

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

For temporary pits, closed-loop systems, and below-grade tanks, submit to the appropriate NMOCD District Office.
For permanent pits and exceptions submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

**Pit, Closed-Loop System, Below-Grade Tank, or
Proposed Alternative Method Permit or Closure Plan Application**

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

Instructions: Please submit one application (Form C-144) per individual pit, closed-loop system, below-grade tank or alternative request

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1. Operator: <u>Murchison Oil & Gas, Inc.</u>		OGRID #: <u>15363</u>	<div style="border: 2px solid black; padding: 5px; text-align: center;"> RECEIVED OCT 22 2012 NMOCD ARTESIA </div>
Address: <u>1100 Mira Vista Blvd., Plano, Texas 75093-4698</u>			
Facility or well name: <u>War Horse Federal Com. No. 3H</u>			
API Number: <u>30-015-41227</u>		OCD Permit Number: _____	
U/L or Qtr/Qtr <u>I</u>	Section <u>21</u>	Township <u>T18S</u> Range <u>R29E</u> County: <u>Eddy</u>	
Center of Proposed Dr. <u>32° 43' 55.195"</u>		Longitude <u>104° 04' 18.317"</u>	NAD: <input type="checkbox"/> 1927 <input checked="" type="checkbox"/> 1983
Surface Owner: <input type="checkbox"/> Federal <input type="checkbox"/> Tribal Trust or Indian Allotment			

2. ☒ **Pit:** Subsection F or G of 19.15.17.11

Temporary: ☒ Drilling ☐ Workover

☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A

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

☒ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume _____ bbl Dimensions: L _____ x W _____ x D _____

3. ☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC

Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Applies to activities which require a permit or notice of intent)

☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other _____

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

Liner Seams: ☐ Welded ☐ Factory ☐ Other _____

4. ☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC

Volume: _____ 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 _____

5. ☐ **Alternative Method:**

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

6.

Fencing: Subsection D of 19.15.17.11 NMAC (*Applies to permanent pits, temporary pits, and below-grade tanks*)

- ☐ Chain link, six feet in height, two strands of barbed wire at top (*Required if located within 1000 feet of a permanent residence, school, hospital, institution or church*)
- ☒ Four foot height, four strands of barbed wire evenly spaced between one and four feet
- ☐ Alternate. Please specify _____

7.

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)

8.

Signs: Subsection C of 19.15.17.11 NMAC

- ☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers
- ☒ Signed in compliance with 19.15.16.8 NMAC

9.

Administrative Approvals and Exceptions:

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

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

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

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

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

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells SEE FIGURE 2a	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site SEE FIGURE 3a & 3b	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to temporary, emergency, or cavitation pits and below-grade tanks) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image. SEE FIGURE 3a	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to permanent pits) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site. SEE FIGURE 2b	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. SEE FIGURE 4 - Written confirmation or verification from the municipality; Written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site - SEE FIGURE 5	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division. SEE FIGURE 6	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map. SEE FIGURE 7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within a 100-year floodplain. - FEMA map. SEE FIGURE 8	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

11.

Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

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

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

12.

Closed-loop Systems Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Geologic and Hydrogeologic Data (only for on-site closure) - based upon the requirements of Paragraph (3) of Subsection B of 19.15.17.9
- ☐ Siting Criteria Compliance Demonstrations (only for on-site closure) - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

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

☐ Previously Approved Operating and Maintenance Plan API Number: _____ (Applies only to closed-loop system that use above ground steel tanks or haul-off bins and propose to implement waste removal for closure)

13.

Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Climatological Factors Assessment
- ☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Quality Control/Quality Assurance Construction and Installation Plan
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Nuisance or Hazardous Odors, including H₂S, Prevention Plan
- ☐ Emergency Response Plan
- ☐ Oil Field Waste Stream Characterization
- ☐ Monitoring and Inspection Plan
- ☐ Erosion Control Plan
- ☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

14.

Proposed Closure: 19.15.17.13 NMAC**Instructions:** Please complete the applicable boxes, Boxes 14 through 18, in regards to the proposed closure plan.

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

☐ Alternative

Proposed Closure Method: ☐ Waste Excavation and Removal

☐ Waste Removal (Closed-loop systems only)

☒ On-site Closure Method (Only for temporary pits and closed-loop systems)

☒ In-place Burial ☐ On-site Trench Burial

☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

15.

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

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

16.

Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only: (19.15.17.13.D NMAC)

Instructions: Please indentify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please provide the information below) ☐ No

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

☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.

Siting Criteria (regarding on-site closure methods only): 19.15.17.10 NMAC

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

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

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

☐ Yes ☒ No
☐ NA

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

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

☐ Yes ☒ No
☐ NA

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

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

☐ Yes ☒ No
☐ NA

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

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

Within 500 feet of a wetland.

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

☐ Yes ☒ No

Within the area overlying a subsurface mine.

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

☐ Yes ☒ No

Within an unstable area.

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

☐ Yes ☒ No

Within a 100-year floodplain.

- FEMA map

☐ Yes ☒ No

18.

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

☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC

☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of 19.15.17.11 NMAC

☐ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC

☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC

☒ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☒ Waste Material Sampling Plan - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)

☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

19.

Operator Application Certification:

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

Name (Print): Greg Boans Title: Production Superintendent

Signature: [Signature] Date: October 19, 2012

e-mail address: Gboans@jdmii.com and r@rthicksconsult.com Telephone: (575) 361-4962, (Hicks: 505/266-5004)

20.

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

OCD Representative Signature: WITHDRAWN BY OPERATOR Approval Date: [Signature]

Title: _____ OCD Permit Number: _____

21.

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

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

☐ Closure Completion Date: _____

22.

Closure Method:

☐ Waste Excavation and Removal ☐ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)
☐ If different from approved plan, please explain.

23.

Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:

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

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

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

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

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

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

24.

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

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

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

25.

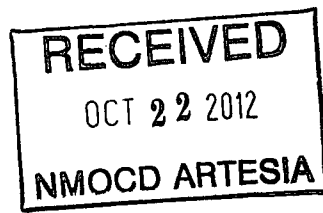
Operator Closure Certification:

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

Name (Print): _____ Title: _____

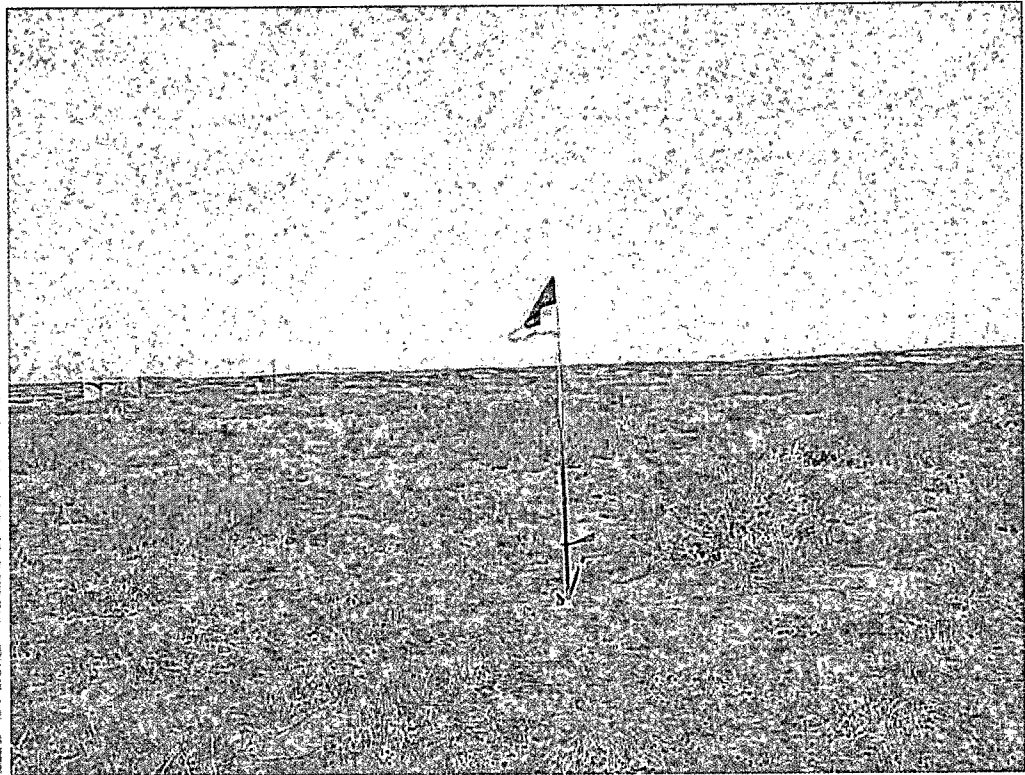
Signature: _____ Date: _____

e-mail address: _____ Telephone: _____



October 2012

**C-144 Permit Package for
War Horse Federal Com No. 3H Well
Section 21 T18S R29E Eddy County NM**



**Prepared for
Murchison Oil & 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

October 19, 2012

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

Mr. John Fast
BLM Carlsbad
Via E-mail

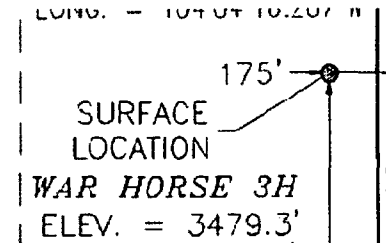
RE: Murchison Oil and Gas: War Horse #3H

Dear Mike:

For the above-referenced temporary pit, attached are:

1. A C-144 Form
2. Supplemental information to support the C-144

Please note that Plate 1 of the permit application provides the location of the proposed pit in relation to the well and surveyed elevations near the pit. The Pit Rule (19.15.17.9.D.2) states: "... If the operator plans to use a temporary pit, the operator shall provide the proposed pit location on form C-102." On the Form C-102, the location of the pit would plot as a small dot in the portion of the C-102 shown in the figure (right). Therefore, we ask for administrative approval to use Plate 1 in lieu of showing the location of the pit on Form C-102.



We are concerned that Santa Fe has mandated reviews of C-144s for drilling pits commence after BLM approves the APD. Because NMOCD reviews for C-144 permits might require 40-60 days, we respectfully request that OCD and BLM communicate regarding their reviews of the proposal to employ a temporary pit. Such communication could allow OCD to begin review of the C-144 when BLM signals their consent to use a temporary pit. This could shorten the time between permit submission and approval.

As shown below, we are sending a copy of this application to Concho Resources to serve as notice to the surface owner of the intention to dispose of drilling waste on-site. As always, thanks for your help.

Sincerely,
R.T. Hicks Consultants

Randall Hicks

Copy: Murchison Oil and Gas, Inc.
Rand French, Concho Resources

C-144 and Site Specific Information for Drilling Pit

R.T. Hicks Consultants, Ltd.

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

Distance to Groundwater

Figure 2a, 2b, and the discussion presented below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 100 feet beneath the temporary pit.

Figure 1 is an area topographic map that shows the location of the temporary pits (both War Horse #1H and #3H) as orange squares.

Figure 2a is a Regional Geologic Map that shows:

1. The location of the temporary pits (both Murchison well locations) as orange squares.
2. The potentiometric surface contours representing the shallowest aquifer as solid blue lines.
3. Open File Report No. 95 (OFR-95) listed wells as solid squares identified by well total depth (light blue is less than 151 feet, green is 151 to 500 feet, and yellow is unreported).
4. Water wells from the USGS database as red triangles.
5. There are 4 wells in the area listed on the Office of the State Engineer (OSE) database, but only one (RA-7774) includes groundwater elevation data and it is located adjacent to a USGS well (USGS-1344) that has more recent water level data. Therefore none of the OSE wells were included on the map.

Figure 2b is the same as Figure 2a with well numbers that correspond to the table provided in Appendix SSI-A and excluding the groundwater elevations and contours.

Geology

The proposed temporary pit is located on an outcrop of the Quaternary eolian deposits (Qe on Figure 2). It consists of low sand dunes that have been stabilized by vegetation. Quaternary piedmont (Qp), alluvium (Qa), and older alluvium (Qoa) are also exposed at the surface near the site. Underlying the thin layer of Quaternary age sediments is the Permian Rustler Formation (Pr on Figure 2). It is exposed at the surface approximately 5 miles to the south and 8 miles to the northwest. The Rustler is probably more than 150 feet thick at this site and consists of siltstone, gypsum, sandstone, and dolomite, which provide fresh water to a few nearby wells. The underlying Permian Salado Formation (Psl on Figure 2) is comprised of evaporite sequence rocks (gypsum, shale, salts) and is not considered a source for fresh water. Salado Formation rocks are exposed at the surface 11 miles to the west. The Permian-Artesia Group (Pat on Figure 2) crops out approximately 12 miles to the west of the site and extends in the subsurface to the east, underlying the Salado Formation. These formations are comprised of more clastic (shelf facies) rocks that are capable of producing fresh water when located near the surface and below the water table elevation; conditions that are not present at this site.

Topographically, the site is located on a gentle southeast slope that is interrupted by small dunes. Surface drainage for the area is provided by Bear Grass Draw, located approximately 0.5 miles to the east.

Siting Criteria (19.15.17.10 NMAC)
Murchison Oil & Gas: War Horse Federal Com No. 3H

Water Table Elevation

Twenty water wells were identified in the area, which were used to construct the regional potentiometric surface map provided in Figure 2a. Most of the depth to water measurements were recorded in OFR-95, are dated from 1948 to 1977, and should be considered conservative with respect to this evaluation (see Appendix SSI-A). The OFR-95 potentiometric surface map (not included) indicated that the groundwater elevation near the War Horse sites was approximately 3,280 feet above sea level (approximately 216 feet below the surface). This map however contained a few contour anomalies. To verify the data we elected to field check three locations (four wells) that were close to the site. These included: (1) a data point located in Section 24, approximately 2.5 miles to the east, (2) a data point located in Section 34, approximately 2.0 miles to the south-southeast, and (3) a data point located in Section 29 (T-17-S, R-29-E), 4.5 miles to the north. A summary of the investigation of these data points is provided on the table below:

Well Numbers	Well Location						Well Source Information					Groundwater Elevation Data						Gauging Date	
	Township (south)	Range (east)	Section	Quarter Section (64, 16, 4)			NM-OSE Database	USGS Database	Open File Rpt. 95	USGS Topo Sheet	Aerial Photograph	Field Verification	Surface Elevation (published)	Surface Elevation (Topo Sheet)	Well Total Depth (published)	Depth to Water (published)	Groundwater Elev. (published)		Groundwater Elev. (using topo elev.)
Misc - 36	17	29	29	4	4	4		✓	✓	✓	✓		3,545		102.4		3442.6	10/4/12	
Misc - 26a	18	29	24	1	1	3		✓	✓	✓	✓	3,430	3,436		158.3	3,272	3,278	4/28/50	
Misc - 26b	18	29	24	1	1	3		✓	✓	✓	✓	3,436	3,436		156.44	3,280	3,280	10/18/77	
Unnamed	18	29	34					✓				Could not identify current or historic location							

✓ Indicates well was verified, (blank) indicates well not verified, and -- indicates no attempt to verify

Visual inspections of questionable wells were performed to verify the information provided by the public records and published reports. Initially, an attempt was made 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, or roads associated with the well. Locations that could not be verified by maps or photographs were verified in the field. Attempts were also made to gauge wells during the field investigation when access was permitted. The results of the field inspections are summarized as follows:

- Wells No. Misc-26a and Misc-26b were both present at the approximate location reported in OFR-95, which included only one of the wells. An effort was made to measure the depth to water but casing access was not possible in either well. Based on the inspection, it was assumed that the data in OFR-95 was valid for this area.
- Evidence of the unnamed well in Section 34, south of the site, could not be located after a thorough search of the area. It is therefore assumed that the well was incorrectly identified in OFR-95 and the data, which indicated a groundwater elevation of 3,210 feet above sea level, was not utilized in the creation of Figure 2a.

Siting Criteria (19.15.17.10 NMAC)
Murchison Oil & Gas: War Horse Federal Com No. 3H

- Well No. Misc-36 was identified at the location reported in OFR-95 but the casing had collapsed and could not be accessed. A section of exposed casing is present approximately 30 feet to the southeast of the former windmill. According to the land owner this water well encountered groundwater but was not considered productive. The depth to water in the newer well was measured at 102.4 feet below the surface on October 4, 2012, which is significantly less than the 210-foot depth recorded in OFR-95 from the windmill in 1948. The OFR-95 groundwater elevation for the windmill is considered to be incorrect and was discarded in favor of the recent data in the preparation of Figure 2a.

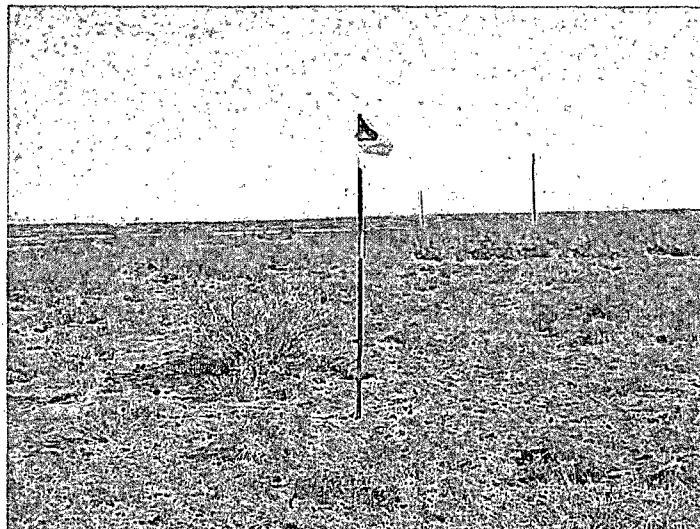
Distance Between Bottom of Pit and Groundwater

All of the groundwater in the area is produced from the Permian Rustler Formation, which is considered a regionally consistent aquifer. The most recent and accurate available groundwater data was used in the preparation of the potentiometric map (Figure 2a). Based on this map and the well survey information provided, War Horse Federal Com. No. 3H should encounter groundwater at an elevation of 3,315 feet above sea level, which is approximately 164 feet below the surface or 151 feet below the bottom of the deepest pit.

Distance to Surface Water

Figure 3a and 3b and the site visit demonstrates that the location is not 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).

- The nearest USGS identified drainage feature (Bear Grass Draw) is approximately 2,500 feet to the east of the site and flows to the south.
- No other watercourses, as defined by NMOCD Rules, or water bodies exist with 300-feet of the location.



Typical Ground Surface (photo looking north)

Distance to Permanent Residence or Structures

Figure 3a and the site visit demonstrates that the location is not within 300 feet from a permanent residence, school, hospital, institution, church, or other structure in existence at the time of initial application.

Distance to Non-Public Water Supply

Figures 2a and 2b demonstrate 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 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.

- The nearest water well (Misc-26) is located approximately 2.5 miles to the east, both wells in this area are used for livestock.
- No springs were identified within the mapping area.

Distance to Municipal Boundaries and Fresh Water Fields

Figure 4 demonstrates that the location is not within incorporated municipal boundaries or defined municipal fresh water well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.

- The closest municipality is Artesia, NM approximately 20 miles to the west.
- The closest public well field is located approximately 17 miles to the northeast.

Distance to Wetlands

Figure 5 demonstrates the location is not within 500 feet of wetlands.

- The nearest designated wetlands is a “Freshwater Pond” located approximately 7,000 feet to the northeast.
- A designated “Freshwater Pond” with an associated “Emergent Wetland” is also located approximately 10,000 feet to the northwest.

Distance to Subsurface Mines

Figure 6 and our general reconnaissance of the area demonstrate that the nearest subsurface mines are caliche pits.

- The nearest caliche pit is located approximately 4,000 feet to the northeast.

Distance to High or Critical Karst Areas

Figure 7 shows the location of the temporary pits with respect BLM Karst areas

- The proposed temporary pit is located within a “low” potential karst area. This designation is defined as “areas of questionable karst geology and few if any known caves or karst features” according to the BLM.
- The nearest “high” potential karst area is located approximately 7.0 miles northwest of the site. This designation is defined as “areas of known karst geology that contain high density of significant caves and karst features” according to the BLM.
- No evidence of solution voids were observed near the site during the field inspection.

Distance to 100-Year Floodplain

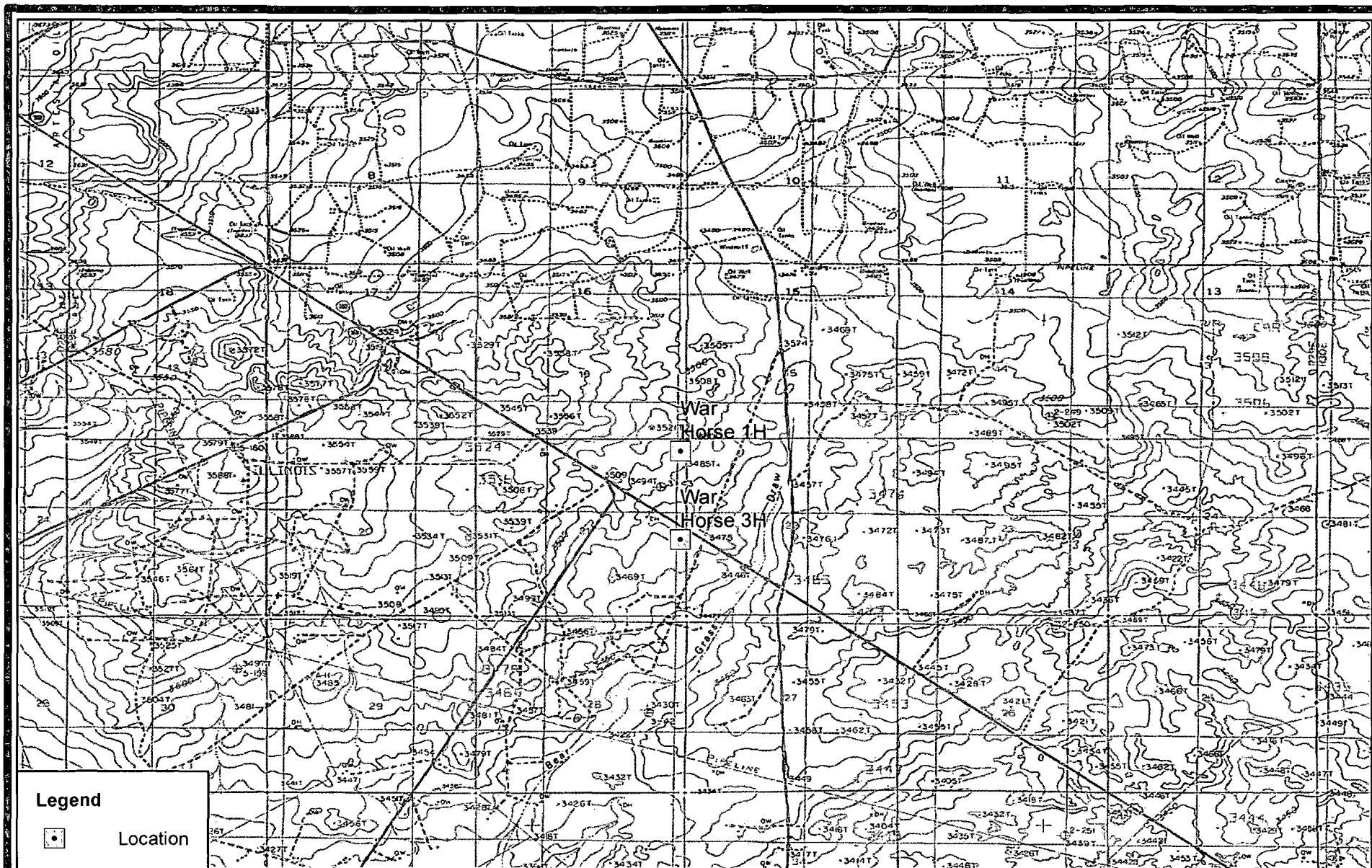
Figure 8 demonstrates that the location is not within a 100-year floodplain.

The location is within Zone X of FEMA Flood Zone Designation. Zone X is defined as an area of minimal flood hazard and above the 500-year (0.2% annual chance) flood level. The nearest Zone A Flood Hazard area is located approximately 2,800 feet to the east.

Site Specific Information Figures

R.T. Hicks Consultants, Ltd.

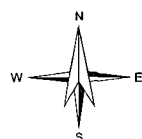
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104



Legend



Location



0

1



Miles

R.T. Hicks Consultants, Ltd

901 Rio Grande Blvd NW Suite F-142

Albuquerque, NM 87104

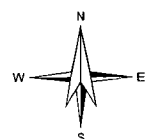
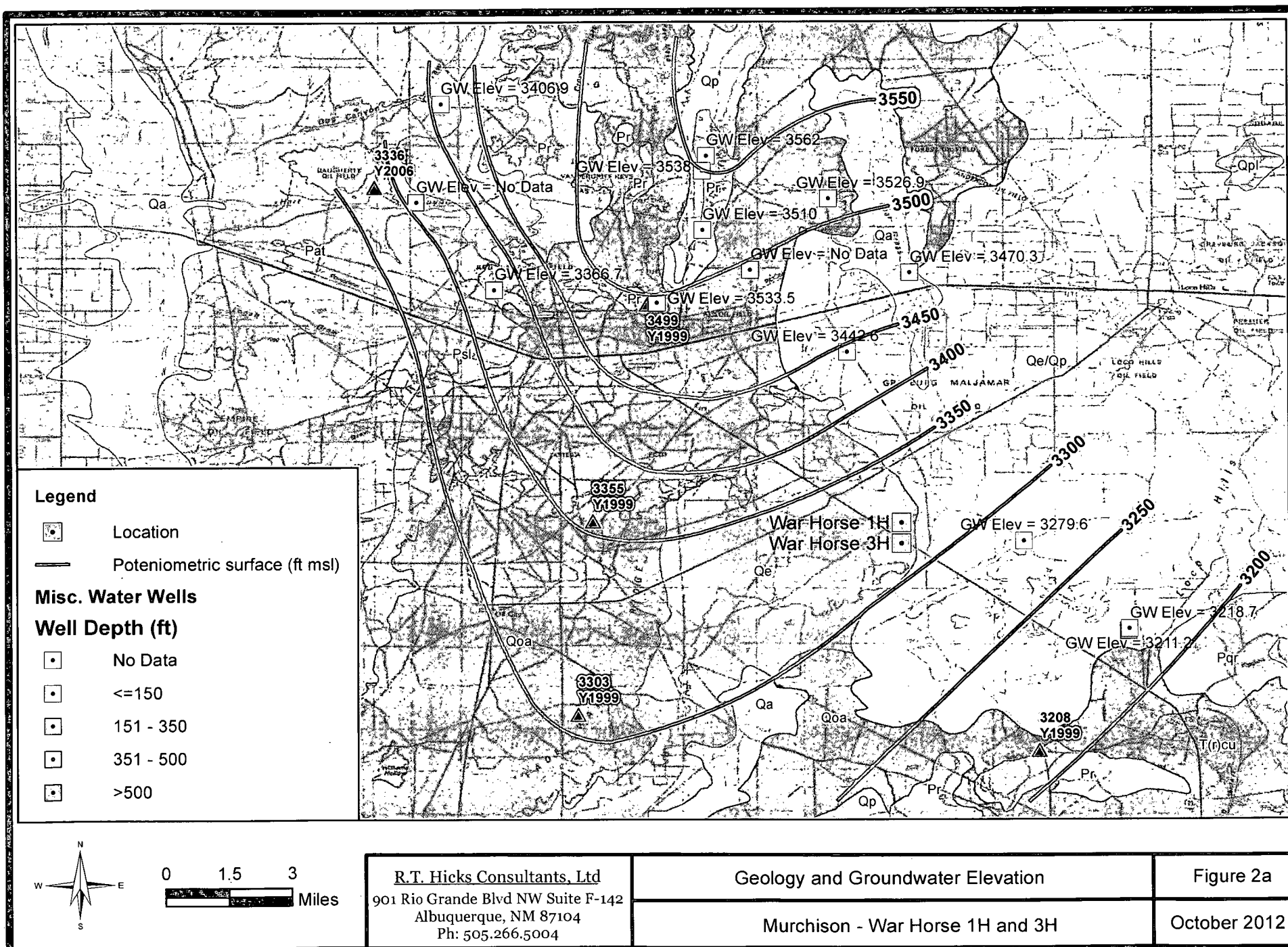
Ph: 505.266.5004

Location Map

Murchison - War Horse 1H and 3H

Figure 1

October 2012



0 1.5 3
Miles

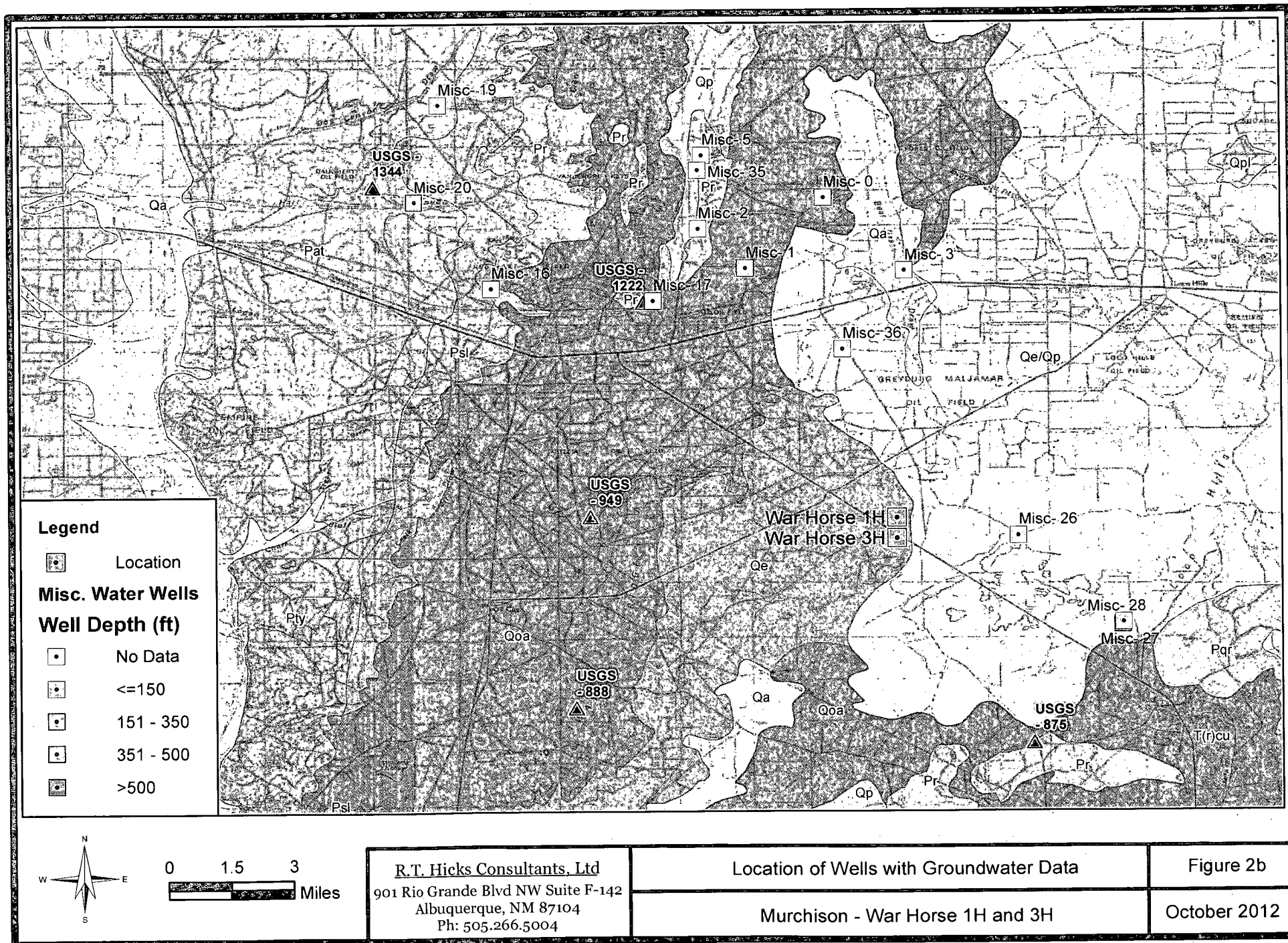
R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

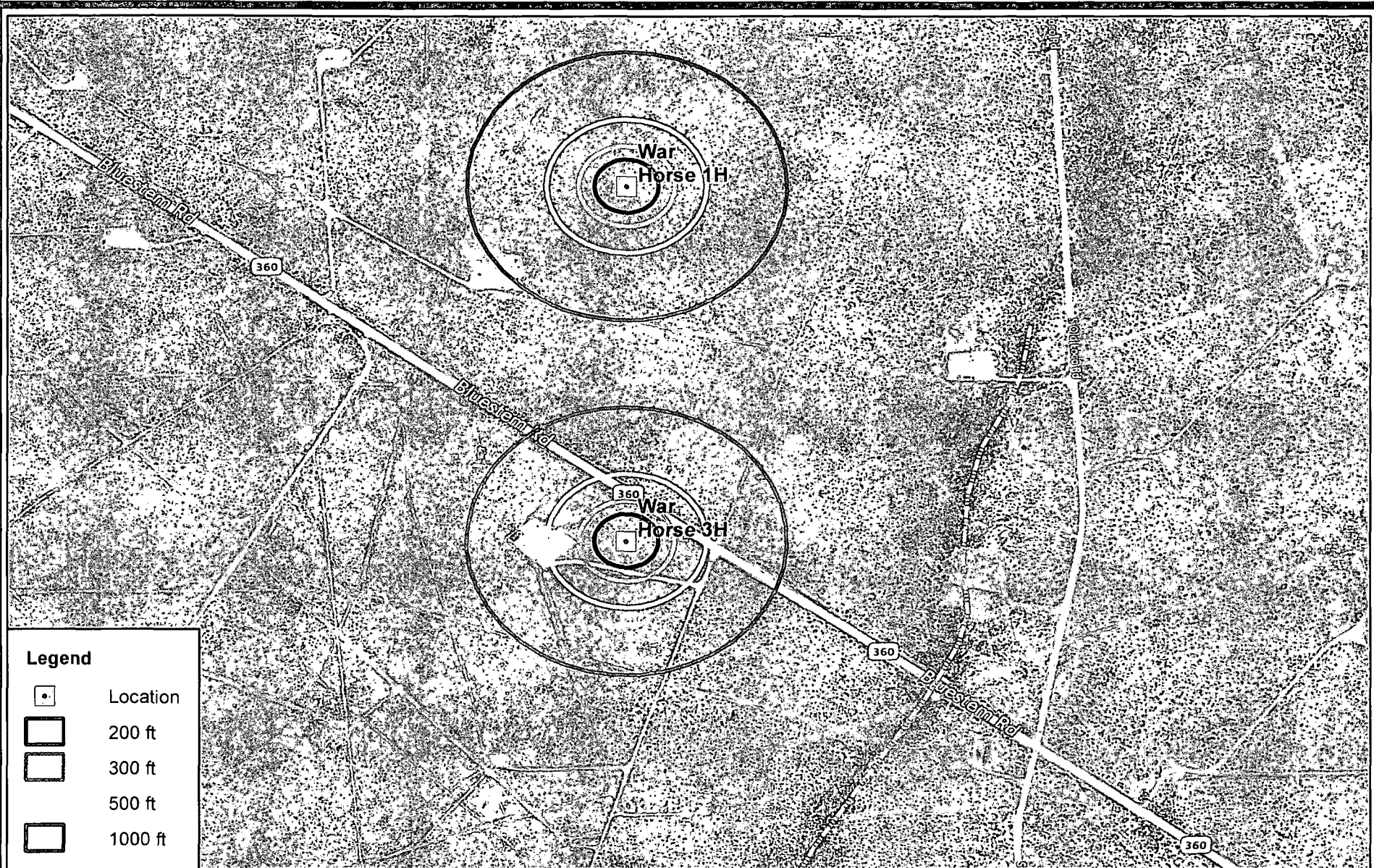
Geology and Groundwater Elevation

Murchison - War Horse 1H and 3H






Figure 2a

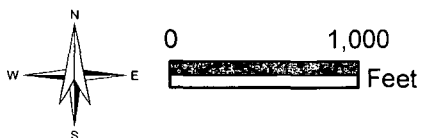
October 2012





Legend

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



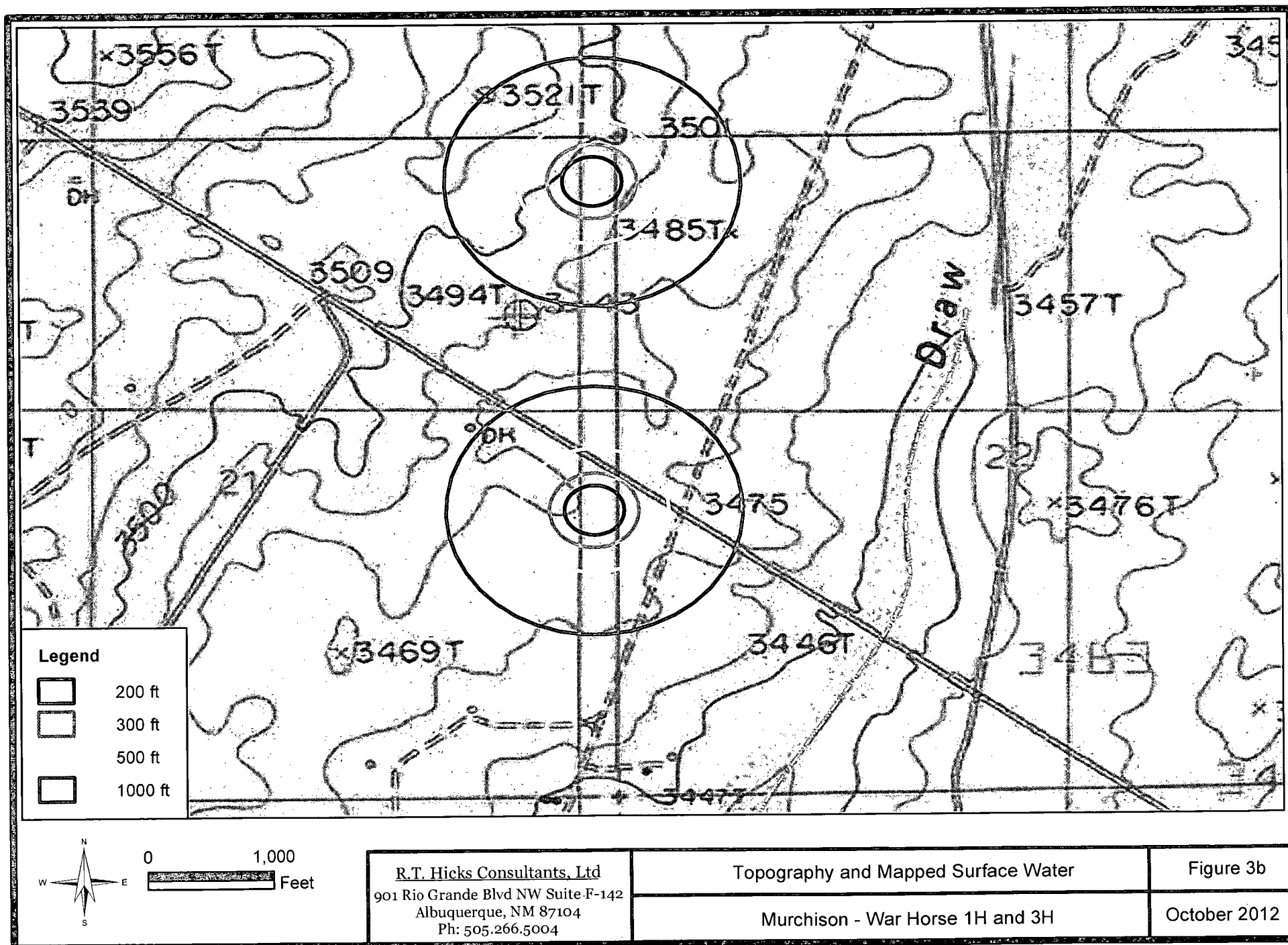
R.T. Hicks Consultants, Ltd
 901 Rio Grande Blvd NW Suite F-142
 Albuquerque, NM 87104
 Ph: 505.266.5004

Air Photo Showing Mapped Surface Water

Figure 3a

Murchison - War Horse 1H and 3H

October 2012



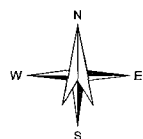
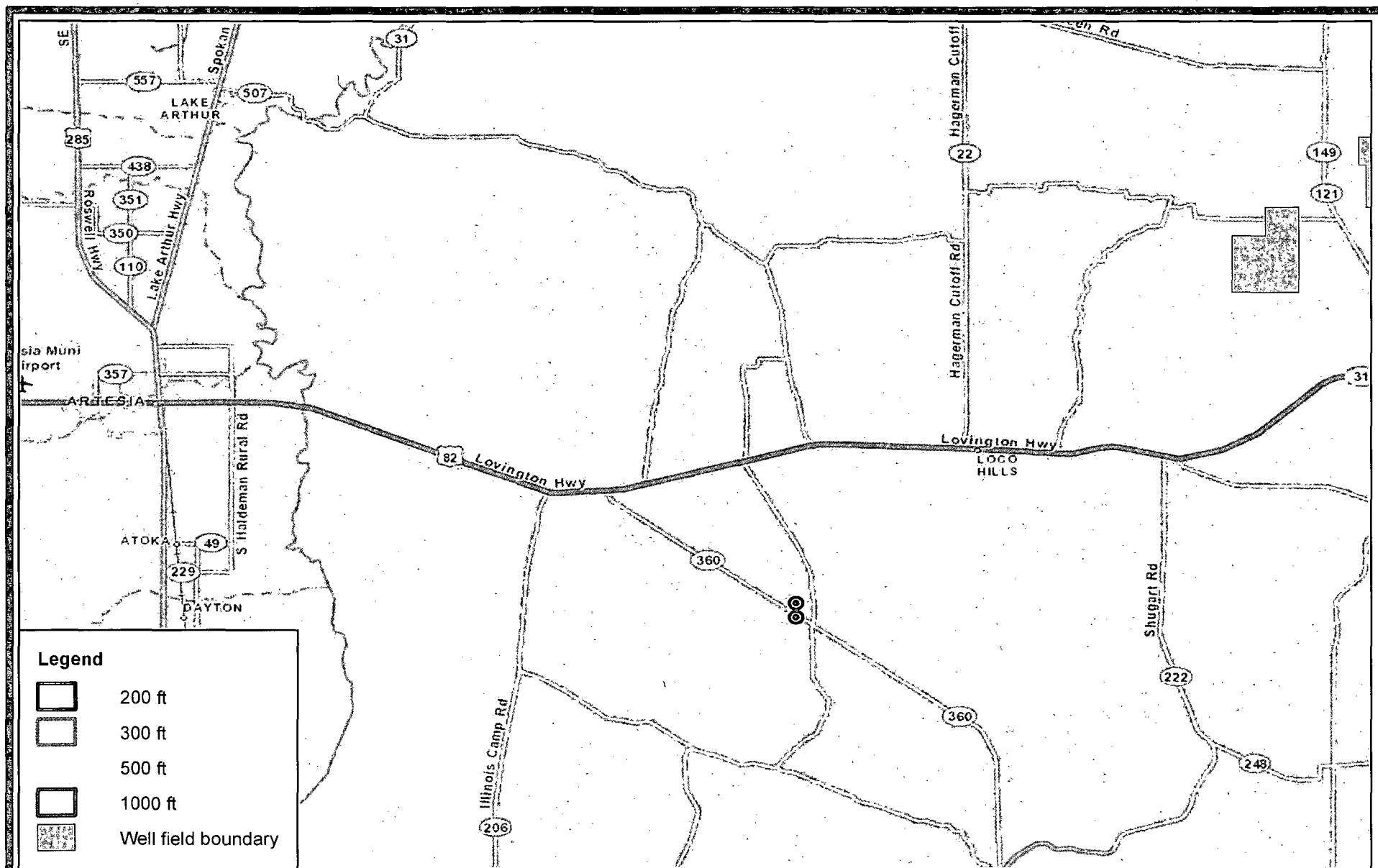
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Albuquerque, NM 87104
Ph: 505.266.5004

Topography and Mapped Surface Water

Murchison - War Horse 1H and 3H

Figure 3b

October 2012



0 2
Miles

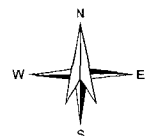
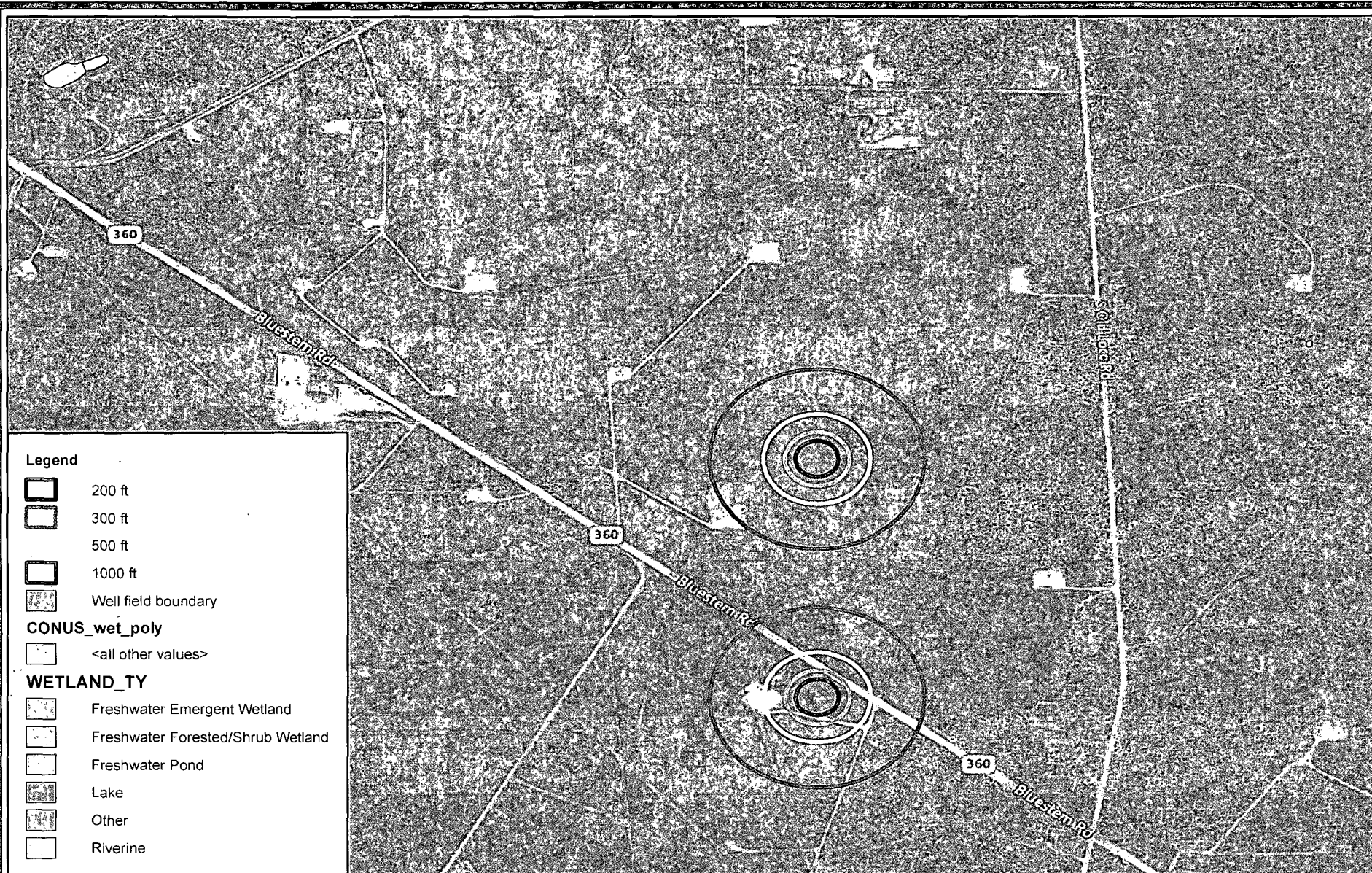
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Albuquerque, NM 87104
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Nearest Municipalities and Wellfields

Murchison - War Horse 1H and 3H

Figure 4

October 2012



0 1,000
Feet

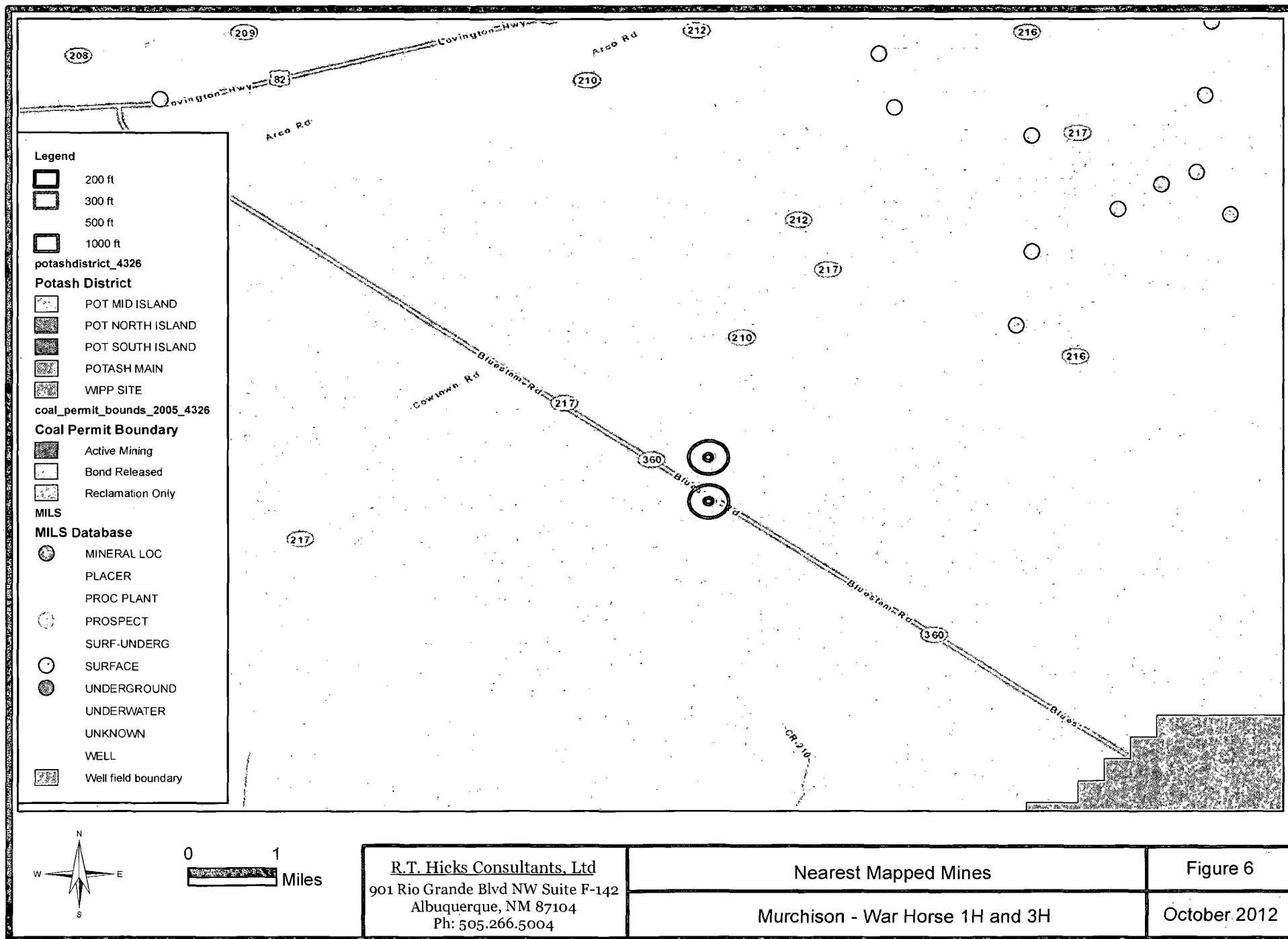
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Nearest Mapped Wetlands

Murchison - War Horse 1H and 3H

Figure 5

October 2012



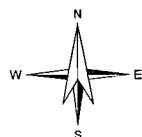
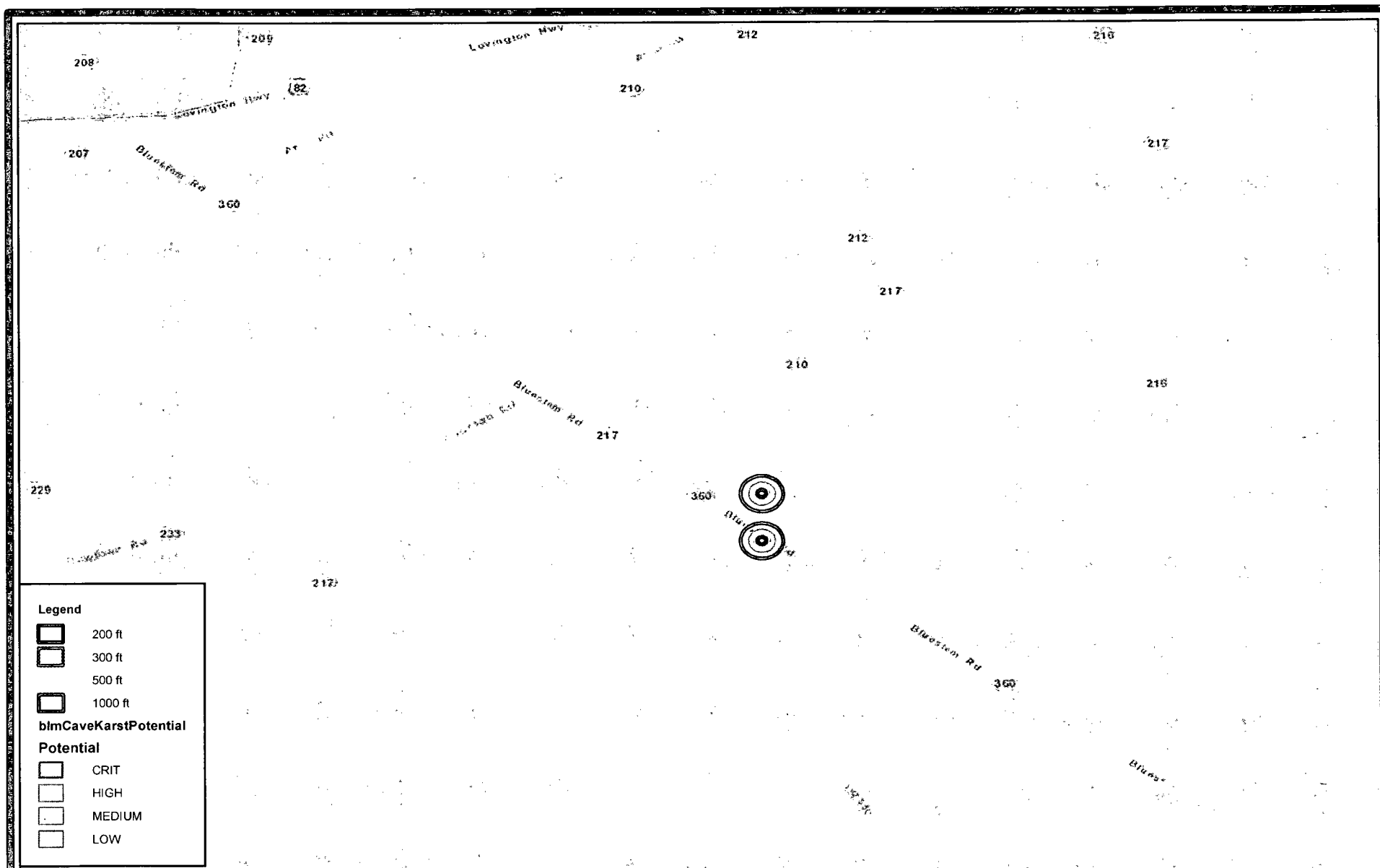
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 Albuquerque, NM 87104
 Ph: 505.266.5004

Nearest Mapped Mines

Murchison - War Horse 1H and 3H

Figure 6

October 2012



0 1
Miles

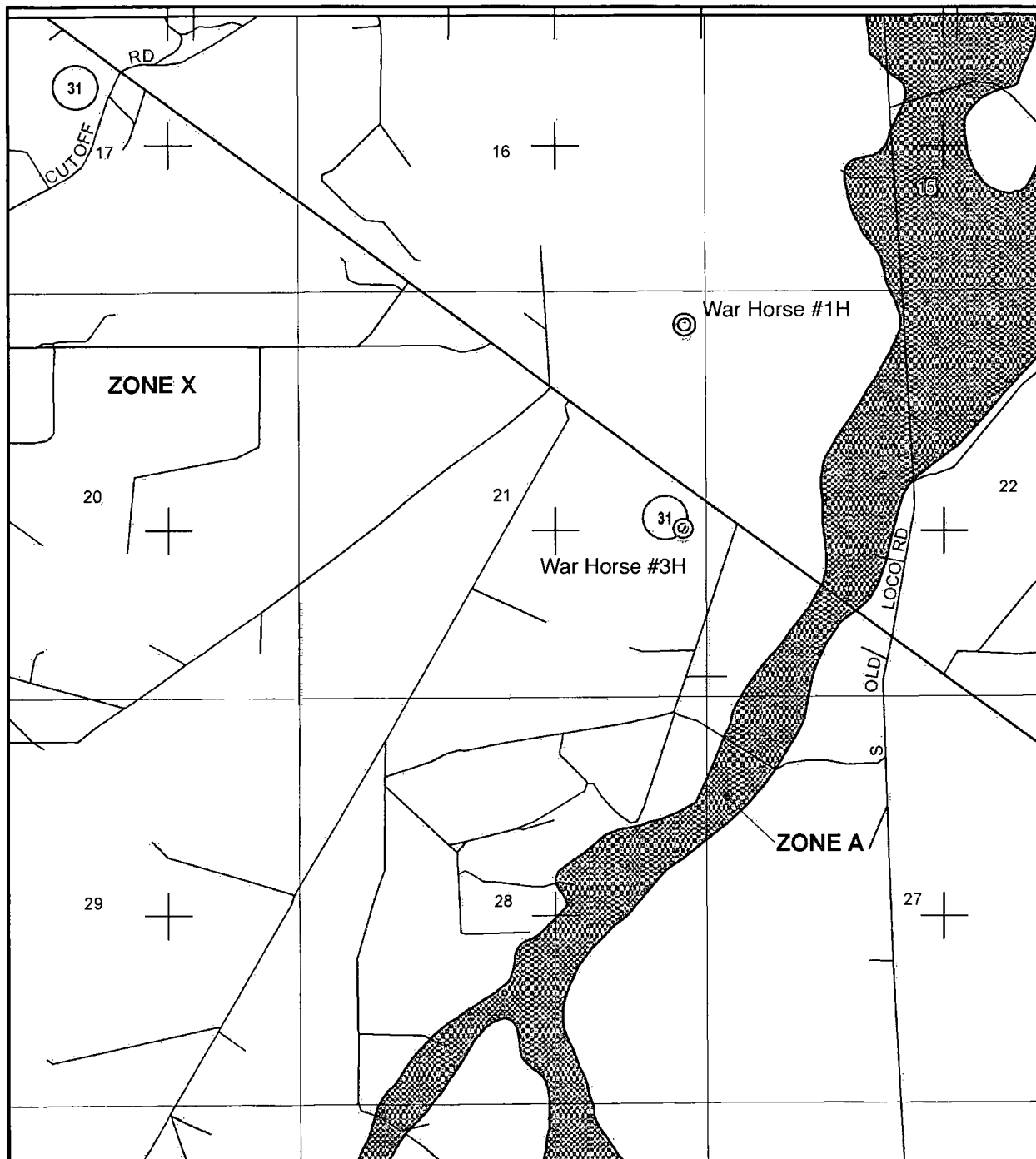
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BLM Cave/Karst Potential Map

Murchison - War Horse 1H and 3H

Figure 7

October 2012



MAP SCALE 1" = 2000'

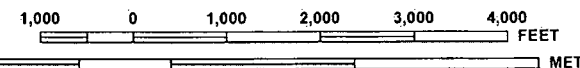


Figure 8

PANEL 0625D

FIRM

**FLOOD INSURANCE RATE MAP
EDDY COUNTY,
NEW MEXICO
AND INCORPORATED AREAS**

PANEL 625 OF 2000

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EDDY COUNTY, UNINCORPORATED AREAS	350120	0625	D

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.



**MAP NUMBER
35015C0625D
EFFECTIVE DATE
JUNE 4, 2010**

Federal Emergency Management Agency

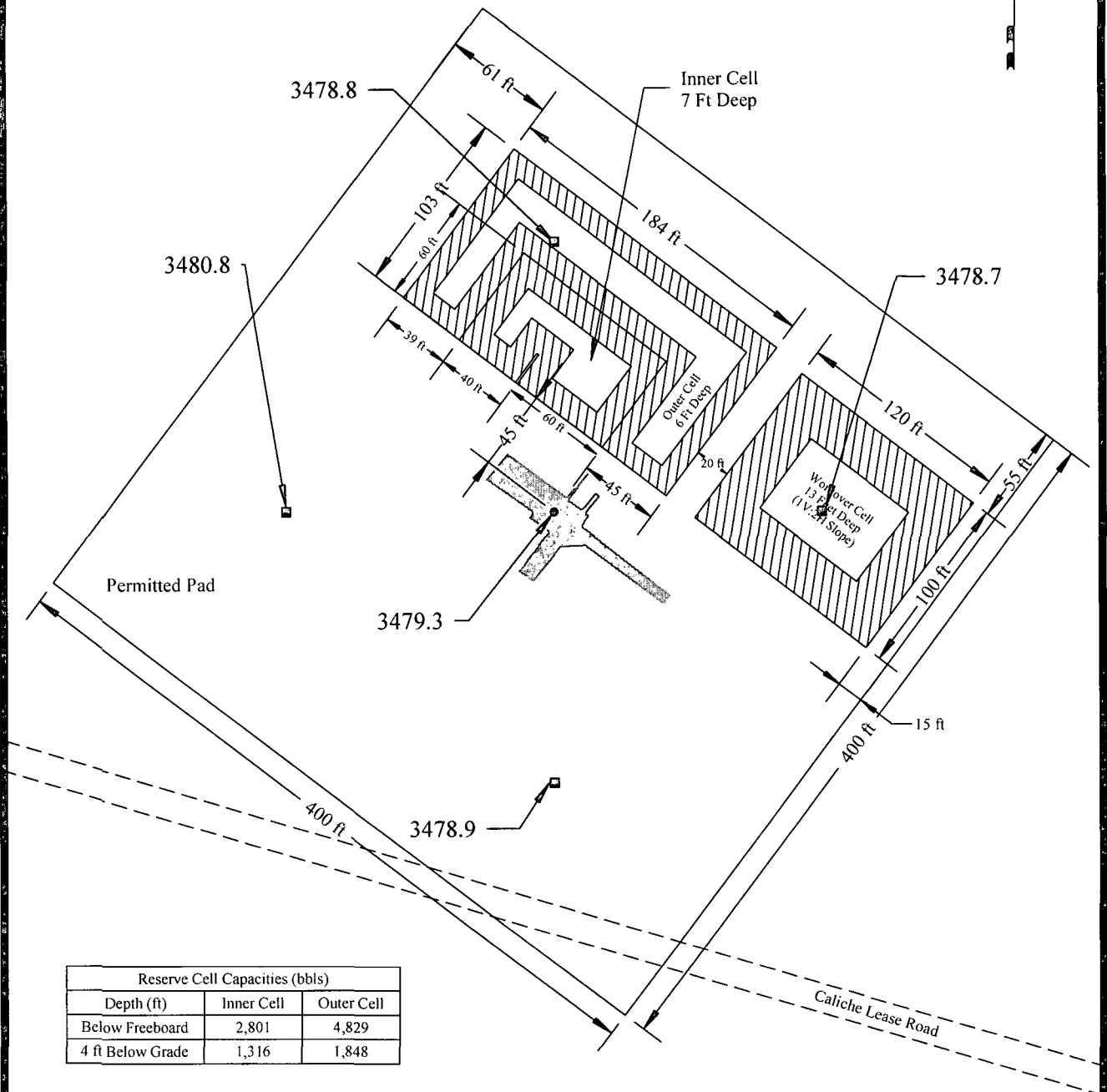
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Site Specific Information Plates

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Albuquerque, NM 87104

Original Survey
Elevations Shown in Red



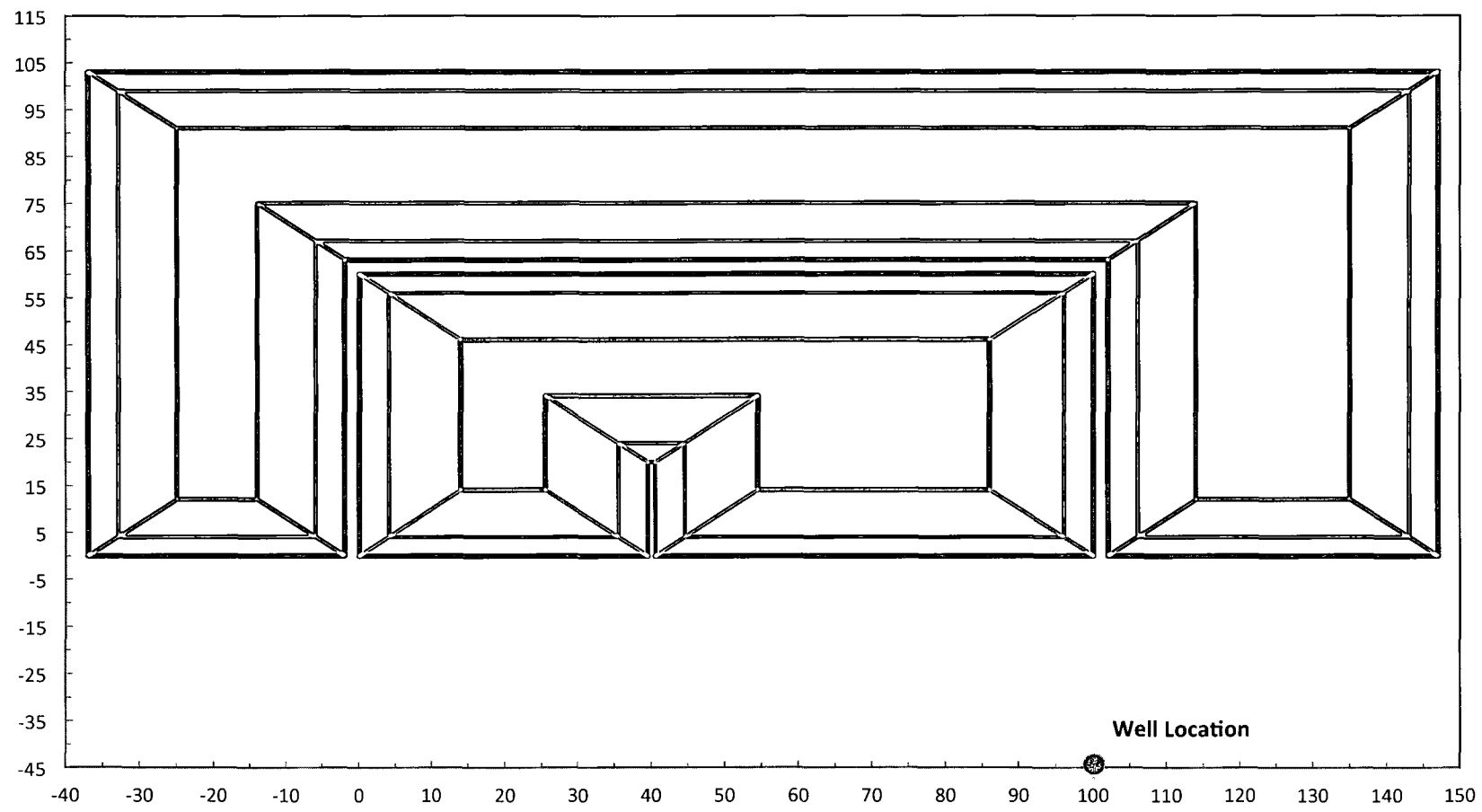
Reserve Cell Capacities (bbls)		
Depth (ft)	Inner Cell	Outer Cell
Below Freeboard	2,801	4,829
4 ft Below Grade	1,316	1,848

Workover Cell Capacities	
Depth (ft)	Barrels
Below Freeboard	12,659
4 ft Below Grade	3,920

RT Hicks
Consultants, Ltd.

War Horse Federal Com. #3H
Murchison Oil and Gas, Inc.

Plate 1
October 2012



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

Double Horseshoe Reserve Cells

Plate 2

Murchison Oil & Gas - War Horse Federal Com No. 3H

Oct-12



Width refers to East-West dimensions.
Length refers to North-South dimensions.

Overall Pit Dimensions	Total Width of both Cells	184.0	[feet]
	Total Length of both Cells	103.0	
	Rise over Run for all slopes	2.0	(-)

Inner Horseshoe Pit Dimensions	Width of Inner Horseshoe Cell	100.0	[feet]
	Length of Inner Horseshoe Cell	60.0	
	Depth of Inner Horseshoe Cell	7.0	
	Inner Horseshoe Cell Floor "width" (North to South)	11.0	[feet]
	Inner Horseshoe Pit Floor "width" (East to West)	11.0	
	Width of Inner Horseshoe Divider on the ground surface	1.0	[feet]
	Length of Inner Horseshoe Divider on the ground surface	20.0	
	Distance from SW corner of Inner Horseshoe Cell to Inner Divider Axis	40.0	

Divider Dimensions	Width of Divider between Inner and Outer Horseshoe Cells	3.0	[feet]
---------------------------	--	-----	--------

Outer Horseshoe Pit Dimensions	Length of Outer Horseshoe Cell (East Side)	103.0	[feet]
	Width of Outer Horseshoe Cell (East Side)	45.0	
	Depth of Outer Horseshoe Cell (East Side)	6.5	
	Length of Outer Horseshoe Pit (West Side)	103.0	[feet]
	Width of Outer Horseshoe Cell (West Side)	35.0	
	Depth of Outer Horseshoe Cell (West Side)	7.5	
	Length of Outer Horseshoe Cell (North Side)	40.0	[feet]
	Width of Outer Horseshoe Cell (North Side)	184.0	
	Depth of Outer Horseshoe Cell (North Side)	8.5	
	"Average Width" of Outer Horseshoe Cell Floor (East to West dimension)	11.0	[feet]
	"Average Width" of Outer Horseshoe Cell Floor (North to South dimension)	16.0	

R.T. Hicks Consultants 901 Rio Grande Blvd. NW Suite F-142 Albuquerque, N. M. 87104	Double Horseshoe Reserve Cells	Plate 3
	Murchison Oil & Gas - War Horse Federal Com No. 3H	Oct-12

Appendix SSI-A

Summary of Groundwater Data

From NMBMMT Open File Report 95

& USGS Database

R.T. Hicks Consultants, Ltd.

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

Appendix SSI-A

Summary of Groundwater Data from NMBMMT Open File Report 95 and USGS Data Used to Create Figure 2a and 2b

Well Numbers (see Map)	Well Location						Well Source Information						Groundwater Elevation Data						Gauging Date
	Township (south)	Range (east)	Section	Quarter Section (64, 16, 4)			NM-OSE Database	USGS Database	Open File Rpt. 95	USGS Topo Sheet	Aerial Photograph	Field Verification	Surface Elevation (published)	Surface Elevation (Topo Sheet)	Well Total Depth (published)	Depth to Water (published)	Groundwater Elev. (published)	Groundwater Elev. (using topo elev.)	
Misc - 19	16	27	36	2	1	2			✓	✓	--	--	3,454	3,454	61.4	47.1	3,407	3,407	10/13/77
RA 07774	17	27	11	3	2	1	✓			✓	✓	✓		3,401	100	50		3,351	12/20/89
USGS-1344	17	27	11	2	2	1		✓		✓	✓	✓	3,390		100	54.3	3,336		1/30/06
Misc - 20	17	27	12	3	1	4			✓				Could not identify current or historic location						
Misc - 5	17	28	2	2	4	2			✓		✓	✓		3,590		27.6	3,560	3,562	1/1/48
Misc - 35	17	28	2	4	2	4					✓	✓		3,574		35.8		3,538	9/6/12
Misc - 2	17	28	14		2	2			✓	✓	✓	--		3,590		80	3,540	3,510	Pre 1978
Misc - 16	17	28	19			2			✓	✓	✓	✓		3,591		224.3	3,380	3,367	1/2/48
Misc - 17	17	28	22		3	2			✓	✓	✓	✓	--	3,579		45.5	3,520	3,534	1/1/48
USGS-1222	17	28	22	4	2	4		✓		✓	✓	✓	3,578		95	78.6	3,499		1/13/99
Misc - 1	17	28	24	2	2	2			✓				Could not identify current or historic location						
Misc - 0	17	29	8	2	3	1			✓	✓	✓	✓	3,617	3,617	92.7	90.1	3526.9		10/14/77
Misc - 3	17	29	22	1	1	1			✓	✓	✓	✓	3,550	3,545		79.7	3,470	3,465	11/29/48
Misc - 36	17	29	29	4	4	4			✓	✓	✓	✓		3,545		102.4		3442.6	10/4/12
USGS-949	18	28	21	1	2	2		✓		✓	✓	--	3,580	3,582	250	225.24	3,355	3,357	2/19/99
Misc - 26a	18	29	24	1	1	3			✓	✓	✓	✓	3,430	3,436		158.3	3,272	3,278	4/28/50
Misc - 26b	18	29	24	1	1	3			✓	✓	✓	✓	3,436	3,436		156.44	3,280	3,280	10/18/77
Unnamed	18	29	34						✓				Could not identify current or historic location						
Misc - 28	18	30	32	3	2	4			✓			--	3,380			161.28	3,219		4/8/71
Misc - 27	18	30	32	4	2	3			✓	✓	✓	--	3,370	3,368	266	158.77	3,211	3,209	10/18/77
USGS-888	19	28	9	3	1	3		✓		✓	✓	--	3,549	3,549	365	246.38	3,303	3,303	2/19/99
USGS-875	19	29	13	2	1	4		✓			✓	--	3,309		120	101.22	3,208		1/20/99

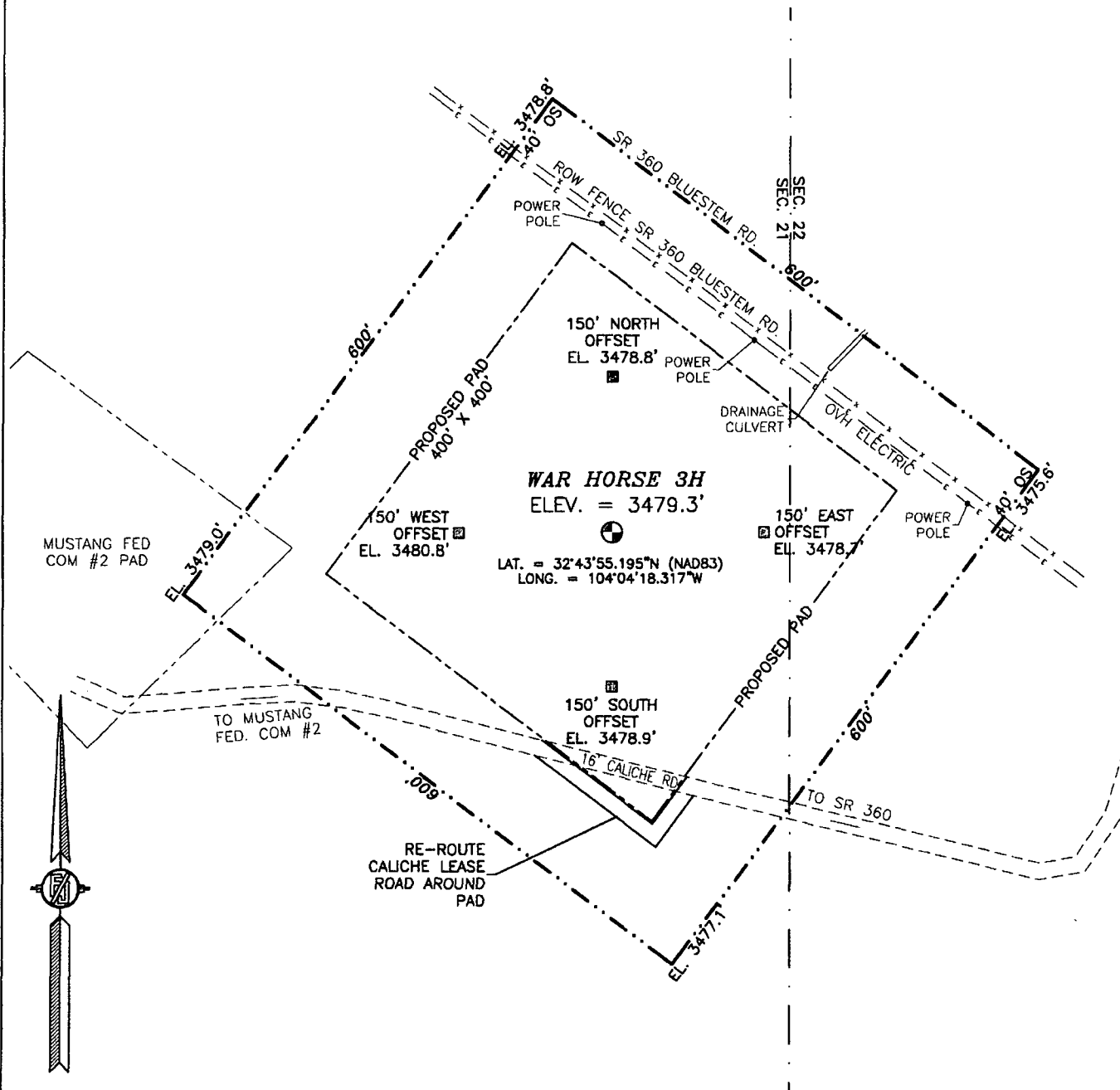
✓ Indicates well was verified, (blank) indicates well not verified, and -- indicates no attempt to verify

Survey Information

R.T. Hicks Consultants, Ltd.

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

SECTION 21, TOWNSHIP 18 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO



015 75 150 300

SCALE 1" = 150'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR 217 (HAGERMAN CUTOFF) AND SR 360 (BLUESTEM) GO SOUTH ON SR 360 1.9 MILES TO CALICHE LEASE ROAD WITH CATTLE GUARD ON RIGHT GO WEST ON CALICHE ROAD ABOUT 200 FT. TO CALICHE ROAD ON RIGHT GO NORTH 0.1 MILES SITE IS ABOUT 170 FT ON RIGHT (NORTH)

MURCHISON OIL & GAS, INC.
WAR HORSE 3H

**LOCATED 2290 FT. FROM THE SOUTH LINE
AND 175 FT. FROM THE EAST LINE OF
SECTION 21, TOWNSHIP 18 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO**

SURVEY NO. 1245A

SEPTEMBER 24, 2012

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

Generic Plans for Temporary Pits

R.T. Hicks Consultants, Ltd.

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

Temporary Pit Design Plan

Plates 1, 2, and 3 show 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 cells, which will consist of the following:

1. A cell for drilling fluid circulation and cuttings storage
2. A cell for the storage of fresh water (drilling/stimulation) and stimulation flow-back water prior to re-use or disposal

In addition to the commitments listed below, the operator will install a system that can drain water entrained in the drilling waste of the drilling pit. As described in the closure plan, this system of filtered perforated pipe and drainage mats cover much of the bottom of the drilling cell of the pit – the cut brine cell and the inner cell. The system will drain to the lowest corner of each cell, generally near the suction area. The exact location will be determined upon completion of the cells. Standpipes rise from the depression and house a solar-powered pump. The drainage system for the cut brine cell removes water to the brine cell via the solar pumps. This water can be placed in an above-ground tank or the fluids cell of the pit for temporary storage before re-use or disposal. The drainage system in the brine cell may also be used to introduce water below the residual cuttings/mud, causing the introduced fluid to move upwards through the cuttings/mud and enhance the solids rinsing process. Introduced water to the brine cell (which will become cut brine or saturated brine after movement through the cuttings) can be removed from the pit for re-use via a vacuum truck or recovered from the drainage system at the bottom.

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

- Recover clear water for possible re-use,
- Reduce the concentration of constituents of concern in the drilling waste by removing some water entrained in the drilling waste.

Precipitation and the possible addition of relatively fresh water (see closure plan) will rinse the solid drilling waste, causing additional reduction in the constituents of concern as the water is recovered for re-use or disposal.

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

1. Construction, operation and maintenance of the temporary storage tank(s) will adhere to all applicable NMOCD Rules including but not limited to:
 - a. Safety stipulations
 - b. Protection from hydrogen sulfide mandates
 - c. Signage and identification requirements
 - d. Secondary containment requirements for temporary tanks

- e. Applicable netting requirements
2. Any cleaning of the temporary tank(s) will adhere to NMOCD Rules relating to tank cleaning.
3. Transportation of water or drilling fluids derived from the drilling pit will adhere to all applicable NMOCD Rules relating to transportation.
4. Storage of water or drilling fluids in temporary above-ground tanks will also adhere to all applicable Federal mandates.

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

Finally, we intend to place any temporary tank used in conjunction with the pit drainage system on a 20-mil liner with a berm around it that would allow any inadvertently released fluids to drain or be pumped back into the pit.

Construction/Design Plan of Temporary Pit

1. The operator or qualified contractor will design and construct the pit to contain liquids and solids and prevent contamination of fresh water and protect public health and the environment.
2. Prior to constructing the pit the operator or qualified contractor will strip and stockpile the topsoil for use as the final cover or fill at the time of closure.
3. The operator will post an upright sign in compliance with 19.15.16.8 NMAC. The operator will post the sign in a manner and location such that a person can easily read the legend. The sign will provide the following information: the operator's name; the location of the site by quarter-quarter or unit letter, section, township and range; and emergency telephone numbers.
4. The operator will fence the pit in a manner that prevents unauthorized access and will maintain the fences in good repair. The operator will fence the pit to exclude livestock with a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level. The pit will be completely fenced at all times excluding drilling and workover operations. During drilling or workover operations, the operator is not required to fence the edge of the pit adjacent to the drilling or workover rig.
5. The operator will design and construct the temporary pit to prevent unauthorized releases and ensure the confinement of liquids.
6. The temporary pit will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear.
7. The slopes of the pit will be no steeper than two horizontal feet to one vertical foot (2H:1V). Unless an alternate slope, protective to fresh water, public health and the environment, is proposed and approved by the appropriate division district office.
8. As an additional engineering control to address any concerns relating to the potential presence of karst and associated instability, during construction of the pit the contractor

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will compact the earth material that forms the foundation for the pit liner. An expected proctor density of greater than 90% will be achieved by

- a. Adding water to the earth material as appropriate,
 - b. Compacting the earth by walking a crawler-type tractor down the sides and bottom of the pit
 - c. Repeating this process with a second 6-inch lift of earth material if necessary
9. The operator will design and construct the temporary pit with a geomembrane liner. The geomembrane liner will consist of 20-mil string reinforced LLDPE or equivalent liner material that the appropriate division district office approves. The geomembrane liner will be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. The liner material will be resistant to ultraviolet light. Liner compatibility will comply with EPA SW-846 method 9090A.
 10. The operator will minimize liner seams and orient them up and down, not across a slope. The operator will use factory-welded seams. Prior to any field seaming, the operator will overlap liners four to six inches and orient seams parallel to the line of maximum slope, *i.e.*, oriented along, not across, the slope. The operator will minimize the number of welded field seams in corners and irregularly shaped areas. Qualified personnel will weld field seams.
 11. Construction will avoid excessive stress-strain on the liner.
 12. Geotextile will be placed under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity.
 13. The operator and/or qualified contractor retained by the operator will anchor the edges of all liners in the bottom of a compacted earth-filled trench. The anchor trench will be at least 18 inches deep.
 14. The operator and/or qualified contractor retained by the operator will 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.
 15. The operator and/or qualified contractor retained by the operator will design and construct the temporary pit to prevent run-on of surface water. As necessary, a berm or ditch will surround the temporary pit to prevent run-on of surface water.
 16. The volume of the temporary pit (fluids cell plus drilling cell), including freeboard, does not exceed 10 acre-feet (77,583 bbls).

Temporary Pit Operating and Maintenance Plan

The operator will operate and maintain the pit to contain liquids and solids and maintain the integrity of the liner, liner system, or any secondary containment system to prevent contamination of fresh water and protect public health and the environment as described below:

1. If feasible, the operator will recycle, reuse or reclaim of all drilling fluids and recovered water in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment. Specifically, drilling fluids and reclaimed water will be transferred to other drilling operations for use (see closure plan).
2. If re-use is not possible, fluids will be sent to disposal at division-approved facility.
3. Reuse or disposal of fluids from the pit will be conducted in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment.
4. The operator will not discharge into or store any hazardous waste in the pit.
5. If any pit liner's integrity is compromised, or if any penetration of the liner occurs above the liquid's surface, then the operator will notify the appropriate division district office within 48 hours (phone or email) of the discovery and repair the damage or replace the liner.
6. 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, notify the appropriate district office within 48 hours (phone or email) of the discovery and repair the damage or replace the pit liner.
7. The injection or withdrawal of liquids from the pit will be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
8. The operator will install diversion ditches and berms around the pit as necessary to prevent the collection of surface water run-on.
9. The operator will immediately remove any visible layer of oil from the surface of the temporary pit and maintain on site an oil absorbent boom to contain and remove oil from the pit's surface.
10. Only fluids used or generated during the drilling or workover process will be discharged into the temporary pit. The discharge of workover fluids to the drilling pit as a rinse to the drilling waste solids is discussed in the closure plan (below).
11. The operator will maintain the temporary pit free of miscellaneous solid waste or debris.
12. Although hydrocarbon-based drilling mud is not anticipated for use, the operator will use a tank made of steel to contain hydrocarbon-based drilling fluids if need be.
13. Immediately after cessation of drilling, the operator will remove any visible or measurable layer of oil from the surface of a drilling pit, in the manner described above.
14. The operator will maintain at least two feet of freeboard for the temporary pit.
15. The operator will inspect the temporary pit containing drilling fluids at least daily while the drilling rig is on-site to ensure compliance with this plan.
16. After drilling operations, the operator will inspect the temporary drilling pit weekly so long as liquids remain in the temporary pit.

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17. The operator will maintain a log of such inspections and make the log available for the appropriate district office's review upon request.
18. The operator will file a copy of the log with the appropriate division district office when the operator closes the temporary pit.
19. The operator will remove all free liquids from the temporary pit within 30 days from the date that the operator releases the drilling rig – unless granted an extension of time by the District Office. The operator will note the date of the drilling rig's release on form C-105 or C-103 upon well completion.

Temporary Pit Closure Plan

Protocols and Procedures

The operator will use the following procedures and protocols to implement the closure:

- The operator will notify the surface owner by certified mail, return receipt requested, prior to closure, that the operator plans to close the temporary pit.
- The operator of the temporary pit will notify the applicable division district office verbally or by email at least 72 hours, but not more than one week, prior to any closure operation. The notice will include the operator's name and the location to be closed by unit letter, section, township and range, well's name, number, the API number.
- The operator of the temporary pit will remove all liquids from the temporary pit prior to closure and either:
 - Dispose of the liquids in a division-approved facility, or
 - Recycle, reuse or reclaim the liquids for use in drilling another well.
- Fluids on and entrained in the drilling waste will be removed from the pit for re-use or disposal.
- The operator may request extensions of time for the pit to hold free liquids as extensions may be necessary to allow the addition of water to the outer horse shoe of the pit to cause rinsing of solid waste and removal of constituents of concern via the pit drainage system to the inner shoe then to an above-ground tank (or truck) or to the fluids cell of the temporary pit. Sources of water for rinsing the solid drilling waste in the outer horse shoe include:
 - Residual fresh water in the workover cell not used for hydraulic fracturing (removed from the workover cell prior to the introduction of flow-back)
 - Flow-back of water pumped down hole during hydraulic fracturing that is less than 50% of the estimated TDS of pit pore water based on field conductance or specific gravity measurements¹.
- Fluids pumped from the outer horseshoe drainage system are transferred to the inner shoe drainage system causing relatively low salinity water to move up through the cuttings, dissolving the rock salt cuttings.
- When the inner shoe contains at least 130 barrels of clear water (one water truck load), the brine or cut brine can be removed for re-use in drilling operations or sent to disposal.
- The operator shall remove all free liquids from the temporary pit within 30 days from the date that the operator released the drilling rig. The operator shall note the date of the drilling rig's release on form C-105 or C-103 upon well completion. The operator will request an extension of up to three months from the appropriate division district office if necessary to allow for rinsing of drilling waste solids and the recovery of water for re-use.

¹ If water pumped from the pit drainage system prior to stimulation is 9.5 pounds/gallon and distilled water is 8.3 pounds per gallon, discharge to the outer shoe ceases when measurements of flow back are 8.9 pounds/gallon or less

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- After removal of all standing water, cuttings rinsing ceases and drilling cell drainage begins as:
 - Water from the outer horseshoe drainage system discharges to the surface of the inner shoe
 - Solar pumping from the inner shoe drainage system transfers water to an above-grade tank or the fluids cell of the temporary pit
- Fluids drained from the cell are temporarily stored in the above-ground tank or fluids cell and are removed for re-use or disposal. Both temporary storage of fluids from the pit and reuse or disposal will be conducted in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment.
- The operator will close the temporary pit within six months of the date that the operator releases the drilling rig. An extension not to exceed three months may be requested of the applicable district office.
- The operator will close the pit by an earlier date that the division requires because of imminent danger to fresh water, public health or the environment.
- Within 60 days of closure completion, the operator will submit a closure report on form C-144, with necessary attachments to document all closure activities including sampling results; information required by 19.15.17 NMAC; a plot plan; and details on back-filling, capping and covering, where applicable.
- In the closure report, the operator will certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan.
- The operator will provide a plat of the pit location on form C-105 with the closure report within 60 days of closing the temporary pit.

Additional Protocols and Procedures for On-Site Closure

- The operator has provided the surface owner notice of the operator's proposal of an on-site closure (see transmittal letter for proof of notice to the landowner) as required in 19.15.17.13.F(1)(b).
- Upon receipt of NMOCD approval for on-site closure (in-place burial), the operator will notify the surface owner by certified mail, return receipt requested, that the operator plans to close the pit and where the operator has approval for on-site closure. Evidence of mailing of the notice will demonstrate compliance with this requirement.
- The operator will place a steel marker at the center of an on-site burial (unless the surface owner requires an alternative marker that is acceptable to the appropriate division district office). The steel marker will be not less than four inches in diameter and will be cemented in a three-foot deep hole at a minimum. The steel marker will extend at least four feet above mean ground level and at least three feet below ground level. The operator name, lease name and well number and location, including unit letter, section, township and range, and that the marker designates an on-site burial location will be welded, stamped or otherwise permanently engraved into the metal of the steel marker.

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- The operator will report the exact location of the on-site burial on form C-105 filed with the division.
- If the State of New Mexico or the Federal government owns the land surface, no deed exists, the land is held in trust. Therefore, the operator cannot file a deed notice identifying the exact location of the on-site burial with the county clerk in the county. The exact location of the on-site burial will be transmitted to the surface owner by copy of the form C-105 discussed above.
- If the surface is not in the public domain, the operator will file a deed notice identifying the exact location of the on-site burial with the county clerk in the county. The exact location of the on-site burial will be transmitted to the surface owner by copy of the form C-105 discussed above.

In-place closure is the preferred closure alternative for the temporary pit. If waste sampling results suggest that standards for in-place closure are not met for the entire drilling cell (inner horseshoe and outer horseshoe), the operator will implement excavation and removal as described in later sections of this plan

Site Reclamation Plan

After the operator has closed the pit, the operator will reclaim the pit location and all areas associated with the pit, including associated access roads to a safe and stable condition that blends with the surrounding undisturbed area. The operator will substantially restore the impacted surface area to the condition that existed prior to oil and gas operations by placement of the soil cover as provided in Subsection H of 19.15.17.13 NMAC, re-contour the location and associated areas to a contour that approximates the original contour and blends with the surrounding topography and re-vegetate according to Subsection I of 19.15.17.13 NMAC.

Soil Cover Design Plan

If the operator removes the pit contents or remediates any contaminated soil to the division's satisfaction the soil cover will consist of the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

The soil cover for the in-place burial will consist of a minimum of four feet of compacted, non-waste containing, earthen material. The soil cover will include either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

The operator will construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material.

Re-vegetation Plan

1. The first growing season after the operator closes the pit, including access roads; the operator will seed or plant the disturbed areas.
2. The operator will accomplish seeding by drilling on the contour whenever practical.
3. The operator will obtain vegetative cover that equals 70% of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation).
4. In the absence of specific guidance from the surface owner, the operator will follow BLM mandates for the seed mixture not including noxious weeds, and maintain that cover through two successive growing seasons. The operator will notify NMOCD of the specific mixture prior to seeding.
5. During the two growing seasons that prove viability, there will be no artificial irrigation of the vegetation.
6. The operator will repeat seeding or planting until it successfully achieves the required vegetative cover.
7. If conditions are not favorable for the establishment of vegetation, such as periods of drought, the operator may request that the division allow the operator to delay seeding or planting until soil moisture conditions become favorable or may require the operator to use additional cultural techniques such as mulching, fertilizing, irrigating, fencing or other practices.
8. The operator will notify the division when it has seeded or planted and when it successfully achieves re-vegetation.

In-place Closure Plan

In the event that sampling of the drilling waste suggests that the inner and outer horseshoe of the drilling cell meet the criteria for in-place closure, the operator will proceed with in-place closure for one or both cells (inner and outer horseshoe).

Siting Criteria Compliance Demonstration for In-Place Burial

The Siting Criteria Compliance Demonstration for the temporary pit show that the requirements of 19.15.17.10 NMAC are met for in-place closure.

Waste Material Sampling Plan for In-place Burial

The operator will collect at a minimum, a five-point, composite sample of the contents of the temporary pit after treatment or stabilization.

The purpose of the sampling after the waste material is stabilized is to demonstrate that:

- Benzene, as determined by EPA SW 846 method 8021B or 8260B, does not exceed the concentration limit for in-place burial;
- Total BTEX, as determined by EPA SW-846 method 8021B or 8260B, does not exceed the concentration limit for in-place burial;
- The GRO and DRO combined fraction, as determined by EPA SW-846 method

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- 8015M, does not exceed the concentration limit for in-place burial;
- TPH, as determined by EPA method 418.1 does not exceed the concentration limit for in-place burial;
- Chloride, as determined by EPA method 300.1, does not exceed the concentration limit for in-place burial or the background concentration, whichever is greater.
- The Stabilized waste passes the paint filter liquids test (EPA SW-846, method 9095)

Protocols and Procedures for In-Place Burial

In addition to the General Conditions Protocols and Procedures and the Additional Protocols and Procedures for On-site Closure listed above, the operator will execute the following steps for in-place closure of the pit:

- A. The operator will measure the distance between the top of the drilling waste and existing grade to determine if stabilized drilling waste (see stabilization methods, below) will be at least 4-feet below existing grade to allow installation of the soil cover (see soil cover design, above).
- B. The operator will stabilize or solidify the contents of the pit to a bearing capacity sufficient to support the temporary pit's final cover. However, the operator will not mix the pit contents with soil or other material at a mixing ratio of greater than 3:1, (3 parts soil or other material to 1 part drilling waste).
- C. Specifically, the drilling waste will be stabilized in the cell by adding no more than 3 parts clean fill derived from the excavation of the pit to 1 part drilling waste.
- D. After stabilization such that the waste material will support the soil cover, the mixture will be re-sampled (as necessary) pursuant to NMOCD Rules (see above).
- E. If sample results show that stabilized waste in the inner and outer horse shoe of the cell satisfy the regulatory standards for in-place burial, the operator will measure the distance between the stabilized waste and existing grade and, if necessary, transfer stabilized waste from one shoe to the other to allow for placement of the soil cover (see design criteria, above).
- F. Cover the geomembrane lined, filled, temporary pit with compacted, non-waste containing, earthen material; construct a division-prescribed soil cover; recontour and re-vegetate the site as described in this plan. Specifically, a 4-foot thick soil cover consistent with NMOCD Rules will be placed over the stabilized waste.
- G. If necessary to meet the other mandates of NMOCD Rules (e.g placement of a 4-foot soil cover to existing grade) and this closure plan, the stabilized drilling waste in the inner horseshoe will be excavated and placed in the outer horseshoe. The operator will implement confirmation sampling consistent with excavation and removal (see below) if this option is exercised on the inner horseshoe. This process would be conducted according to applicable regulations as described below, not allowing waste stabilization to exceed a 3:1 mixing ratio (3 parts soil or other material to 1 part drilling waste), testing

stabilized waste to demonstrate compliance with in-place burial standards as required, sampling to confirm no release has occurred beneath the inner horseshoe.

- H. Any excess liner above the stabilized waste will be removed for re-use or disposal.

Excavation and Removal Closure Plan

IF THE CRITERIA FOR ON-SITE CLOSURE (IN-PLACE BURIAL) FOR SOME OR ALL OF THE TEMPORARY PIT ARE NOT MET, THE OPERATOR WILL ADHERE TO NMOCD RULES AND IMPLEMENT THE FOLLOWING ACTIONS FOR ONLY THE MATERIALS THAT DO NOT MEET CRITERIA FOR IN PLACE CLOSURE:

Protocols and Procedures for Excavation and Removal

The operator will close the temporary pit by excavating the drilling waste that does not meet the criteria for in-place closure (e.g. solids in the inner shoe) and any synthetic pit liners that cannot be re-used and transferring those materials to one of the division-approved facilities listed below:

Controlled Recovery, Inc.

NM-01-0006

Lea Land, LLC

NM-01-0035

If the sampling program described below demonstrates that a release has not occurred or that any release does not exceed the concentrations specified in Subparagraph (b.ii) of Paragraph (1) of Subsection B of 19.15.17.13 NMAC, then the operator will:

1. Backfill the temporary pit excavation with compacted, non-waste containing, earthen material;
2. Construct a division-prescribed soil cover to existing grade as described in the Soil Cover Plan (above);
3. Re-contour and re-vegetate the site as described in the Re-vegetation Plan (above).

Confirmation Sampling Plan for Excavation and Removal

The operator will test the soils beneath the temporary pit after excavation to determine whether a release has occurred. To determine if a release has occurred, the operator and/or qualified contractor will collect, at a minimum:

- A five-point, composite sample
- Individual grab samples from any area that is wet, discolored or showing other evidence of a release

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The purpose of this sampling is to demonstrate that:

- Benzene, as determined by EPA SW-846 method 8021B or 8260B does not exceed concentration limits of the Rule;
- Total BTEX, as determined by EPA SW-846 method 8021B or 8260B does not exceed concentration limits of the Rule;
- The GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, does not exceed concentration limits of the Rule;
- The TPH, as determined by EPA method 418.1 does not exceed 2,500 mg/kg; and
- Chloride, as determined by EPA method 300.1, does not exceed concentration limits of the Rule or the background concentration, whichever is greater.

Reporting

The operator shall notify the division of its results on form C-141. If the operator or the division determines that a release has occurred, then the operator will comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.