute on the bottom of the pit and water will drain to a "sump" where pumps will remove the fluid on a daily basis. There will not be more than 2 feet of standing fluid in the sump area at any time.

The surface of this location is mapped by BLM as having a "high karst" potential (Figure 8). During recent site visits we observed no evidence of instability; however, we enclose a supplement to this application that includes a certified, engineered foundation design plan resulting from an inspection of the pit foundation materials from a Professional Engineer from Pettigrew & Associates. Since a variance is required, we realize that this submission may eventually end up in Santa Fe so we hoped to speed the process by copying this application to Santa Fe OCD in case such review is required. The design/construction, operation/maintenance and closure plans have been reviewed by Registered Professional Engineer and any amendments to these plans are stamped.

Please note the following additional elements of this application:

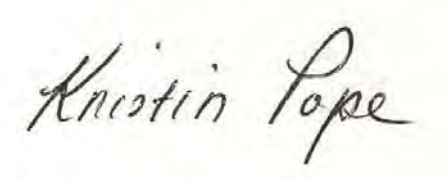
- A variance request is included in this application to allow the siting at the surface mapped as "high karst potential" by BLM.

- With the exception of the high karst potential due to the presence of soluble bedrock (Salado and Castile Formation), the pit location meets all other setback requirements.
- The Generic Design/Construction Plan and Operating and Maintenance Plan included in this submission have been slightly modified to suit the situation. The In-Place Closure Plan remains the same as those recently-approved by NMOCD.
- We anticipate in-place closure of stabilized solids.
- I certify that Randall Hicks and I performed recent visual inspections of the site.
- This letter and application are copied to the surface owner (State Land Office) as notification of the intent to bury drilling solids on-site.

Murchison is now drilling the Jawbone St Com 2H and 1H will be next. Construction of the location pad for the 3H and 4H is complete and the temporary pit will be located adjacent to this pad on the northeastern edge. Please contact me if you have any questions regarding this application or if I can assist in your review in any way.

Sincerely,

R.T. Hicks Consultants



Kristin Pope
Project Geologist

Copy: Murchison Oil and Gas, Pettigrew & Associates,
Ed Martin (NM State Land Office)

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

Distance to Groundwater

Figure 1 and Figure 2 demonstrate that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 100 feet beneath the temporary pit 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 trench burial or in-place closure.

Figure 1 is a geologic/ topographic map that shows:
1. The location of the staked 3H well location (285-feet west-southwest from proposed temporary pit) as a hexagon with the surface elevation.
2. Water wells from the OSE database as a blue triangle inside colored circles that indicate well depth. OSE wells are often mis-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 colored triangles that represent the unit in which the well was completed.
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.

Figure 2 is an area geologic/topographic map that shows:
1. The location of the staked well location (approximately 100-feet south from proposed temporary pit) as a hexagon with the surface elevation.
2. Water wells measured by the USGS or other professionals and the date of the observation.
3. Isocontour lines displaying the elevation of the groundwater surface.

Geology
The surface at the location consists of a thin soil with weathered limestone and anhydrite outcrops. The temporary pit is located on an outcrop of Permian Salado Formation (Psl on Figure 1). The Salado is approximately 50 feet thick at this location and consists of anhydrite, halite, polyhalite, other potassium salts, and red sandy shale. Field examination of the site reveals thin, gray siltstone or limestone capping nearby hills.

As the Salado Formation is characterized by evaporites (halite, anhydrite), the thin-bedded limestone could be a weathered remnant of the bottom of the Los Medaños Member of the overlying Rustler Formation proposed by Powers and Holt (1999)[1]. Figure 1 maps the Rustler Formation (Pr) at the surface about 2.5 miles east of the site. A road-cut northeast of the location exposes Rustler red beds immediately east of a limestone outcrop, lending credence to the suggestion that the limestone capping hills near the subject site is the lowermost Rustler.

Underlying the Salado Formation is the Permian Castile Formation, which is approximately 1,500 feet thick. It is characterized by anhydrite, gypsum, and sandstone with small amounts of

[1] http://www.wipp.energy.gov/library/CRA/2009_CRA/references/Others/Powers_Holt_1999_The_Los_Medanos_Member_of_the_Permian_Rustler_Formation.pdf

halite and dolomite. Quaternary Alluvium (Qa) of variable thickness is located above the Salado Formation along Hackberry Draw to the southeast (Figures 1 and 2). Black River alluvium (approximately 1 mile west) is known to be more than 50 feet thick in some locations.

Topographically, the site is on the southeast-facing slope of a narrow, northeast-southwest trending hill that defines the eastern edge of the Black River valley, located approximately 1 mile northwest.

Hydrogeology

All of the groundwater in this area south of the Black River is produced from either the alluvium adjacent to the Black River or saturated alluvium overlying the Castile or Salado Formations that are locally recharged (e.g. USGS well 3769 south of the proposed pit). This is consistent with descriptions of G E Hendrickson and R S Jones in the 1952 Ground-Water Report No. 3, *Geology and Ground-Water Resources of Eddy County, New Mexico* (GW-3). According to the report, groundwater from the Castile Formation may yield water for stock but it is high in sulfate and chloride concentrations such that it is undesirable for human consumption.

We relied upon the most recent data measured by the USGS and other professionals to create the water table elevation map shown in Figure 2. While the "Misc" well data (see Figure 1) are generally measured water levels, this dataset can contain errors (generally of location) that are not present in the USGS data. Water level data from the OSE database rely upon observed water levels by drillers during the completion of the water well. The OSE dataset provides data that can be useful in certain areas, but due to frequent location errors, we did not rely on OSE data for the potentiometric surface map. We honored all data that we know are accurate to the best of our knowledge. For example, Butch's Rat Hole Service provided data concerning a dry conductor pipe hole that was installed prior to drilling the Cimarex Energy White City "14" Federal 13H well in 2012. This hole went to 80 feet below surface and is labeled Misc-336 on Figures 1 and 2. The recently-drilled conductor pipe drilled for the Jawbone 1H and 2H wells is not shown on Figure 2 but was dry to a depth of 80 feet

Visual inspections of questionable wells verified the information provided by the public records and published reports. Initially, we attempted to identify each well using USGS topographic maps. The surface elevations of wells identified on the maps were compared to the published surface elevation, if available. Wells that could not be verified using maps were searched for using current and historic satellite photographs in an effort to identify windmills, tanks, houses, or roads associated with the well. Critical water wells that could not be verified by maps or photographs were verified in the field. We commonly attempt to gauge wells during the field investigation, when access to the casing was permitted. The results of the map, photograph, and field inspections are summarized as follows:

- Map or satellite photographs could not locate OSE well C03200. A field inspection was not performed because the well is located within the alluvium adjacent to Black River and would not accurately represent the hydrology for the temporary pit site that is underlain by bedrock.

- OSE well C02675 and the historic location of C01089 were verified by historic satellite photographs. C01089 was also inspected in the field but a water level could not be measured.
- OSE well C01368 could not be located by map, photograph, or field inspection; therefore the location, completion, and depth to water data should be considered unreliable. Communications with the OSE regarding this well did not provide any evidence that the well is located other than shown on Figure 1.

Groundwater elevations calculated from the verified wells demonstrate two hydraulically separate groundwater systems as follows:

1. The Misc-23 well (DTW=109.4) and spring (Blue Spring) located north of Black River indicate a groundwater elevation of approximately 3,325 feet above sea level with a likely gradient to the south from the Guadalupe escarpment (source of the spring water) to the Black River.
2. The wells producing from the Black River alluvium indicate a decreasing gradient in the downstream direction (northeast) from 3,265 feet in section 9 (C02675) to 3,245 feet in section 3 (C01089).

There are no water wells or springs that produce outside of the alluvial sediments on the south side of Black River and west and north of Hackberry Draw where the temporary pit will be located. Some water may be produce from wells completed in the Castile Formation located adjacent to the Black River alluvium. The cross-section on the following page shows the relationship between the geology and groundwater from the Black River based upon available data. The conductor pipe hole drilled for the Cimarex Energy's White City "14" Federal 13H gas well (Misc-336) provides useful information on the groundwater conditions at the Jawbone wells.

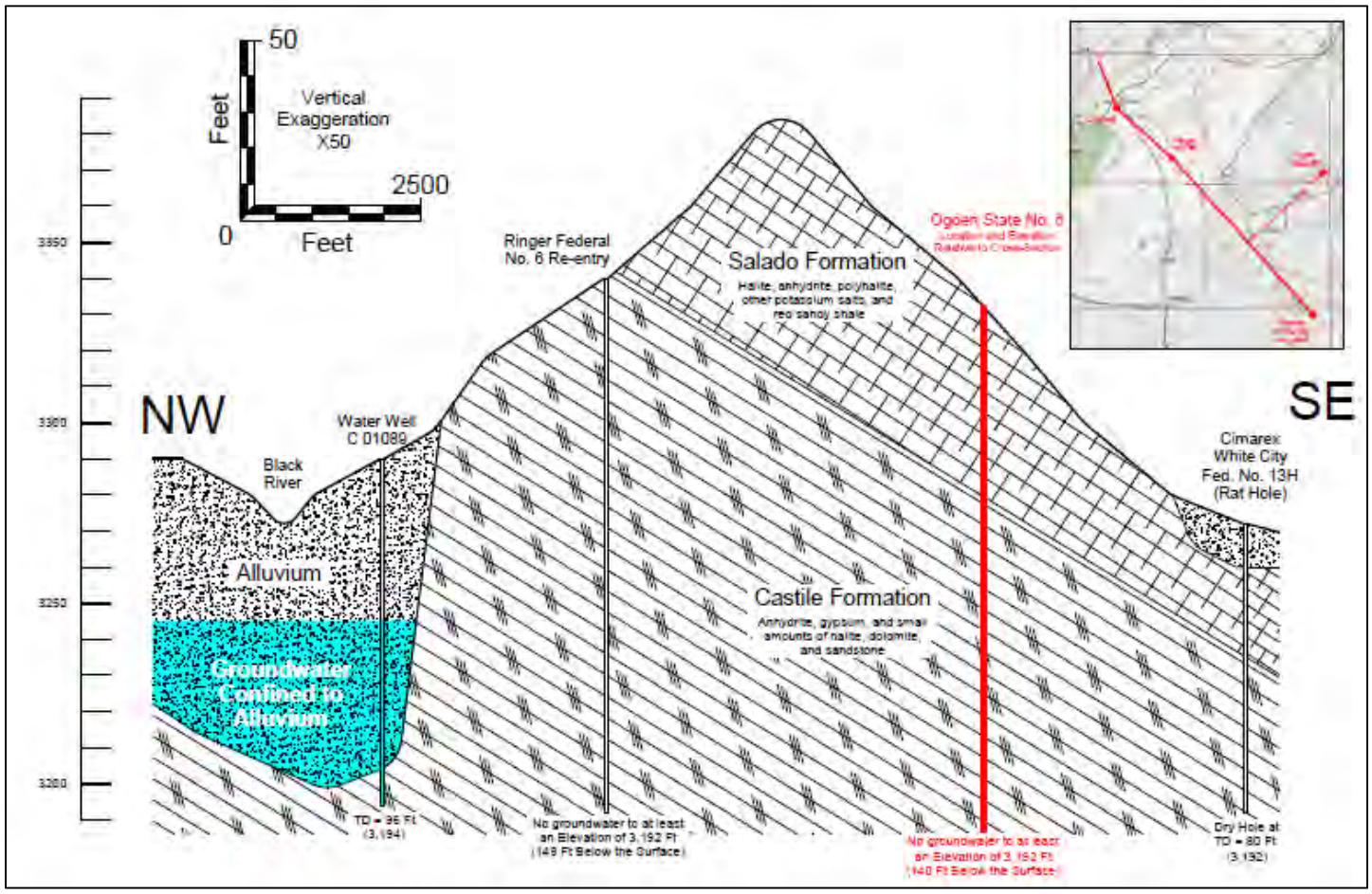
As shown in the cross-section below, the Ringer (Misc-334) and Ogden (Misc-335) conductor hole locations are in the same general stratigraphic position as the Jawbone location and the same distance from the saturated alluvium of the Black River valley.

The data indicates that the groundwater is limited to the Black River alluvium at an elevation of approximately 3,250 feet above sea level west of the Ringer location (on cross section) and the Jawbone location. Had the Castile Formation been permeable enough to transmit groundwater from the alluvial aquifer it would have been identified in the conductor hole drilled to a depth of 3,192 feet above sea level at the Ringer. In light of this, we can conclude that:

1. No groundwater is present at all in the Castile Formation below the subject site, or
2. The groundwater elevation below the subject site is estimated to be no more than 3,192 feet above sea level (or at least 140 feet below the surface) as indicated by the dry conductor hole. More recently, the conductor pipe at the Jawbone 2H well was drilled to 80 feet below surface (3,303 feet above sea level) in January 2017.

Employing available well data, the elevation of the groundwater surface beneath the Jawbone State temporary pit, if such groundwater exists, is at least 3,225 feet above mean sea level (Figure 2). Using the potentiometric surface map, the distance between the bottom of the

proposed 12-foot deep temporary pit and the potentiometric surface of the regional aquifer is approximately 94.1 feet (3,331.1 – 12 – 3,225).



Cross-section: R.T. Hicks Consultants, 2012

Distance to Surface Water

Figure 3 and the site visit demonstrates that the location is not within 300 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 will also qualify for burial trench or 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 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 at this location.
- The nearest mapped surface water features are "intermittent streams," the nearest located approximately 1,800 feet west.

- Although the area is mapped as "high karst", an examination of the area around the proposed pit showed no surface evidence of sinkholes

As the site inspection photographs show, small gullies and rills are present across the location. Thus, exposure of the pit site after abandonment of the well is a concern if the pit is not properly placed.

The pit will be placed "in the cut" of the location as shown in the drawing. Cuttings will be buried 4-feet below the final elevation of the finished location and capped with a stable fill material (see Closure Plan). To minimize any erosion caused by stormwater flow from the access road, the construction plan calls for a water bars and drainage control. The bars will be small and closely-spaced to allow for easy access by large trucks while also diverting any drainage and attendant erosion from the pit area after closure.

When the site is restored to match the surrounding topography at plugging and abandonment, some fill material from the south and west sides of the location will be placed on the north and east part of the location and the downhill side of the vegetated pit area. Thus, the vegetated pit area will be a site of deposition of material, not erosion.

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 burial trench or in-place closure.

- The nearest structures are oil and gas wells and associated facilities.
- 1,200 feet southeast of the subject site is a caliche pad, the future site of a battery for Murchison Oil and Gas, Inc.

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 burial trench or in-place closure.

- Figure 1 shows the locations of all area water wells, active or plugged.
- The nearest known active water well is C01089, located more than 1.5 miles west-southwest. The purpose of the well is for watering livestock. C3200 is mapped approximately 0.75 mile west of the site, but the well could not be located on aerial images or in the field.

- There are no known domestic water wells located within 1,000 feet of the proposed pit.
- No springs were identified within 1,000 feet of the proposed pit (see Figure 6).

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 burial trench or in-place closure.

- The closest municipality is Carlsbad, approximately 10 miles north.
- The Black River Village community is 3 miles north.
- The closest public well field is for the City of Carlsbad and located approximately 8 miles northwest.

Distance to Wetlands

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

- The nearest U.S. Fish and Wildlife Service-designated wetlands are a "riverine" (described as an intermittent stream on Figure 3) located 1,800 feet west, and a "freshwater forested shrub wetland" (spring) located 1,900 feet northwest.

Distance to Subsurface Mines

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

- The nearest mapped caliche (or gravel) pit is located approximately 6 miles to the northwest.
- The location surveys of the Jawbone 1H and 2H include an "old caliche pit" just north of the pad for those wells. The surface lessee reports that the State Lands materials pit has not been used for many years.

Distance to High or Critical Karst Areas

Figure 8 shows the location of the temporary pit with respect to BLM Karst areas.

The subject site is located in an area designated by BLM as having high karst potential. Paragraph (3) of subsection A of 19.15.17.10 that a temporary pit containing non-low chloride drilling fluid cannot be sited

> (h) *within an unstable area, unless a variance is granted upon a demonstration that the operator has incorporated engineering measures into the design to ensure that the temporary pit's integrity is not compromised*

The Rule includes an identical siting requirement for in-place closure. NMOCD defines an unstable area as

> *… a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of a division-approved facility's structural components. Examples of unstable areas are areas of poor foundation conditions, areas susceptible to mass earth movements and karst terrain areas where karst topography is developed as a*

result of dissolution of limestone, dolomite or other soluble rock. Characteristic physiographic features of karst terrain include sinkholes, sinking streams, caves, large springs and blind valleys.

- Although soluble rocks are present near the surface (see adjacent photo), no evidence of solution voids or karstic features were observed near the site during the field inspection.
- No evidence of instability was observed in the area.
- Erosion, but not mass earth movements, is a concern, as discussed in an earlier section of this application.

Anhydrite near the surface of the location

This application requests a variance from the Rule because a NM Registered Professional Engineer has evaluated the site and provides a stamped liner foundation plan for the temporary pit resulting from his inspection of the pit excavation and floor materials during construction of the location. The closure plan has been reviewed by the NM Professional Engineer for post-closure erosion concerns and recommends no amendments to the plan.

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.

- The subject site and surrounds are located within Zone X, which is described as areas outside the 0.2% annual chance floodplain.
- 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 Design

Please refer to Plate 1 for the design of the temporary pit and the Design and Construction Plan at the end of this application. Additionally, a supplement containing engineering measures for design/construction is included with the generic plans.

Variance Request and Engineer's Statement

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

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 of Paragraph (3) of subsection A of 19.15.17.10:

> 19.15.17.10 SITING REQUIREMENTS:
> An operator shall not locate a temporary pit containing fluids that are not low chloride fluids:
> (h) *within an unstable area, unless a variance is granted upon a demonstration that the operator has incorporated engineering measures into the design to ensure that the temporary pit's integrity is not compromised*

The term unstable area is defined by OCD as:

(6) "Unstable area" means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of a division-approved facility's structural components. Examples of unstable areas are areas of poor foundation conditions, areas susceptible to mass earth movements and karst terrain areas where karst topography is developed as a result of dissolution of limestone, dolomite or other soluble rock. Characteristic physiographic features of karst terrain include sinkholes, sinking streams, caves, large springs and blind valleys.

The surface of the site has been mapped as "high karst" potential by BLM. Although soluble rocks and surficial erosion present, a Professional Geologist familiar with karst features, geologic mapping, and the area of the proposed pit identified no evidence of solution voids or karstic features were observed near the site during the field inspection. No evidence of instability was observed within 300 feet of the proposed pit.

This C-144 application requests a variance from the Rule because a NM Registered Professional Engineer has evaluated the site and provides a stamped liner foundation plan for the temporary pit as a result of inspection of the pit excavation and floor materials during construction of the location. This evaluation and stamped foundation plan ensures the liner integrity as allowed in the Rule.

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

We believe approval of this variance will provide better protection of the environment than the alternatives of hauling the cuttings more than 100 miles (round-trip) to a permitted disposal facility. Limiting the transport of cuttings reduces the dust, exhaust and road wear – all of which reduce the environmental footprint of the proposed alternative versus transport to a commercial facility.

PETTIGREW & ASSOCIATES PA

ENGINEERING | SURVEYING | TESTING

DEFINING QUALITY SINCE 1965

Project: **Murchison Oil & Gas, Inc.**
Jawbone State COM 3H
Proposed Temporary Solids Pit
Section 2, T25S, R26E
Eddy County, New Mexico

Date: **January 25, 2017**

Subject: **Geotechnical Observation**

Pettigrew and Associates (P&A) provided Geotechnical Observation at the Jawbone State COM 3H for a temporary solids pit in Eddy County, New Mexico. A test hole was dug prior to the arrival of P&A. Kristen Pope with R.T. Hicks Consultants and Greg Boans of Murchison Oil & Gas, Inc. were onsite during observations.

Site Description and Location

The project site is located in Section 2, T25S, R26E, in Eddy County, NM. The proposed pit dimensions will be 170' x 125' to a depth of 7' - 12'.

Figure 1 - Site Location (Madron Surveying Inc., No. 4939A 12-9-16)

Observed Strata

Test Hole #1 – approximately 12′ deep

Surface Soils are Tan Silty Sands with Gravel

~ 1-8′ below ground surface - Silty Sands with Clay, Gypsum and 4″ Chert Nodules

~ 8′ below ground surface - Dense Gypsum base

Figure 2 - Test Pit (facing west)

Conclusion

Pettigrew has reviewed the Design/Construction Plan and the Closure Plan for the Jawbone State Temporary Pit and are in agreement with the protocols with the following suggestions:

- To a depth of at least six inches below the liner, the sub-grade shall be free of sharp rocks, vegetation and stubble. In addition, liners shall be placed on a sub-grade of sand or fine soil.

- The surface in contact with the liner shall be smooth to allow for good contact between liner and sub-grade.
- The surface shall be dry during liner installation.
- Upon pit closure, the finished grade of the shall be regraded in accordance with the tore original drainage patterns

While karst features are common for this region, none were observed at the surface at the time of this field observation. This does not mean voids are not possible. While excavating the pit, ensure the walls and floor are inspected for voids, expanded fractures or other solution features that may indicate karst. Since the severity of karstic features is highly variable, if any such zones are found the following protocols should be followed:

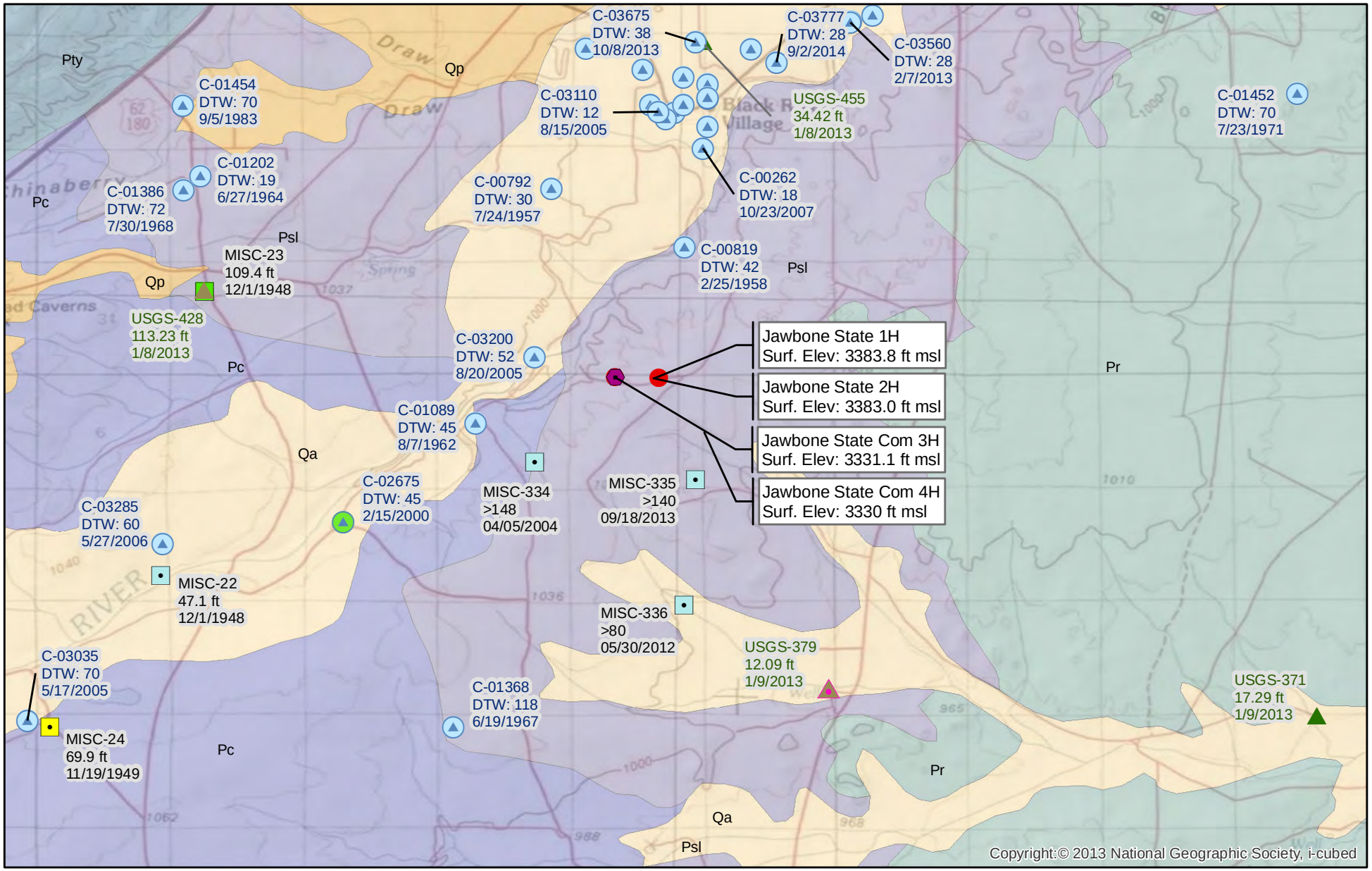
- Immediately stop work;
- Remove any personnel from the area of concern;
- Barricade the karst feature and close access to the area;
- Contact Pettigrew & Associates for further evaluation and recommendations.

Claudius Sanchez Czyzewska, PE NM No. 22897

02/08/2017

Site Specific Information
Figures

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



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

Depth To Water and Geology

Figure 1

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017

Legend

Pit/Well Location

Well Location

OSE Water Well (DTW, Date)

Well Depth (ft)

<= 150

151 - 350

501 - 1000

USGS Gauging Station (DTW, Date)

Aquifer Code, Well Status

Alluvium/Bolsom

Castile Formation

Castile Formation, Water level was affected recently by pumping at a nearby site that taps the same aquifer.

Misc Water Wells (DTW, Date)

Well Depth (ft)

No Data

<=150

151 - 350

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

Pty, Paleozoic-Yates and Tansill Formations; sandstones, siltstones, limestone, dolomite, and anhydrite

Qa, Quaternary Alluvium

Qp, Quaternary-Piedmont Alluvial Deposits

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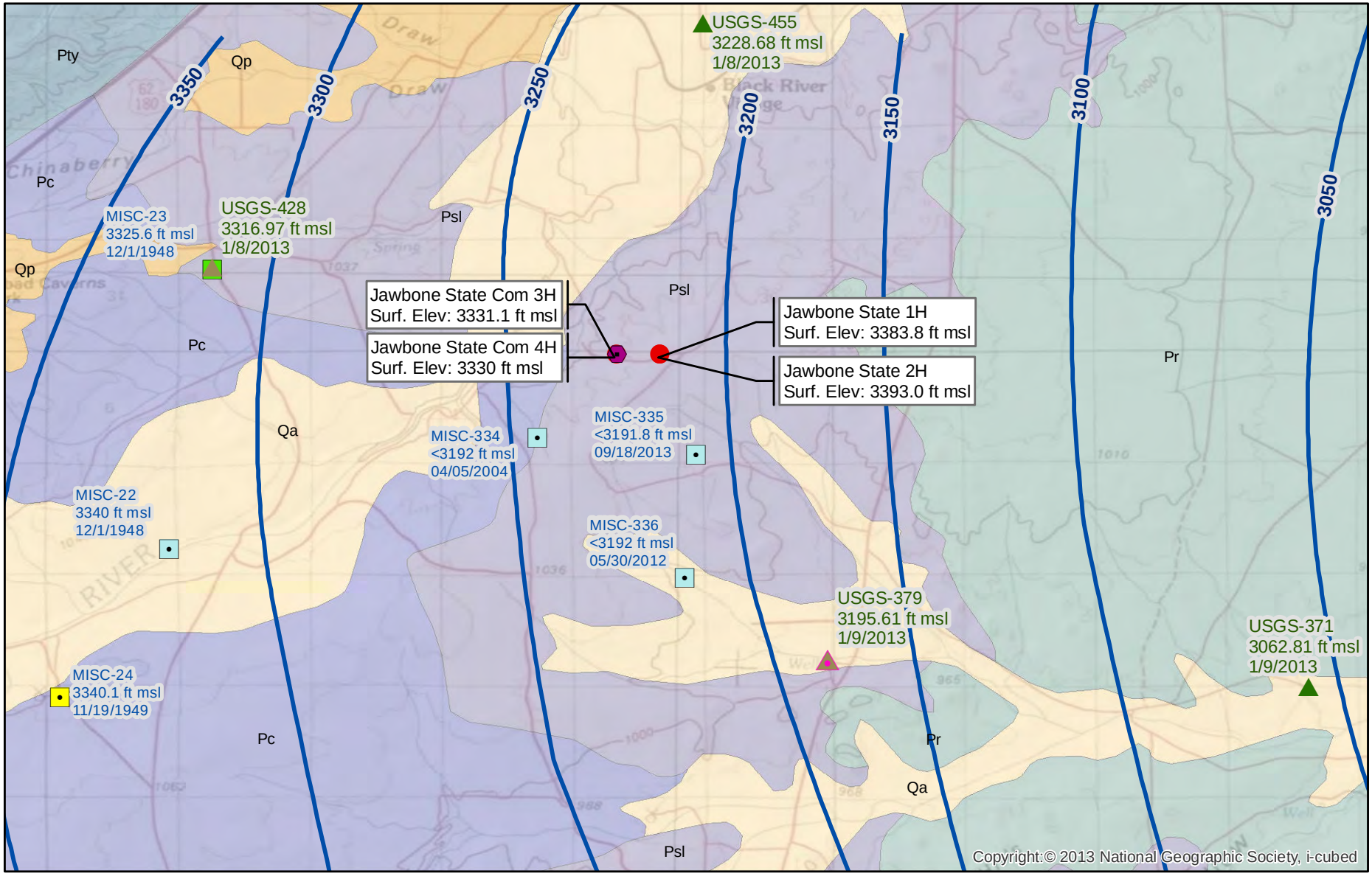
Depth To Water and Geology

Murchison Oil & Gas, Inc: Jawbone State 1H, 2H, Com 3H, Com 4H

Figure 1
LEGEND
February 2017



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Potentiometric Surface and Groundwater Elevation

Figure 2

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017

Legend

Pit/Well Location

Well Location

USGS Gauging Station (GW Elev, Date)

Aquifer Code, Well Status

Alluvium/Bolsom

Castile Formation

Castile Formation, Water level was affected recently by pumping at a nearby site that taps the same aquifer.

Misc. Water Wells (GW Elev, Date)

Well Depth (ft)

No Data

<= 150

151 - 350

NM Geology

Map Unit, Description

Pc, Paleozoic-Castile Formation; anhydrite sequence

Pr, Paleozoic-Ruster Formation; siltstone, gypsum, sandstone, and dolomite; Upper Permian

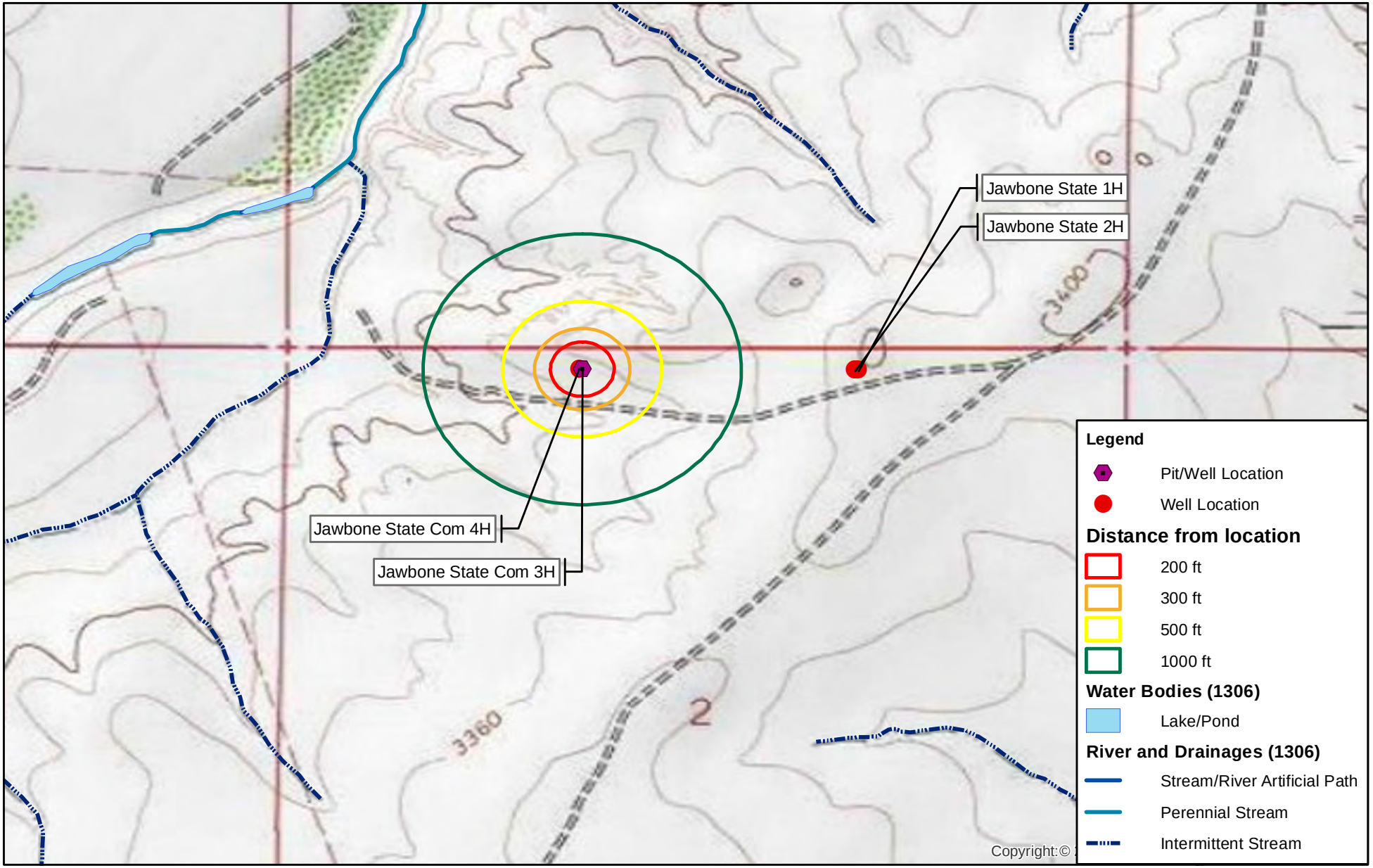
Psl, Paleozoic-Salado Formation; evaporite sequence; Upper Permian

Pty, Paleozoic-Yates and Tansill Formations; sandstones, siltstones, limestone, dolomite, and anhydrite

Qa, Quaternary Alluvium

Qp, Quaternary-Piedmont Alluvial Deposits

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface and Groundwater Elevation	Figure 2 LEGEND
	Murchison Oil & Gas, Inc: Jawbone State 1H, 2H, Com 3H, Com 4H	February 2017



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Feet

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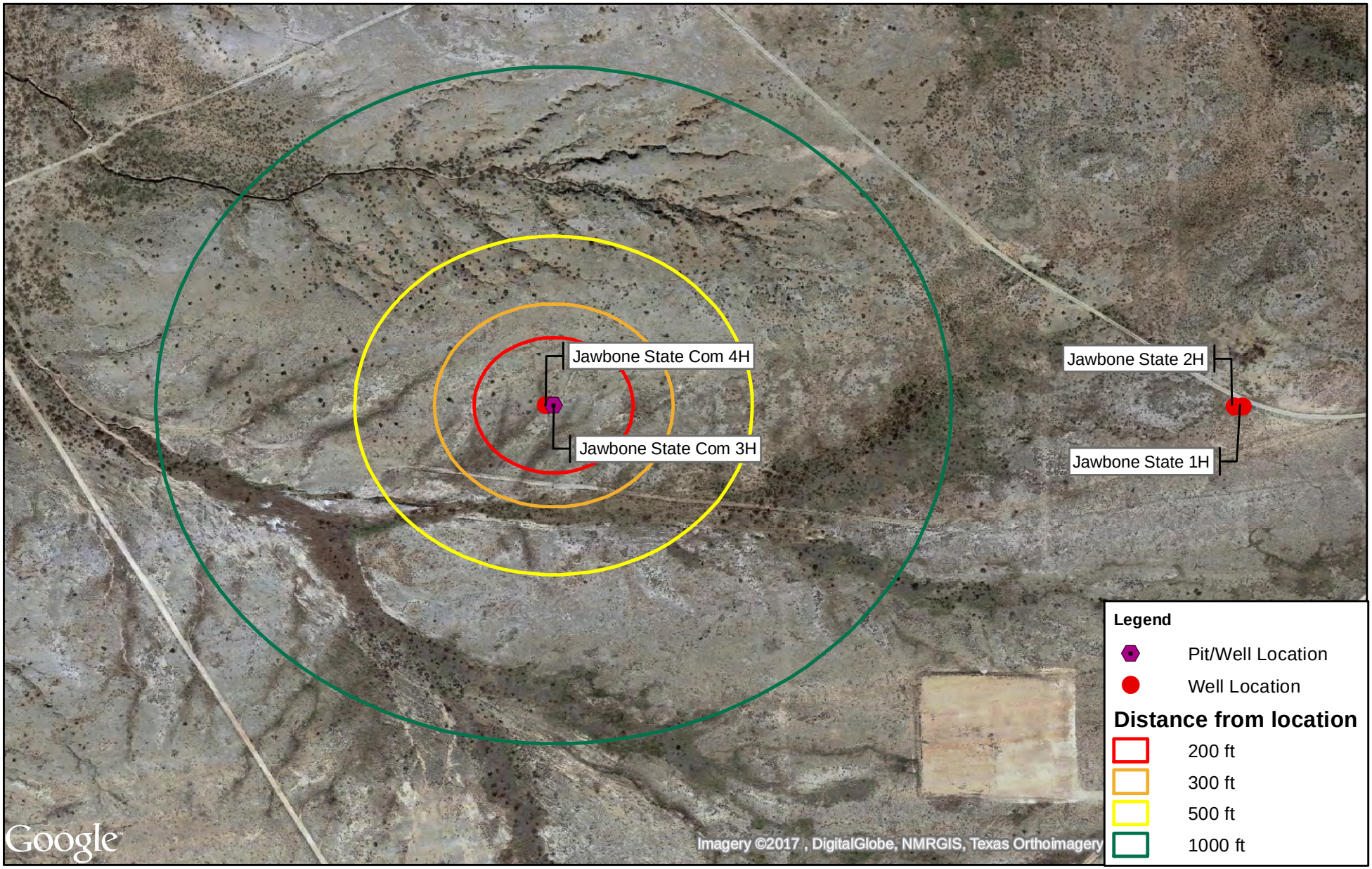
Surface Water and Topography

Figure 3

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017



(aerial image c.2016)

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Feet

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Albuquerque, NM 87104
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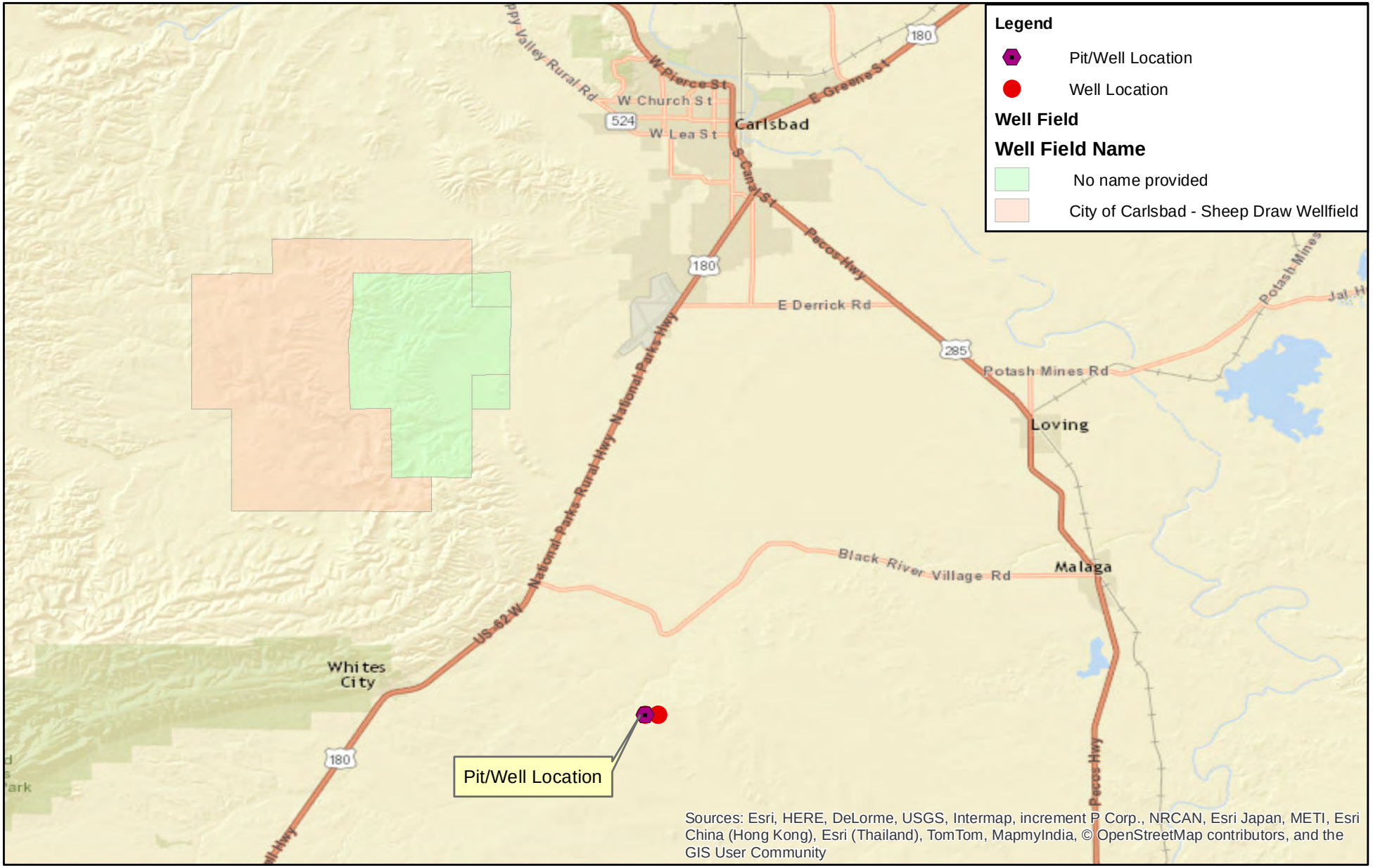
Nearby Structures

Figure 4

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017



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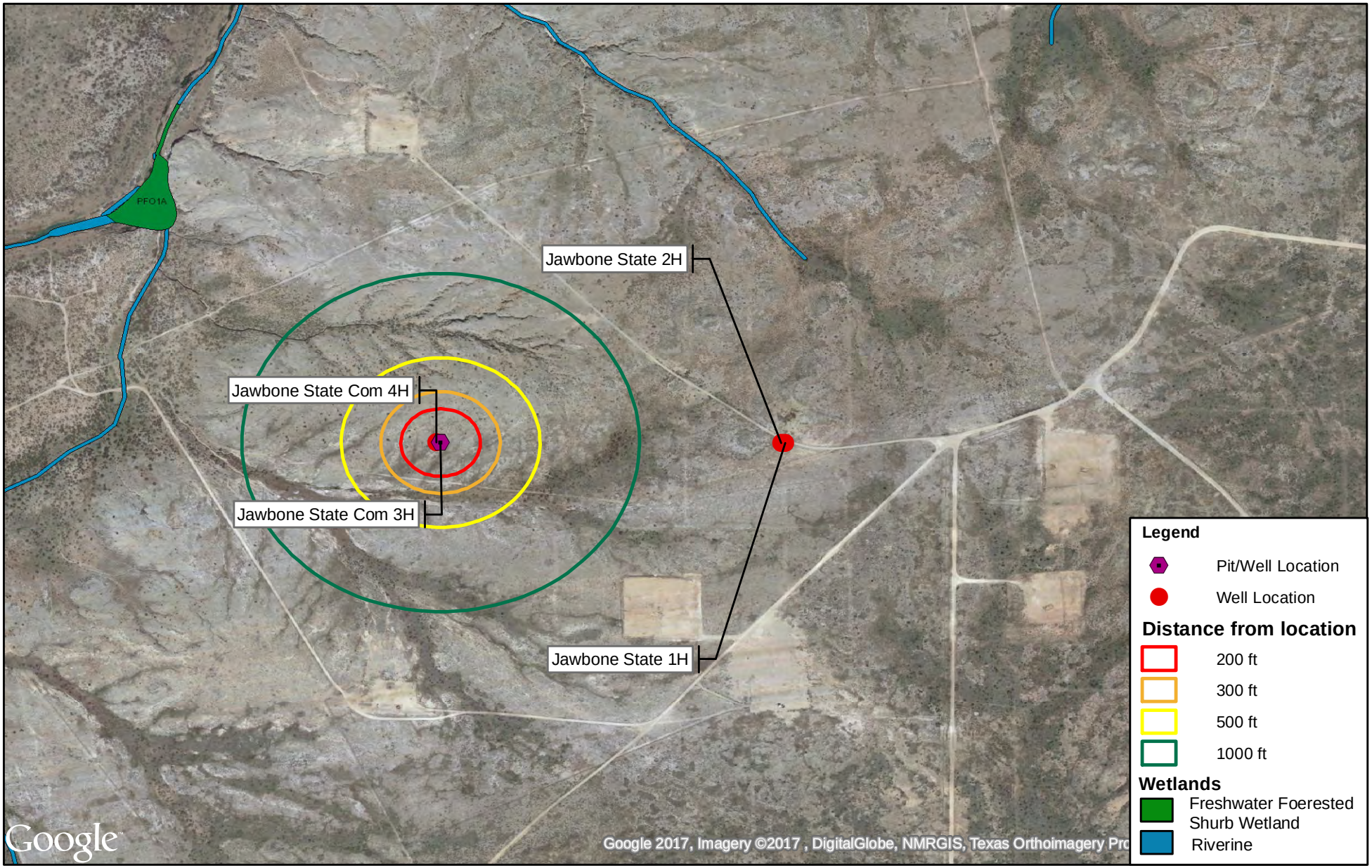
Nearby Municipalities and Well Fields

Figure 5

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017



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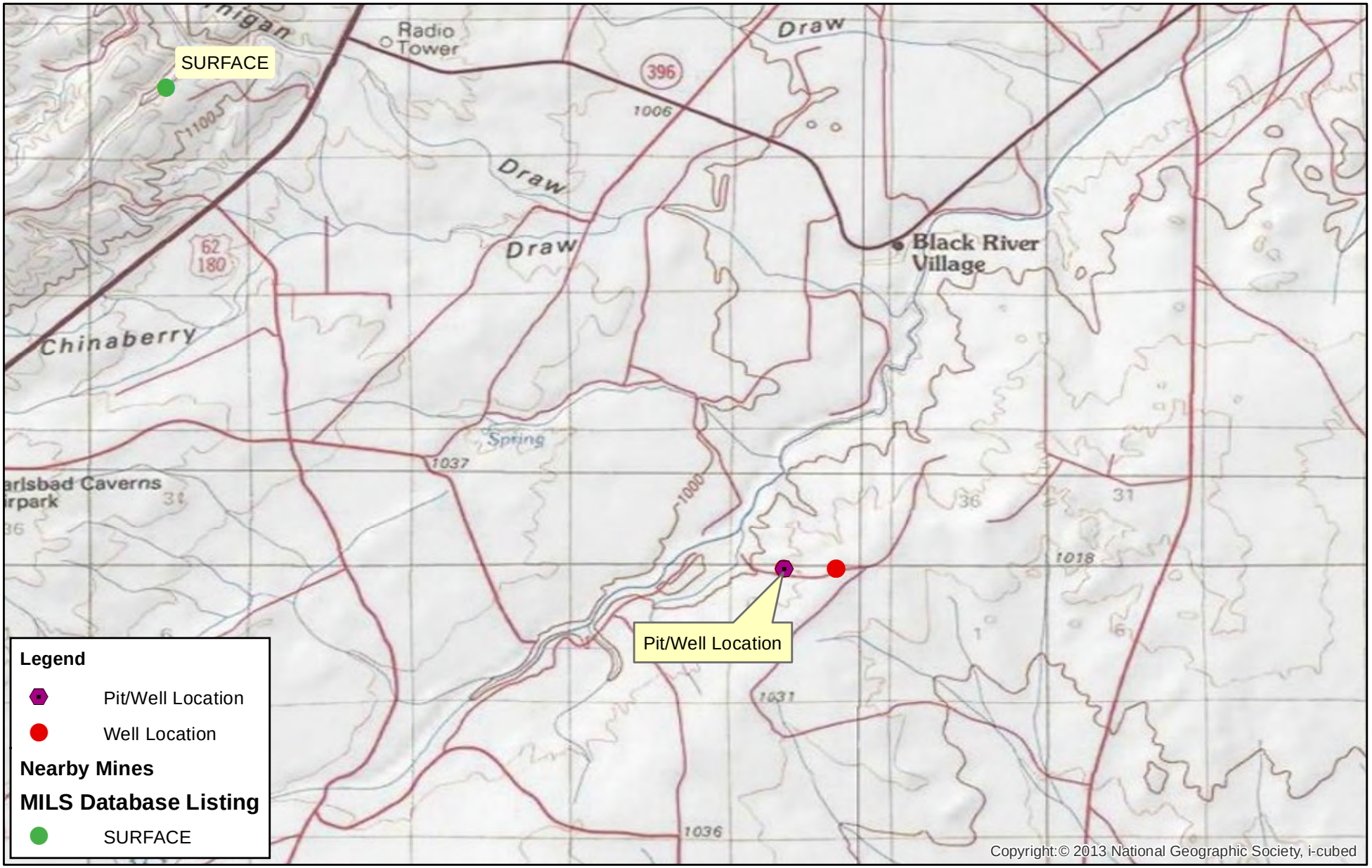
Nearby Wetlands

Figure 6

Murchison Oil & Gas, Inc: Jawbone State 1H, 2H, Com 3H, Com 4H

February 2017



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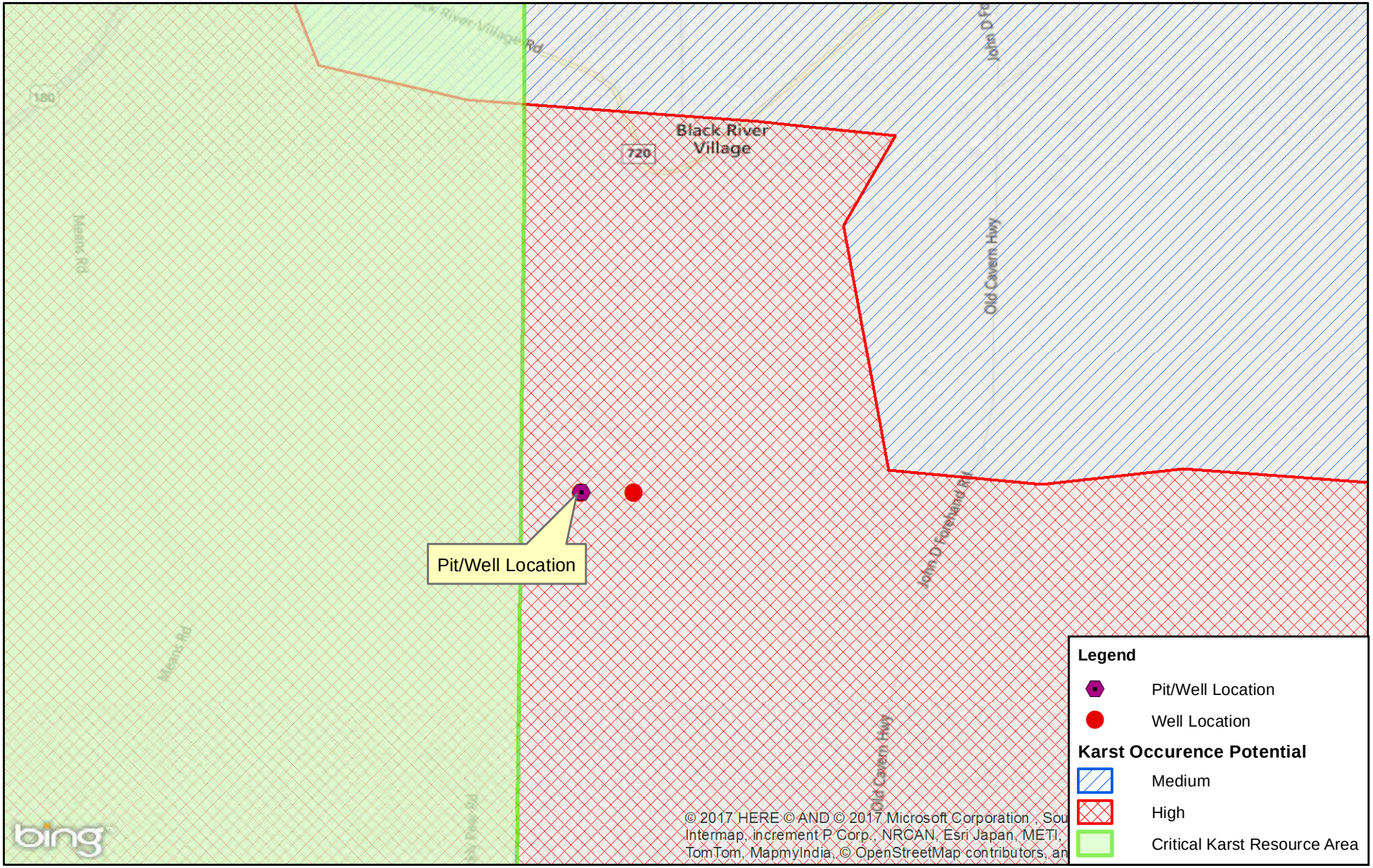
Nearby Mines and Minerals

Figure 7

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017



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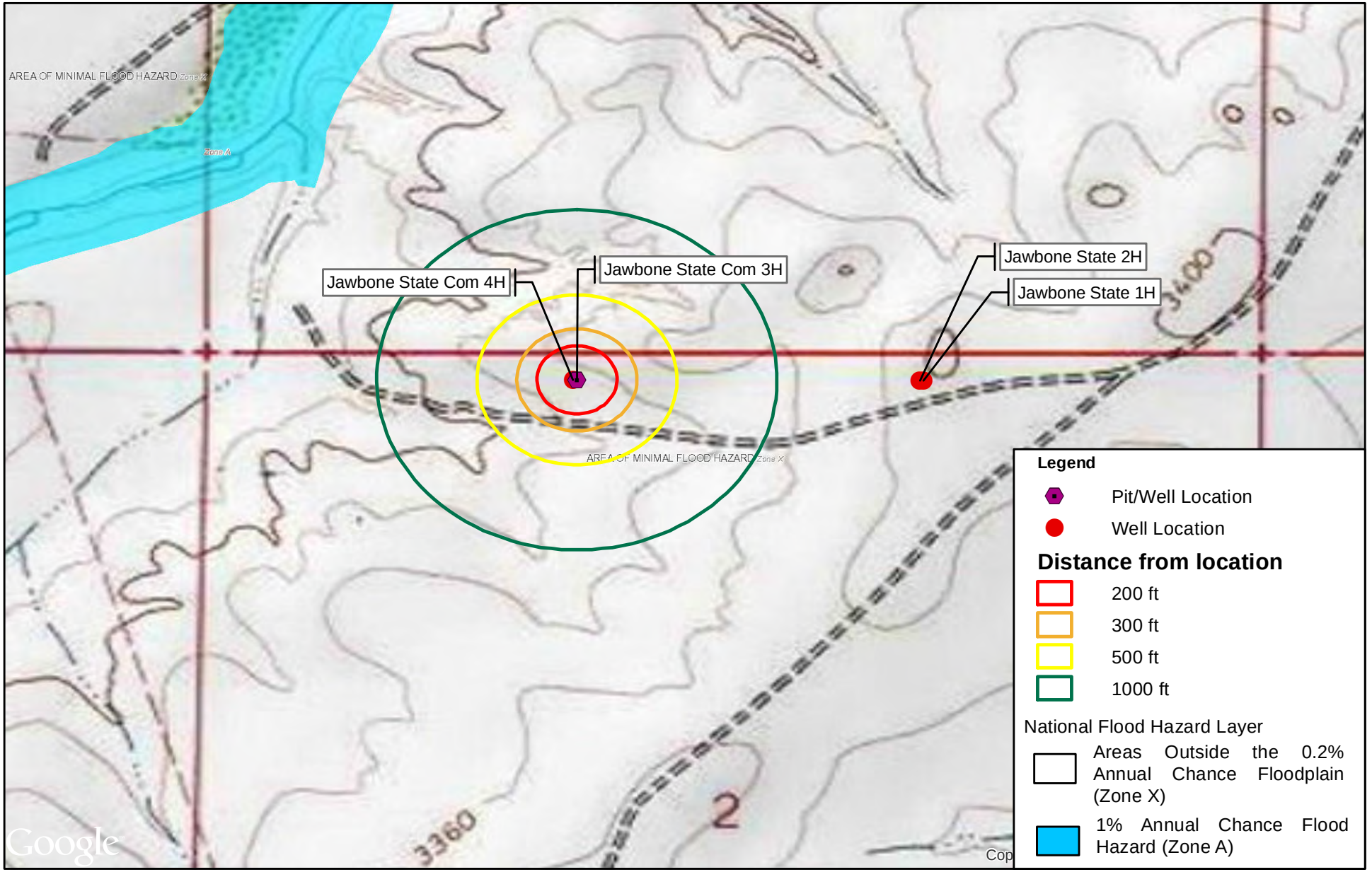
Karst Potential

Figure 8

Murchison Oil & Gas, Inc: Jawbone State
1H, 2H, Com 3H, Com 4H

February 2017



FEMA Source: https://hazards.fema.gov/gis/nfhl/services/public/NFHLWMS/MapServer/WMSServer

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0 500 1,000 Feet

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FEMA Flood Map

Figure 9

Murchison Oil & Gas, Inc: Jawbone State 1H, 2H, Com 3H, Com 4H

February 2017

Site Specific Information Plate

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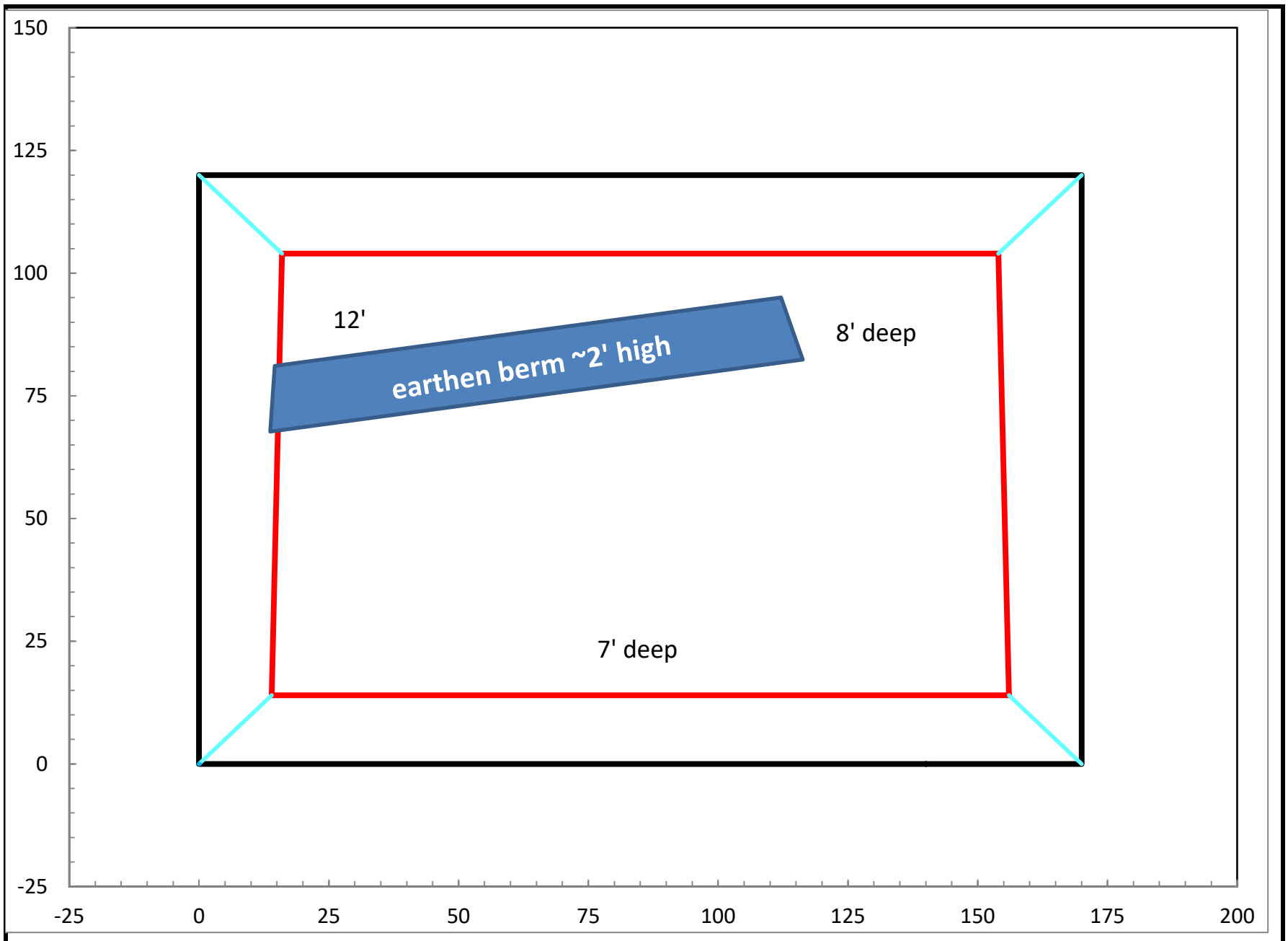
Albuquerque, NM 87104



North

Total Capacity 20698 bbl

Total Width	170.0	Slopes Horizontal Distance	2.00
Total Length	120.0	Slopes Vertical Distance	1.00

R.T. Hicks Consultants Albuquerque, N. M. 87104	**Solids Burial Pit** Bottom of Cell Not to Scale	**Plate 1**	
	Murchison - Jawbone State Temporary Pit	**February 2017**	

Site Inspection Photographs

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

3H and 4H well stakes (center); view southwest

200 ft west; view east toward 3H, 4H wells stakes
Note small gulley in middle of image

Stake for southwestern corner of the pad in center foreground, 200 ft south; Bottom foreground depicts earlier dirt road that followed natural drainage pattern; view north-northeast toward well stakes

Stakes for northern edge of pad, 200 ft north; View south from proposed road location

Stake for eastern edge of pad in right-foreground, 200 ft east; view west toward well stakes

Wells stakes for 3H (left) and 4H; view south
Small rill exists between well stakes

Survey Information

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
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
1000 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

[1] API Number	[2] Pool Code	[3] Pool Name
	97494	COTTONWOOD DRAW;BONE SPRING

[4] Property Code	[5] Property Name	[6] Well Number
	JAWBONE STATE COM	3H

[7] OGRID No.	[8] Operator Name	[9] Elevation
15363	MURCHISON OIL & GAS, INC.	3331.1

[10] Surface Location

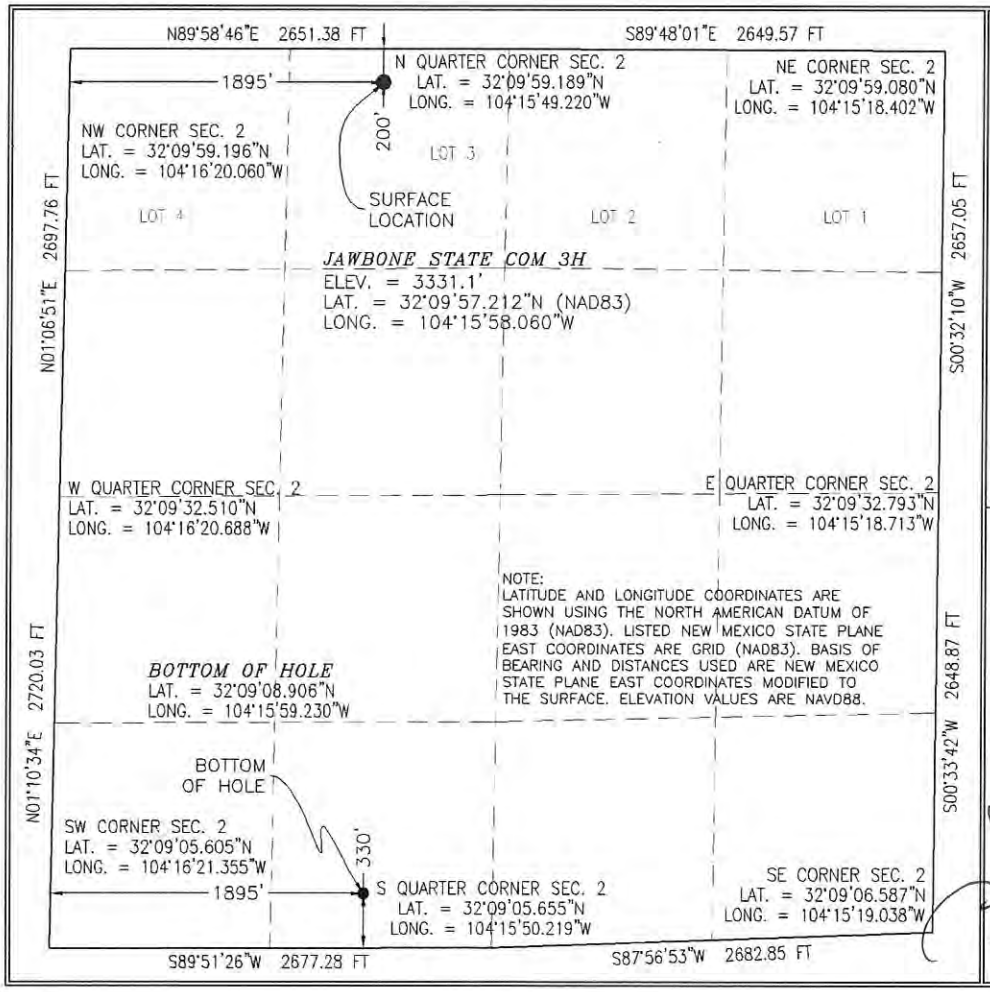
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
3	2	25 S	26 E		200	NORTH	1895	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	2	25 S	26 E		330	SOUTH	1895	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
160			

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.



[17] OPERATOR CERTIFICATION

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

Signature Date

Printed Name

E-mail Address

[18] SURVEYOR CERTIFICATION

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

DECEMBER 9, 2016
Date of Survey

FILIMON F. JARAMILLO
NEW MEXICO
12797
REGISTERED PROFESSIONAL SURVEYOR

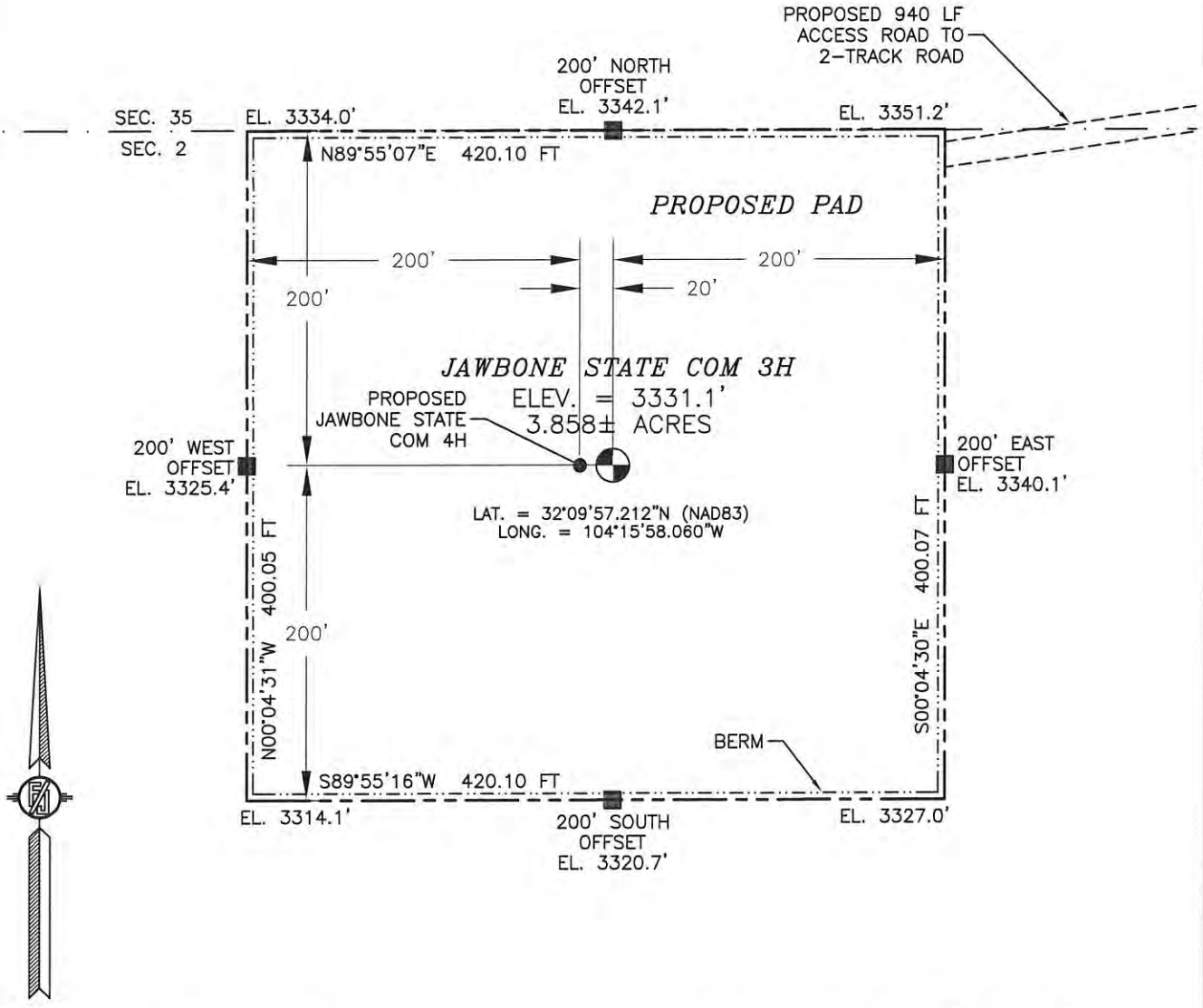
Signature and Seal of Professional Surveyor:

Certificate Number: FILIMON F. JARAMILLO, PLS 12797

SURVEY NO. 4939A

SECTION 2, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM CR 748 (OLD CAVERN HIGHWAY) AND CR 720 (BLACK RIVER VILLAGE) GO SOUTH ON CALICHE ROAD (JOHN D FOREHAND) 3.8 MILES, TURN RIGHT AND GO WEST-SOUTHWEST 2.4 MILES TO FORK IN ROAD AND STAY RIGHT AND GO SOUTHWEST 746' AND STAY RIGHT ON 2-TRACK ROAD AND GO WEST 879' TO EAST EDGE OF JAWBONE STATE 1H PAD. THEN FROM THERE GO NORTHWEST 919' TO A PROPOSED ROAD SURVEY AND FOLLOW FLAGS SOUTHWEST 435' THEN SOUTH-SOUTHWEST 505' (TOTAL OF 940') TO THE NORTHEAST PAD CORNER FOR THIS LOCATION.

MURCHISON OIL & GAS, INC.

JAWBONE STATE COM 3H

LOCATED 200 FT. FROM THE NORTH LINE AND 1895 FT. FROM THE WEST LINE OF SECTION 2, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M. EDDY COUNTY, STATE OF NEW MEXICO

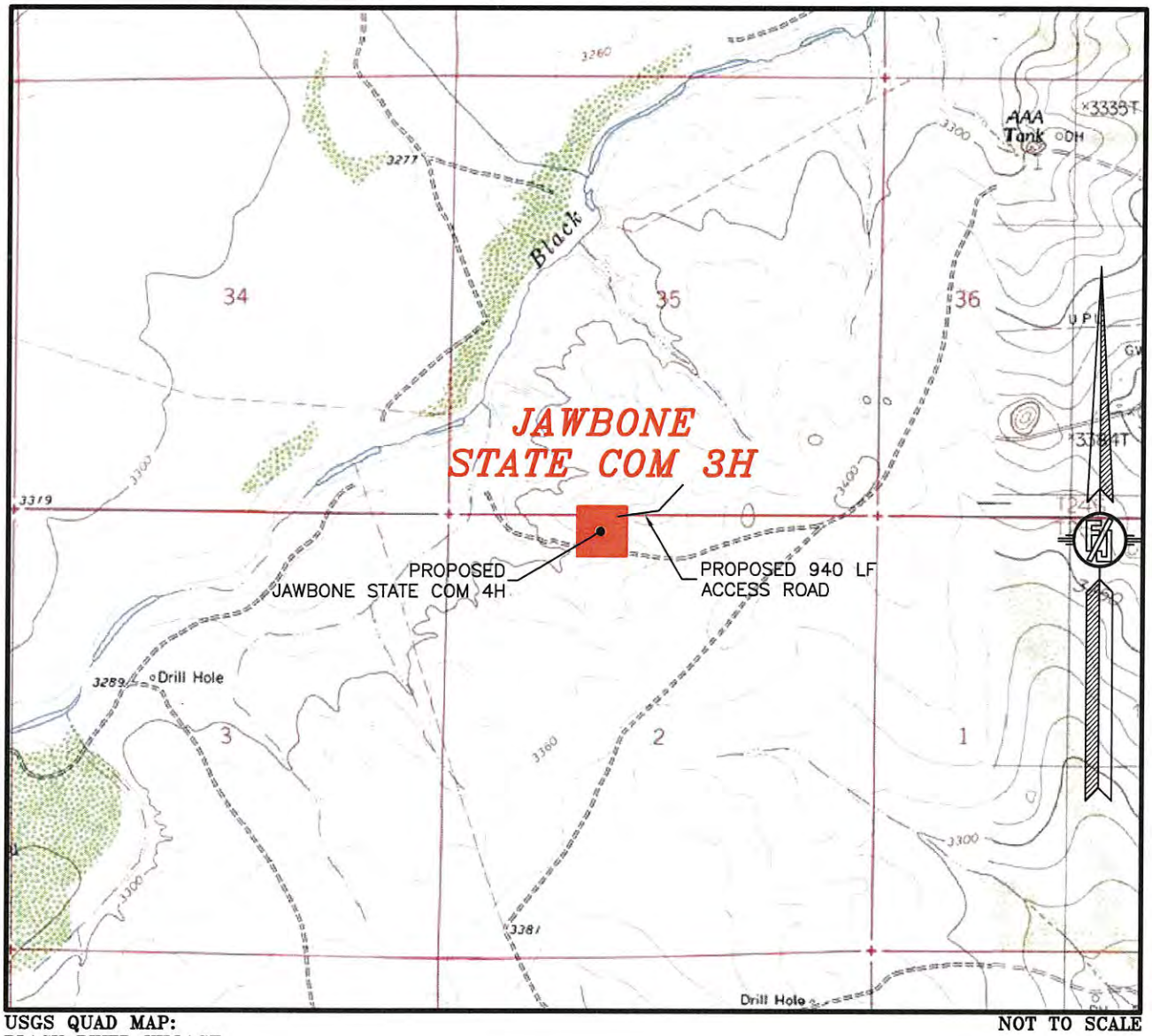
DECEMBER 9, 2016

SURVEY NO. 4939A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

SECTION 2, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

LOCATION VERIFICATION MAP



USGS QUAD MAP:
BLACK RIVER VILLAGE

NOT TO SCALE

MURCHISON OIL & GAS, INC.

JAWBONE STATE COM 3H

LOCATED 200 FT. FROM THE NORTH LINE
AND 1895 FT. FROM THE WEST LINE OF
SECTION 2, TOWNSHIP 25 SOUTH,
RANGE 26 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

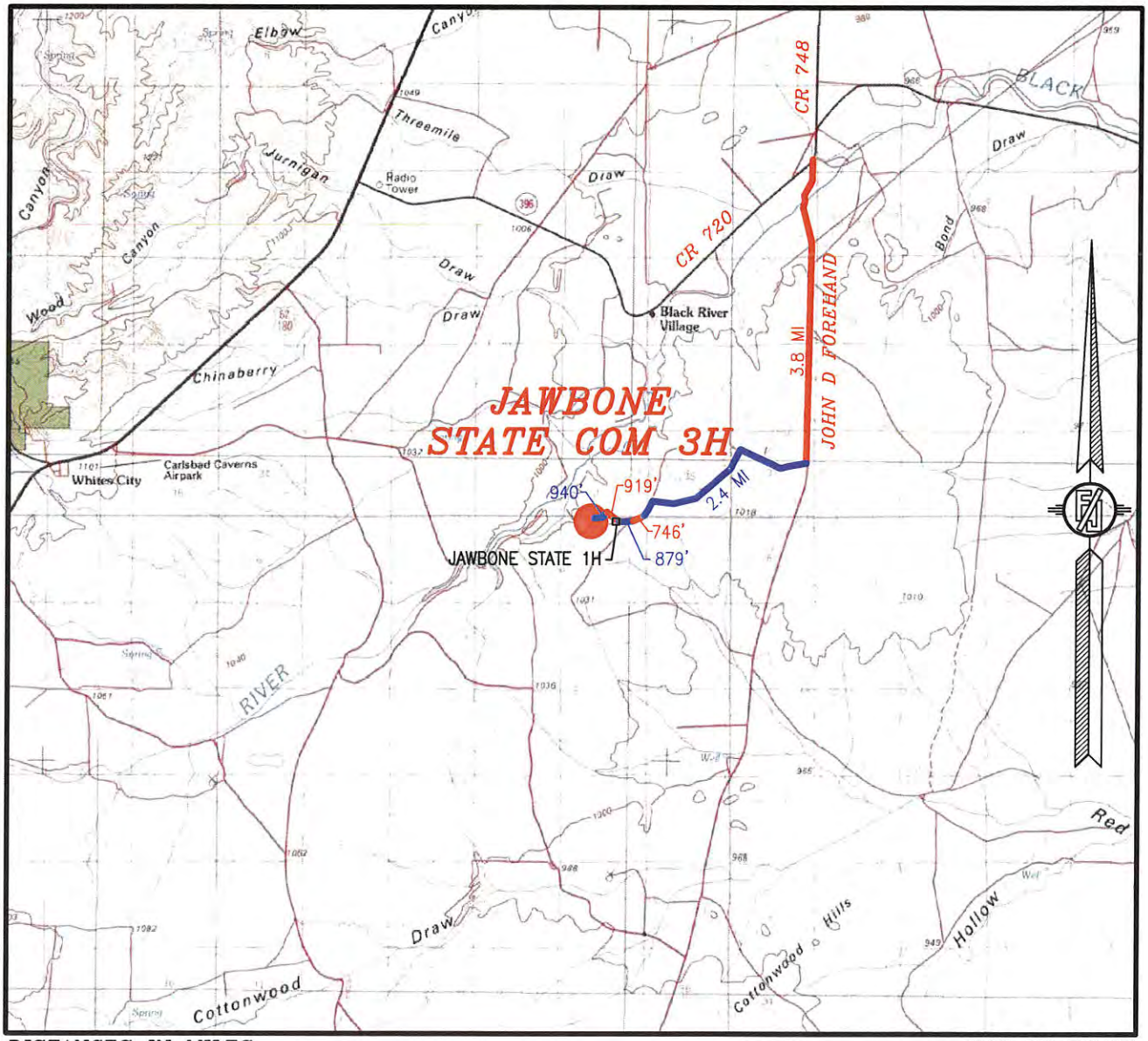
DECEMBER 9, 2016

SURVEY NO. 4939A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 2, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

VICINITY MAP



DISTANCES IN MILES

NOT TO SCALE

DIRECTIONS TO LOCATION
FROM CR 748 (OLD CAVERN HIGHWAY) AND CR 720 (BLACK RIVER VILLAGE) GO SOUTH ON CALICHE ROAD (JOHN D FOREHAND) 3.8 MILES, TURN RIGHT AND GO WEST–SOUTHWEST 2.4 MILES TO FORK IN ROAD AND STAY RIGHT AND GO SOUTHWEST 746' AND STAY RIGHT ON 2–TRACK ROAD AND GO WEST 879' TO EAST EDGE OF JAWBONE STATE 1H PAD. THEN FROM THERE GO NORTHWEST 919' TO A PROPOSED ROAD SURVEY AND FOLLOW FLAGS SOUTHWEST 435' THEN SOUTH–SOUTHWEST 505' (TOTAL OF 940') TO THE NORTHEAST PAD CORNER FOR THIS LOCATION.

MURCHISON OIL & GAS, INC.
JAWBONE STATE COM 3H
LOCATED 200 FT. FROM THE NORTH LINE AND 1895 FT. FROM THE WEST LINE OF SECTION 2, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

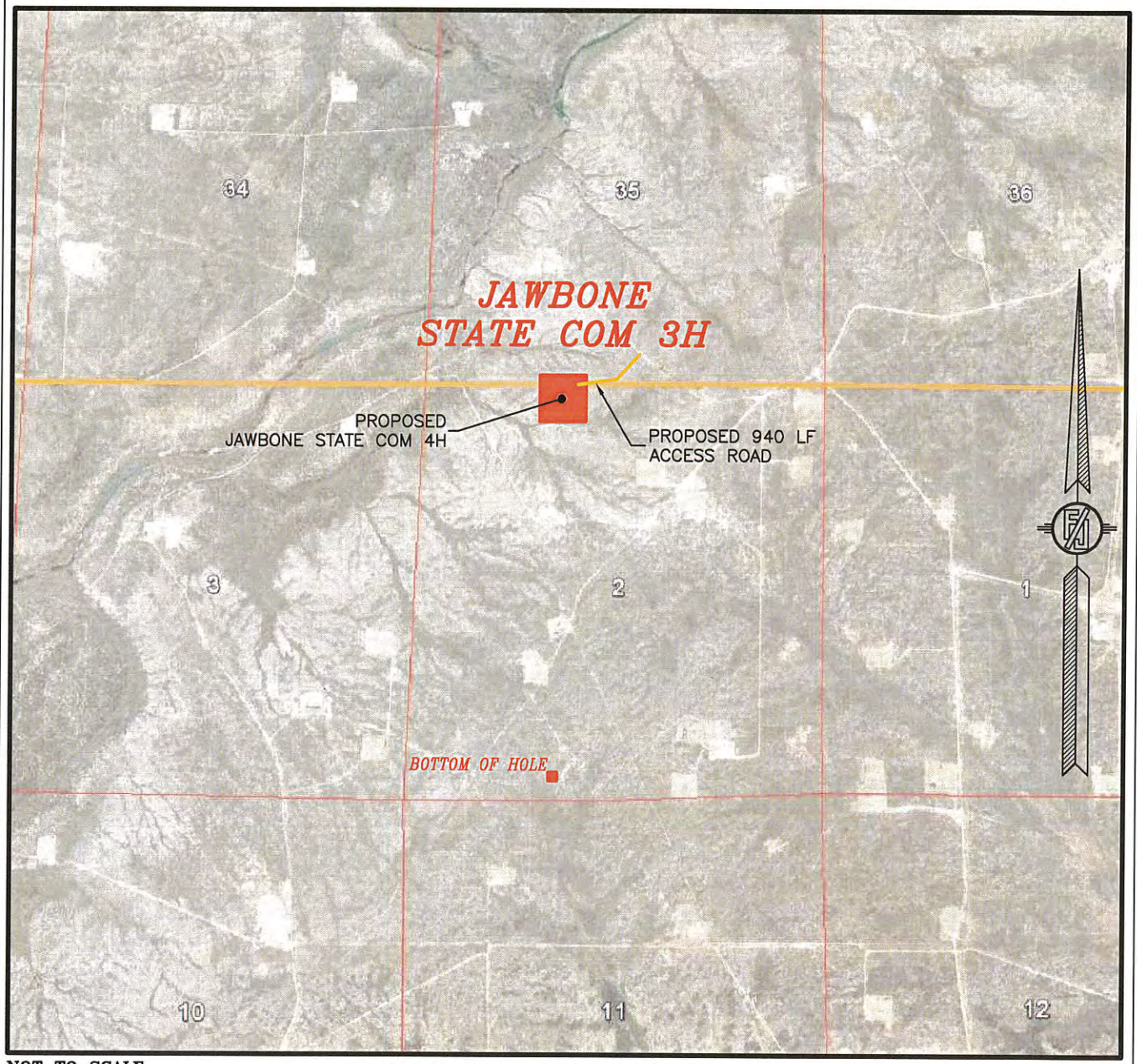
DECEMBER 9, 2016

SURVEY NO. 4939A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 2, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

AERIAL PHOTO



NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
MARCH 2016

MURCHISON OIL & GAS, INC.

JAWBONE STATE COM 3H

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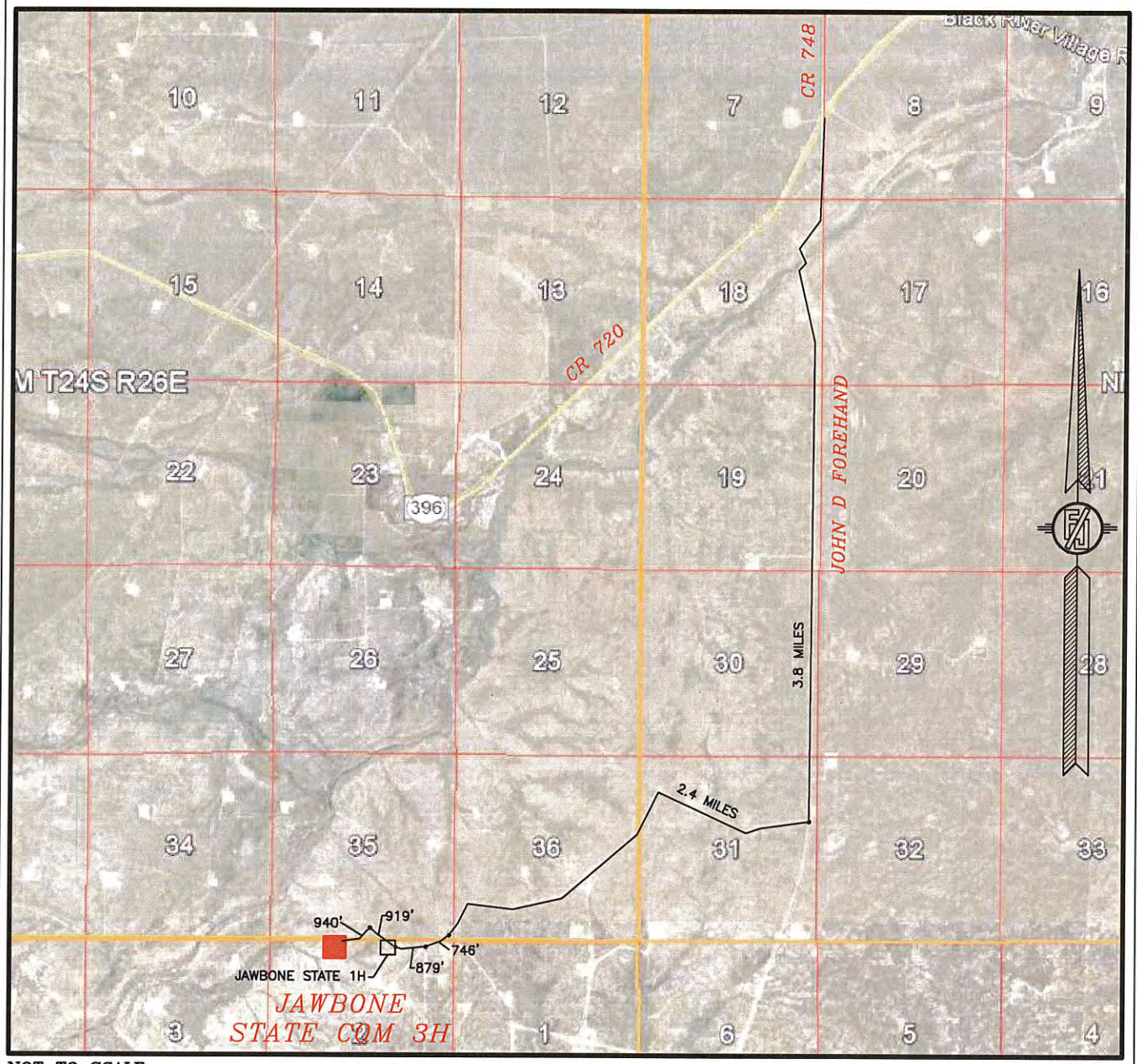
ACCESS AERIAL ROUTE MAP



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Generic Plans for Temporary Pits

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

Solids Pit Design/Construction Plan

Plate 1 shows the design of the temporary pit proposed for this project. Field conditions and the drilling rig layout will determine the final configuration of the pit, which will consist of a single cell for the burial of drilling solids derived from a closed-loop system. This is not a reserve pit. The pit will receive solids and some liquids from a solids control system. The liquids will drain to a sump in a corner of the pit where a pump will transfer the fluids into a steel pit, or frac tank, or other suitable container.

Although unlikely due to the nature of the operation, the operator may install a system that can drain water entrained in the drilling waste of the drilling pit. The drainage system may be installed in the deepest portion of the pit where a standpipe or hose rises from the depression to the top of the berm. The drainage system can remove water to an above-ground tank, a fluids cell of the pit, or directly to a truck for re-use or disposal.

Construction/Design Plan of Temporary Pit

Stockpile Topsoil by Earthwork Contractor

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

Signage Provided by Operator

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

> 19.15.16.8 SIGN ON WELLS:
> B. For drilling wells, the operator shall post the sign on the derrick or not more than 20 feet from the well.
> C. The sign shall be of durable construction and the lettering shall be legible and large enough to be read under normal conditions at a distance of 50 feet.
> F. Each sign shall show
> the: (1) well number;
> (2) property
> name; (3)
> operator's name;
> (4) location by footage, quarter-quarter section, township and range (or unit letter can be substituted for the quarter-quarter section); and
> (5) API number.

The sign will also provide emergency telephone numbers.

Fencing Provided by Liner Contractor

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

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

Earthwork

The temporary pit will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base that is smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Rolling the surface to prepare the foundation for placement of the liner is recommended. Additional engineering controls may be prescribed as necessary.

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

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

If the transmittal letter or contractor instructions identify concerns relating to the presence of karst and associated instability, a Registered Professional Engineer will examine the site and provide stamped drawings or recommendations for appropriate construction of the liner foundation.

Earth material excavated from the pit will be stockpiled on the downhill sides of the pit. This material will be used as directed to create the soil cover and the final grading for reclamation and seeding.

Liner Installation

The geomembrane liner will consist of 20-mil string reinforced LLDPE (or thicker).

The operator will direct the liner installation contractor to:

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

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

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

Solids Pit Operating and Maintenance Plan

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

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

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

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

The operator will install hardware that prevents damage to the liner by solids placement, fluid jets or impact from installation and removal of hoses or pipes during injection or withdrawal of liquids. Cuttings from the solids controls system will contain sufficient liquid content to allow flow and distribution in the bottom of the pit. Cuttings from wells drilled on the location will be discharged directly from the solids control system into the pit. Cuttings transported from nearby wells will be placed in the pit directly from the roll-off or dump truck. The roll-off or truck bed may be washed with water from a frac tank and this liquid discharge will cause the dumped solids to distribute in the pit. Fluid added to the pit will be removed on a daily basis to the frac tank for rinsing as described.

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

As this is not a reserve pit, an oil absorbent boom to contain and remove oil from the pit's surface is not required...

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

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

The operator will maintain no more than two feet of standing fluid in the "sump" of the temporary pit, except under extenuating circumstances, which will be noted on the pit inspection log as described below. Thus, more than 90% of the pit will not contain standing fluids.

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

The operator will remove all free drilling fluids from the temporary pit on a daily basis and whenever more than 2-feet of standing fluid exists in the pit sump.

The operator will note the date of this release upon Form C-105 or C-103 upon well or workover completion.

Solids Pit In-Place Closure Plan

The wastes in the temporary pit are destined for in place burial at the permitted location. However, a transmittal letter may notify OCD that drilling waste from a nearby site on the same lease may be placed in the temporary pit. A notice will include the name of the nearby well, the date that the drilling or workover rig moved from the temporary pit, an affirmation that the temporary pit will be closed in conformance with the mandates of the Rule, including the mandated lifetime of the pit.

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 BLM or State Land Office via email, which serves as notification that the operator intends on-site burial of solids. For private surface owners, this application package was delivered by email, US Mail or by hand delivery.

Construction/Design Plan of Temporary Pit
The design and construction protocols for the temporary pit are provided in the design and construction plan and in Plate 1.

General Protocols and Procedures

- All free liquids from the pit will be recycled or disposed in a manner consistent with OCD Rules.
- The residual drilling mud and cuttings will be stabilized to a capacity sufficient to support the 4-foot thick soil cover.
- The residual pit solids will not be mixed at a ratio greater than 1 part pit solids to 3 parts dry earth material (e.g. subsoil).
- The pit will not be closed until the stabilized pit contents pass the paint filter liquids test.

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

In-place burial is the selected on-site disposal alternative. If a concentration of a contaminant within the material mixed at a ratio not exceeding 3:1 is higher than the concentration given in Table II, closure will proceed in accordance with Subsection C of 19.15.17.13 NMAC.

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

R360 or Sundance Services

Protocols and Procedures for Earthwork

Stabilization of the residual cuttings and mud is accomplished by mixing dry earth material within the temporary pit footprint. After stabilization the operator or qualified contractor will:

1. 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.
2. Use a geomembrane cover made of 20-mil string reinforced LLDPE liner
3. Over the sloping, stabilized material and liner, place the **Soil Cover** of:
    a. at least 2-feet of compacted, uncontaminated, non-waste containing earthen fill (sand/gravel) with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0.
    b. 1-foot of coarse-grained (large gravel/cobble) material from the downhill stockpile placed over the sand/gravel fill
    c. 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.
    d. To replicate the natural ground surrounding the site, as shown on the cover of the application, and to minimize the potential of erosion, larger rocks should be placed with the 1-foot thickness of suitable material to establish vegetation.
4. Contour the cover to
    a. blend with the topography
    b. prevent erosion of the cover and
    c. prevent ponding over the cover.

As the temporary pit is located in an area mapped as high karst, a Registered Professional Engineer has reviewed this plan and provided amendments, if necessary.

Closure Notice

The operator will notify the surface owner by certified mail, return receipt requested, that the operator plans closure operations at least 72 hours, but not more than one week, prior to any closure operation. The notice will include the well name, API number, and location. Notification of the State Land Office or BLM as surface owner's representatives will be accomplished via email if a variance is granted by OCD.

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

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

Closure Report

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

i. closure report on form C-144, with necessary attachments
ii. a certification that all information in the report and attachments is correct, that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan
iii. a plat of the pit location on form C-l05
if burial includes solids derived from a nearby well on the same lease, the report will list the name, API # and location of the well(s) from which the solids originated

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

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

Timing of Closure

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

Reclamation and Re-vegetation Plan

In addition to the area of the in-place burial, the operator will reclaim the surface impacted by the temporary pit, including access roads associated with the pit, to a safe and stable condition that blends with the surrounding undisturbed area including areas not reclaimed as described herein due to their use in production or drilling operations will be stabilized and maintained to minimize dust and erosion. This includes the area of the temporary pit if a transmittal letter to OCD proposes an alternative to the re-vegetation or recontouring requirement with

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

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

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

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

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

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

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

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