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: 1100 Mira Vista Blvd., Plano, TX 75093-4698
Facility or well name: War Horse Federal Com. No. 3H
API Number: 30-015-41227 OCD Permit Number: 2-13-0005
U/L or Qtr/Qtr I Section 21 Township 18S Range 29E County: Eddy
Center of Proposed Design: Latitude 32° 43' 55.195" N Longitude 104° 04' 18.317" W 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: 23,712 bbl Dimensions: L 150 x W 170 x D 6-10 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

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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 Figure 2a**	☐ 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 4** - 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 6** - 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 7** - 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 8** - 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 Figures 3a, 3b**
- 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 3a** ☐ 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 ☐ Yes ☒ No
See Figure 2b

Within 300 feet of a wetland. **See Figure 5**
- 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: [signature] Date: October 21, 2013

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: [signature] **Approval Date:** 12/17/2013

Title: Environmental Specialist **OCD Permit Number:** 2-13-0005

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

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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: _____

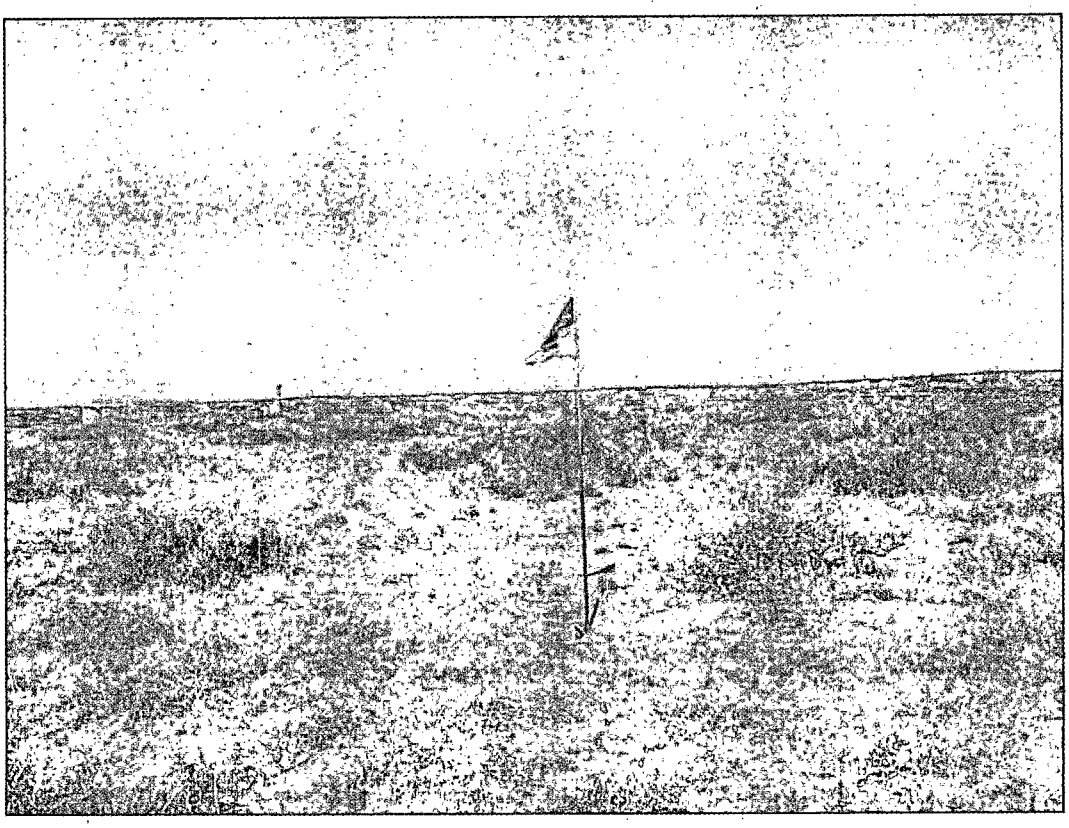
RE: Murchison Oil & Gas
War Horse Fed Com 3H
30-015-41227
I-21-18s-29e
Eddy County, New Mexico

Conditions of Approval for drilling pit – OCD Permit Number 2-13-0005

- Provide disposal facility name and permit number (for liquids, drilling fluids and drill cuttings, or in case on-site closure standards cannot be achieved).
- Pit inspection log is to be provided to OCD with closure portion of the permit.
- Site is situated on private surface. Proof of deed notice is to be submitted with closure portion of permit.
- Pit will not be considered closed until OCD receives notification as required by 19.15.17.13.H (5) and an onsite inspection completed.

October 2013

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



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 21, 2013

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

Mr. Jim Amos
BLM Carlsbad
Via E-mail

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

Dear Mr. Bratcher and Mr. Amos:

On behalf of Murchison Oil and Gas, R.T. Hicks Consultants submits the attached C-144 application for the above-referenced well. The drilling schedule calls for a projected spud date of November 1st. Please note the following:

1. Generic Plans that comply with the new Pit Rule is included in this submission for OCD approval
2. We anticipate "in place" burial of stabilized solids.
3. This letter and application is copied to Concho Resources to notify the surface landowner of the operator's intent to use on-site burial for closure.
4. We certify that we conducted a site inspection to examine the conditions on the ground with respect to the siting criteria.
5. BLM approved the use of a reserve pit at an adjacent location (War Horse 1H). We are submitting a sundry notice to BLM to request a change of Conditions of Approval allow for a reserve pit in conformance with the existing Rule.

Note that we originally submitted an application for this site in 2012 and the site-specific discussion and figures remain the same. The proposed pit dimensions differ only because they make for more efficient construction and better use of the pad size.

If you have any questions or concerns regarding this application, please contact me. As always, we appreciate your help.

Sincerely,
R.T. Hicks Consultants

Kristin Pope

Kristin Pope
Project Geologist

Copy: Murchison Oil and Gas, Inc.
Jim Burnett, 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

Figures 2a and 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 that will contain fluids which cannot be classified as "low-chloride." Groundwater will be more than 25 feet below the bottom of the buried waste, meeting criteria for burial trench or in-place closure.

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.

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 Location						Well Source Information						Groundwater Elevation Data						
Well Numbers	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.)	Gauging Date
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.

- 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.

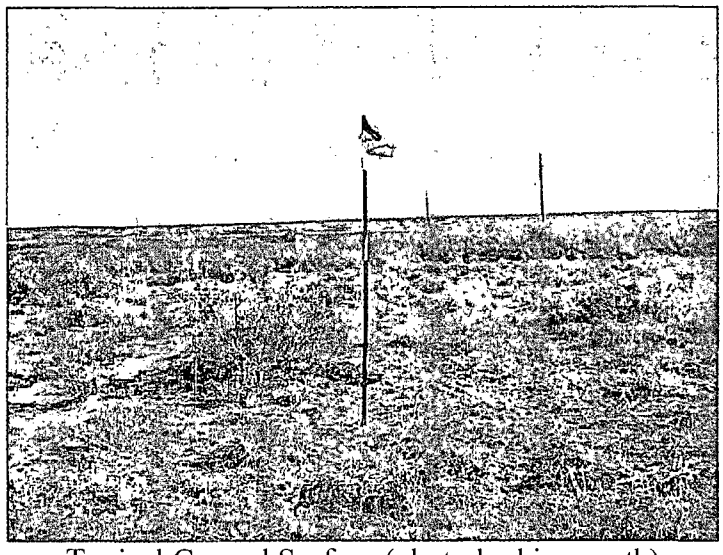
Distance Between Bottom of Pit and Groundwater

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

Figures 3a, 3b, 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).

- 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 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.

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. 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.

- 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 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 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 300 feet of wetlands. This also qualifies the location for burial trench or in-place closure.

- 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 mines are caliche pits. This location is not within an area overlying a subsurface mine.

- 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.

Temporary Pit Design

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

Site Specific Information
Figures

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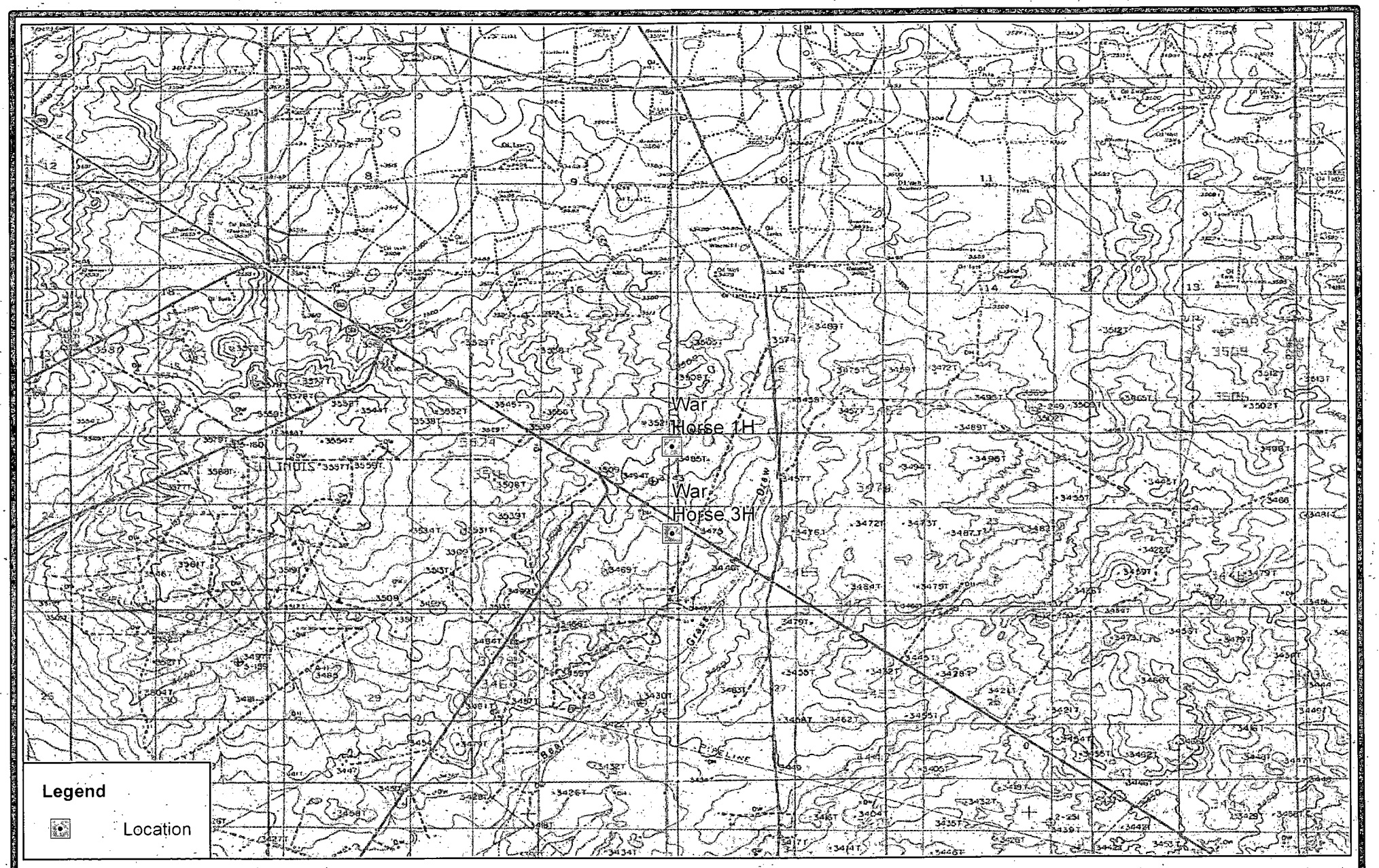
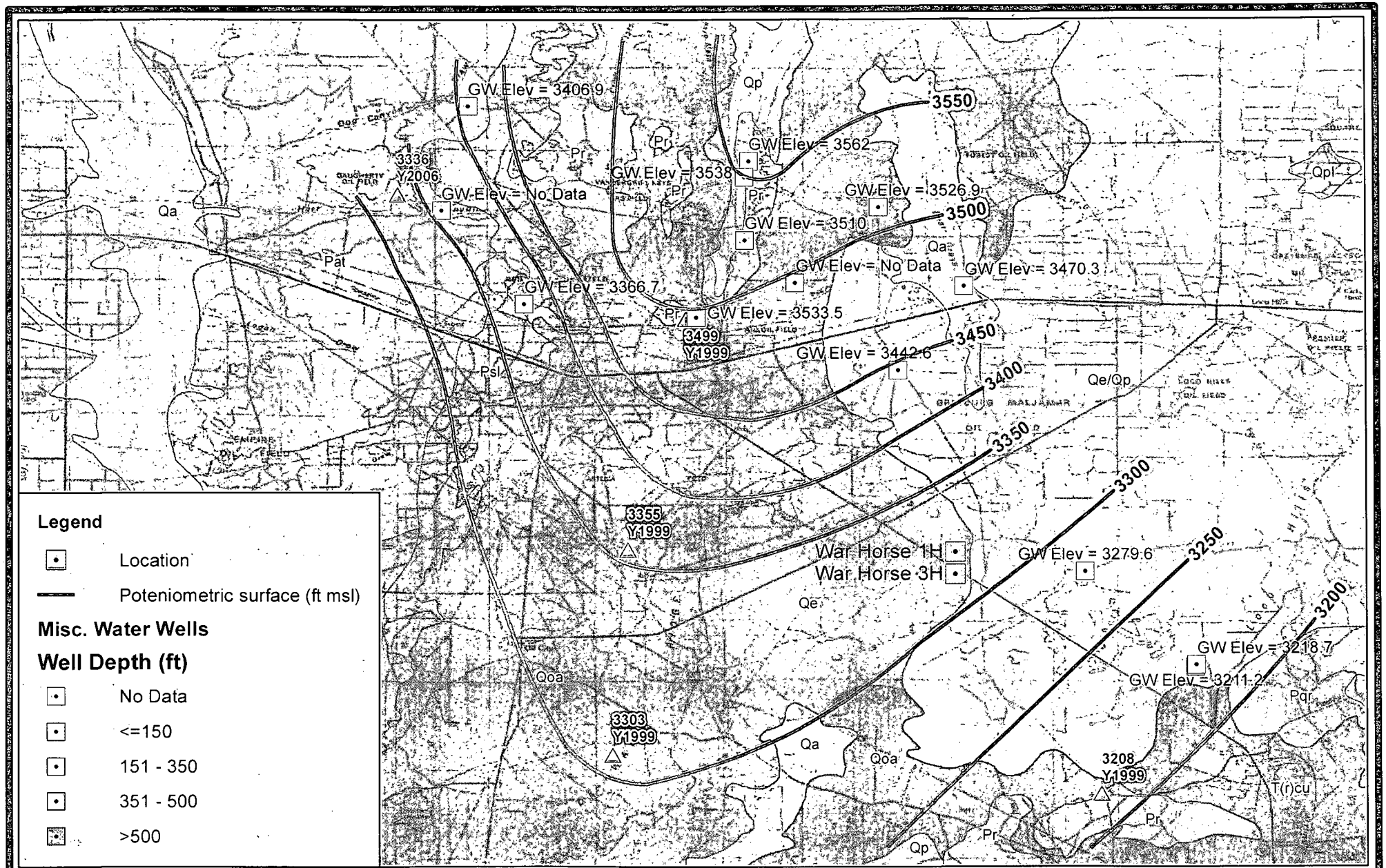
Albuquerque, NM 87104



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Location Map	Figure 1
	Murchison - War Horse 1H and 3H	October 2013



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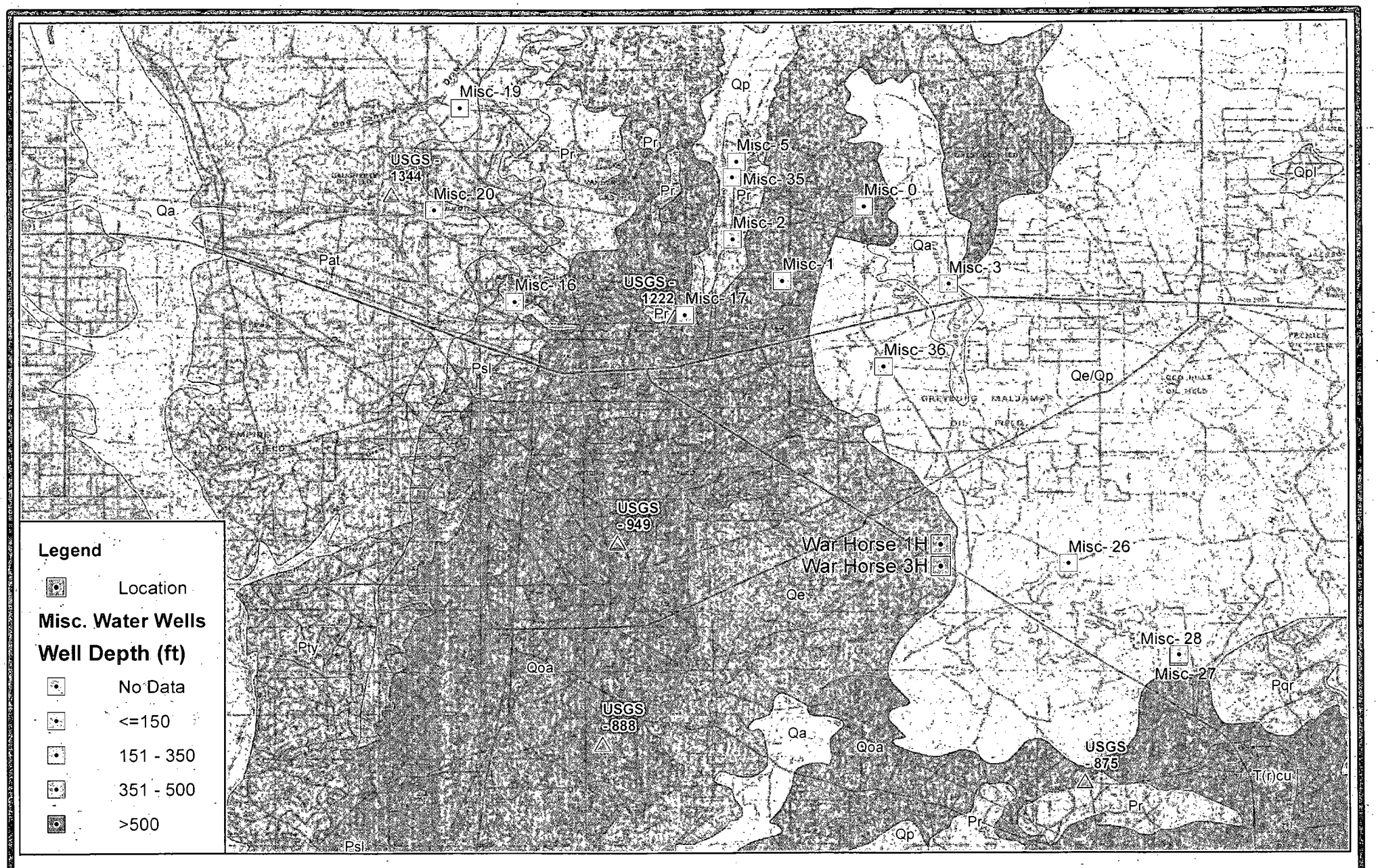
Geology and Groundwater Elevation

Figure 2a

Murchison - War Horse 1H and 3H

October 2013



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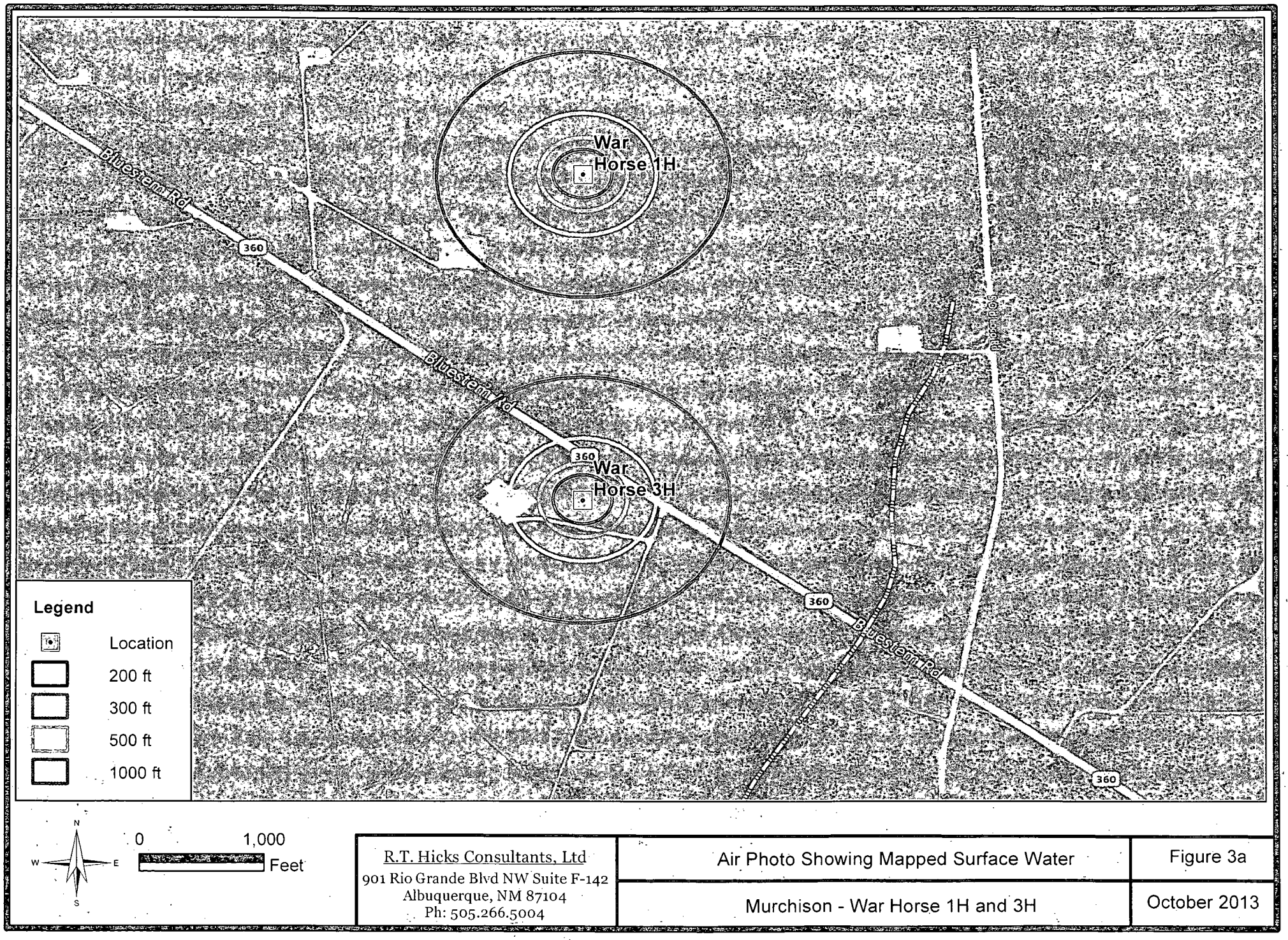
Location of Wells with Groundwater Data

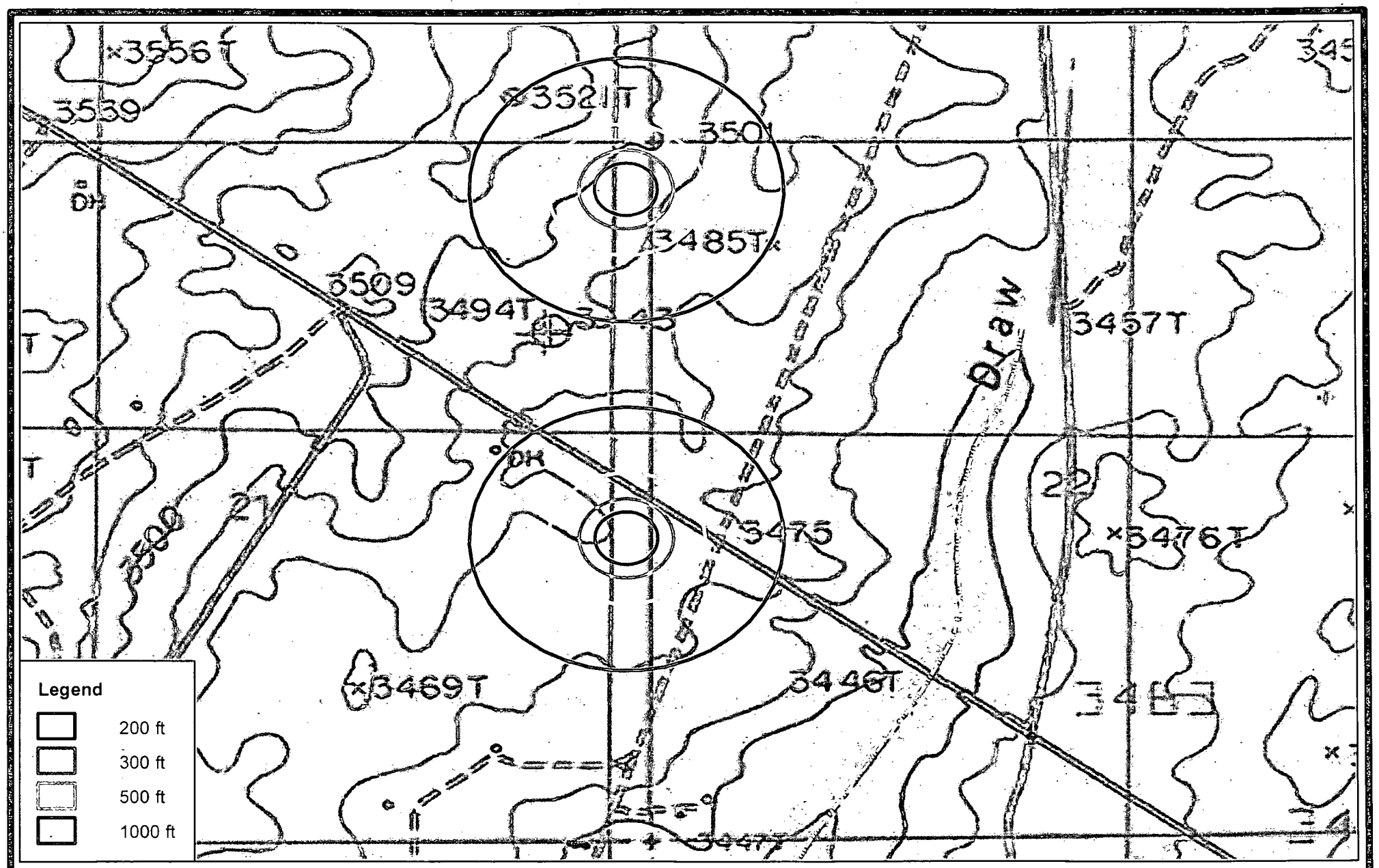
Figure 2b

Murchison - War Horse 1H and 3H

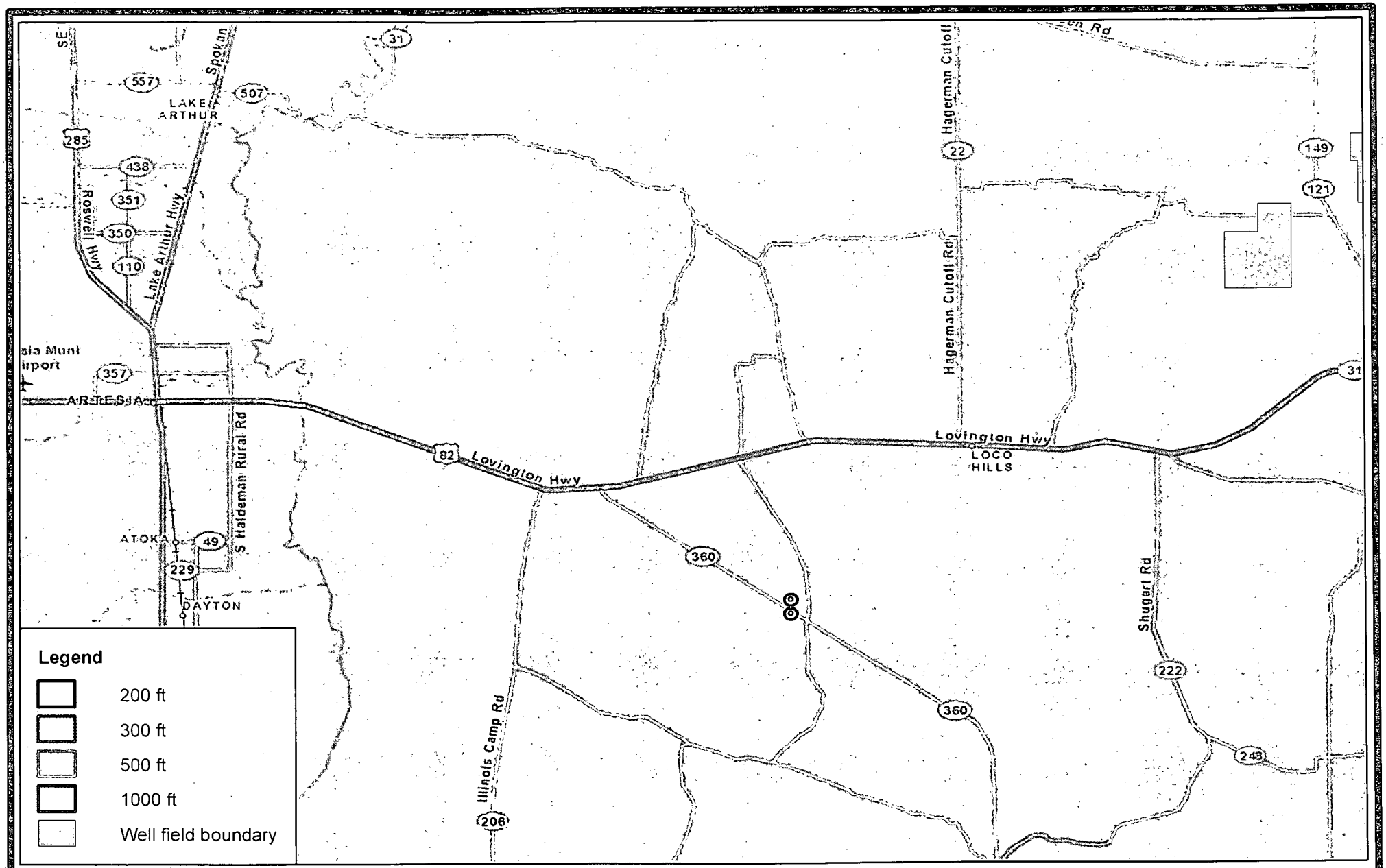
October 2013



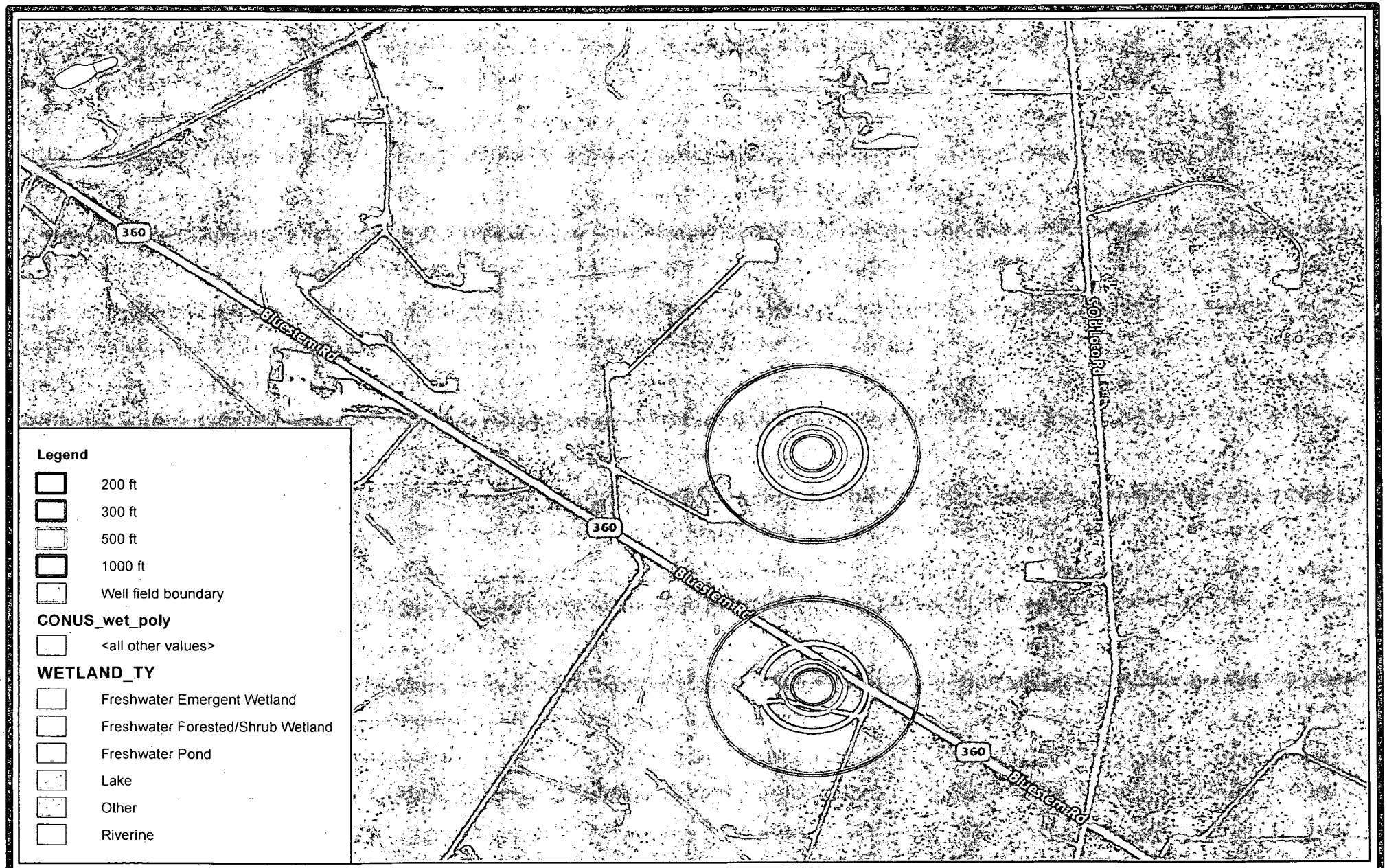
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Air Photo Showing Mapped Surface Water	Figure 3a
	Murchison - War Horse 1H and 3H	October 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Topography and Mapped Surface Water	Figure 3b
	Murchison - War Horse 1H and 3H	October 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearest Municipalities and Wellfields	Figure 4
	Murchison - War Horse 1H and 3H	October 2013



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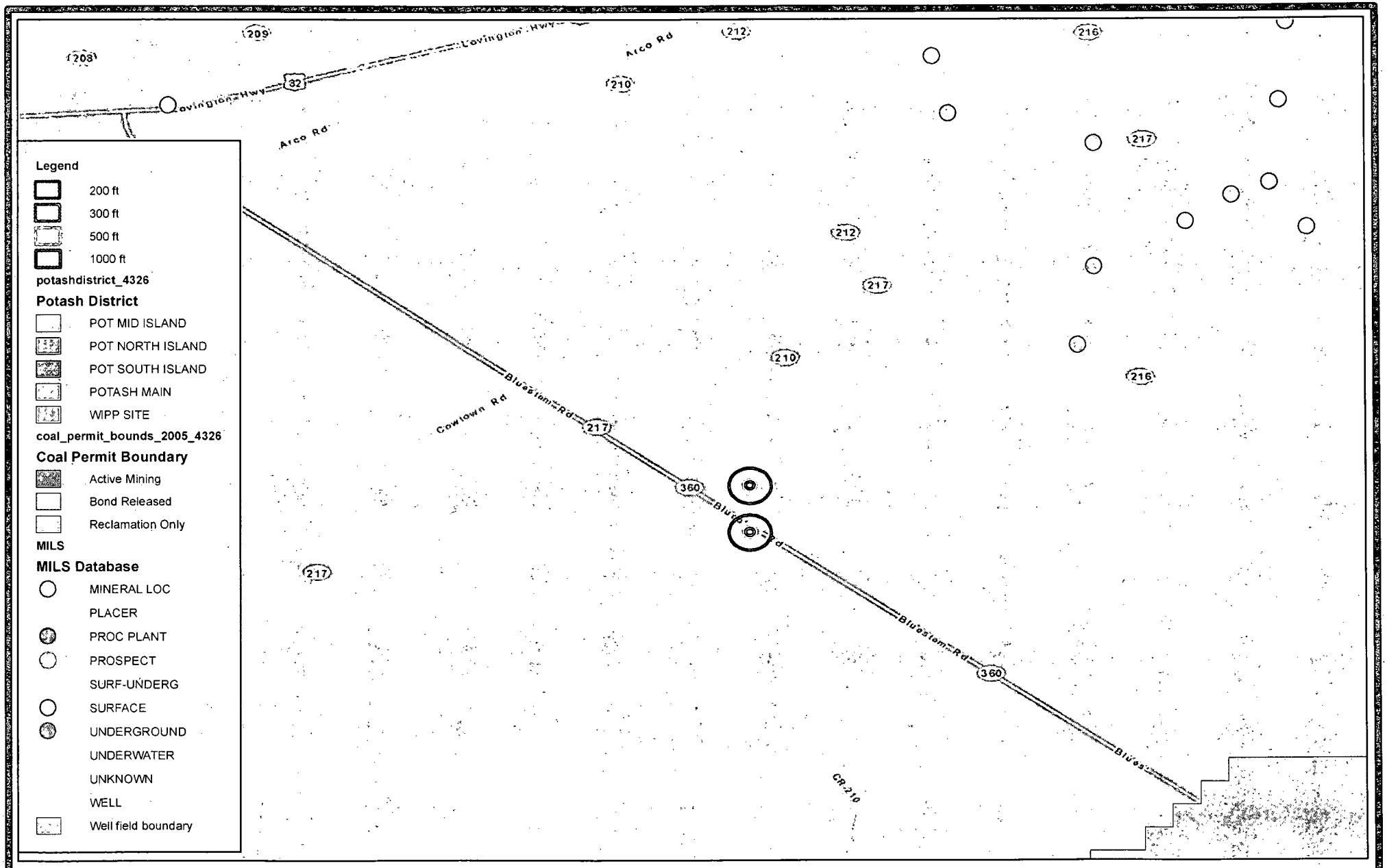
Nearest Mapped Wetlands

Figure 5

Murchison - War Horse 1H and 3H

October 2013



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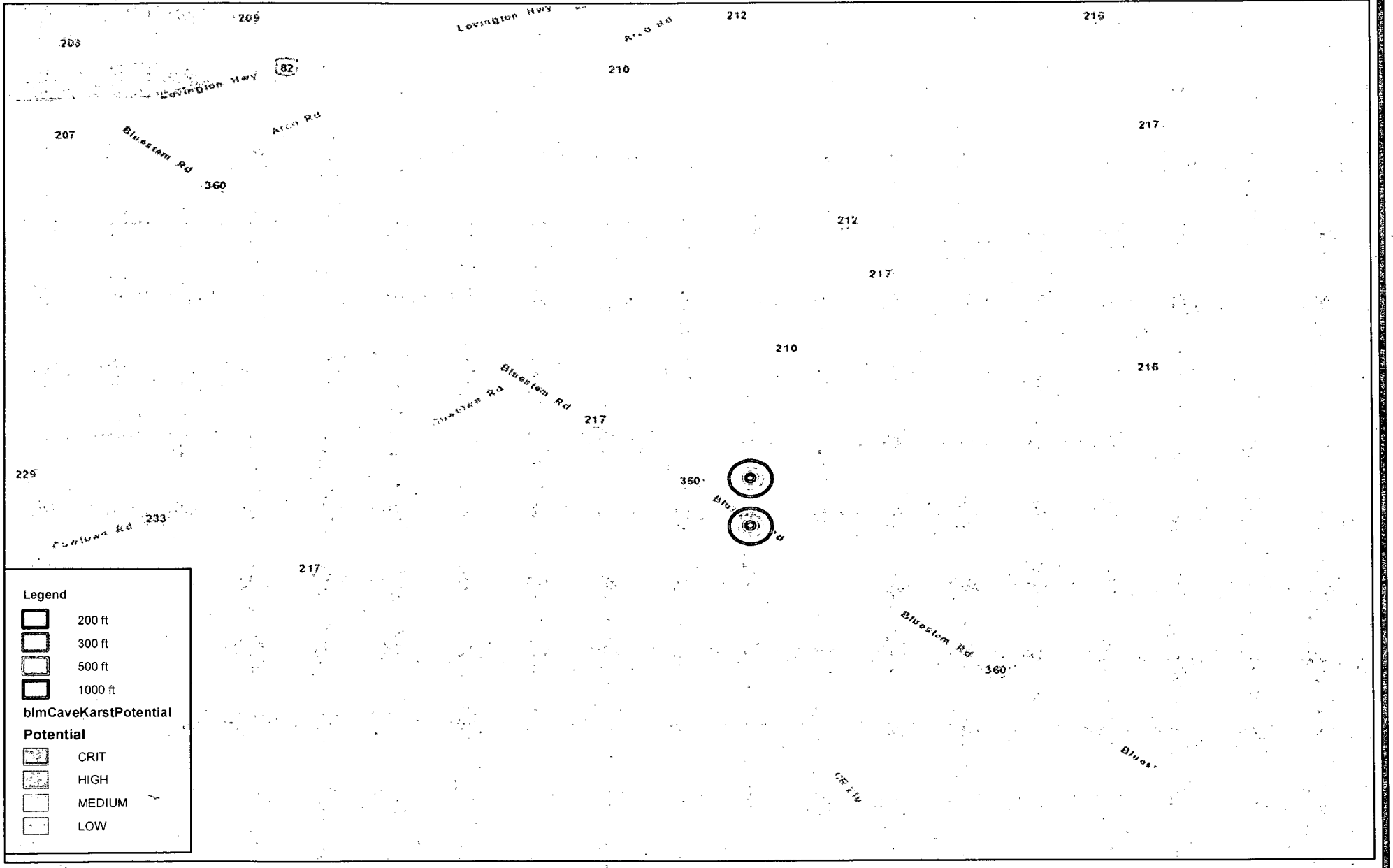
Nearest Mapped Mines

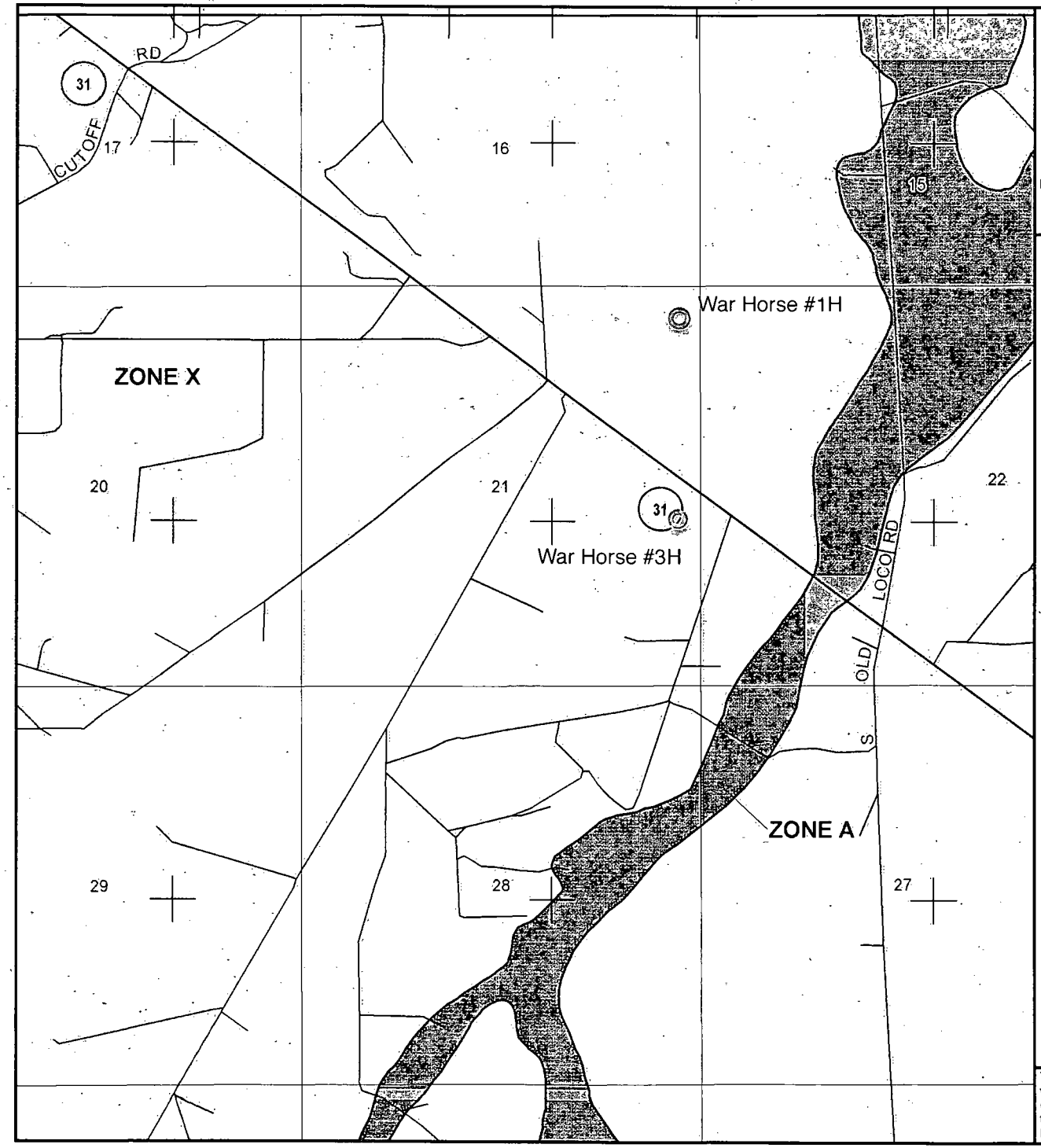
Murchison - War Horse 1H and 3H

Figure 6

October 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	BLM Cave/Karst Potential Map	Figure 7
	Murchison - War Horse 1H and 3H	October 2013



MAP SCALE 1" = 2000'

1,000 0 1,000 2,000 3,000 4,000 FEET

MET

Figure 8

NFIP NATIONAL FLOOD INSURANCE PROGRAM

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

Site Specific Information Plates

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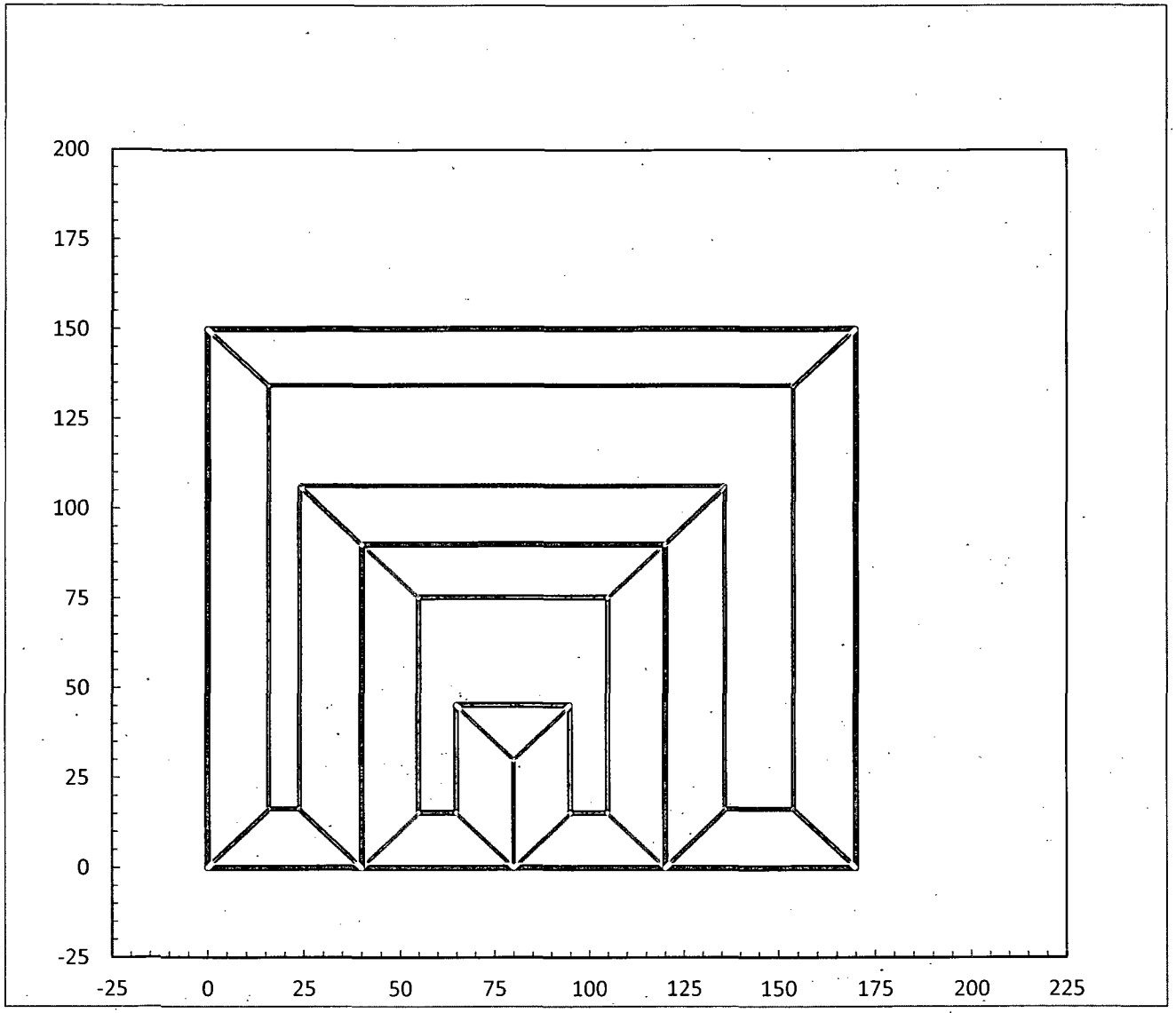
Albuquerque, NM 87104



Drilling Cell Dimensions	
Drilling Cell Total Width	170.0
Drilling Cell Total Length	150.0

Slopes of Pit Horizontal Distance	2.00
Slopes of Pit Vertical Distance	1.00
Horseshoe divider width at surface	0.0

Inner Horseshoe Dimensions	
Total Width (left right)	80.0
Total Length (up down)	90.0
Depth	7.5
Length of Divider	30.0
Divider Width	0.0
Width of discharge floor	10.0
Width of suction floor	10.0

Outer Horseshoe Dimensions	
Width Discharge Side	50.0
Width Suction Side	40.0
Length Far Side (up down)	60.0
Width of discharge Floor	18.0
Width of Suction Floor	8.0
Width of Far Side Floor (right-left dimension)	126.0
Length of far side floor (Up-down dimension)	28.0
Depth of Discharge Side	6.0
Depth of Far Side	8.0
Depth of Suction Side	10.0

Inner Horseshoe Capacity 6011 bbl
Outer Horseshoe Capacity 17701 bbl

Frac Cell Capacity 0 bbl
Total Capacity 23712 bbl

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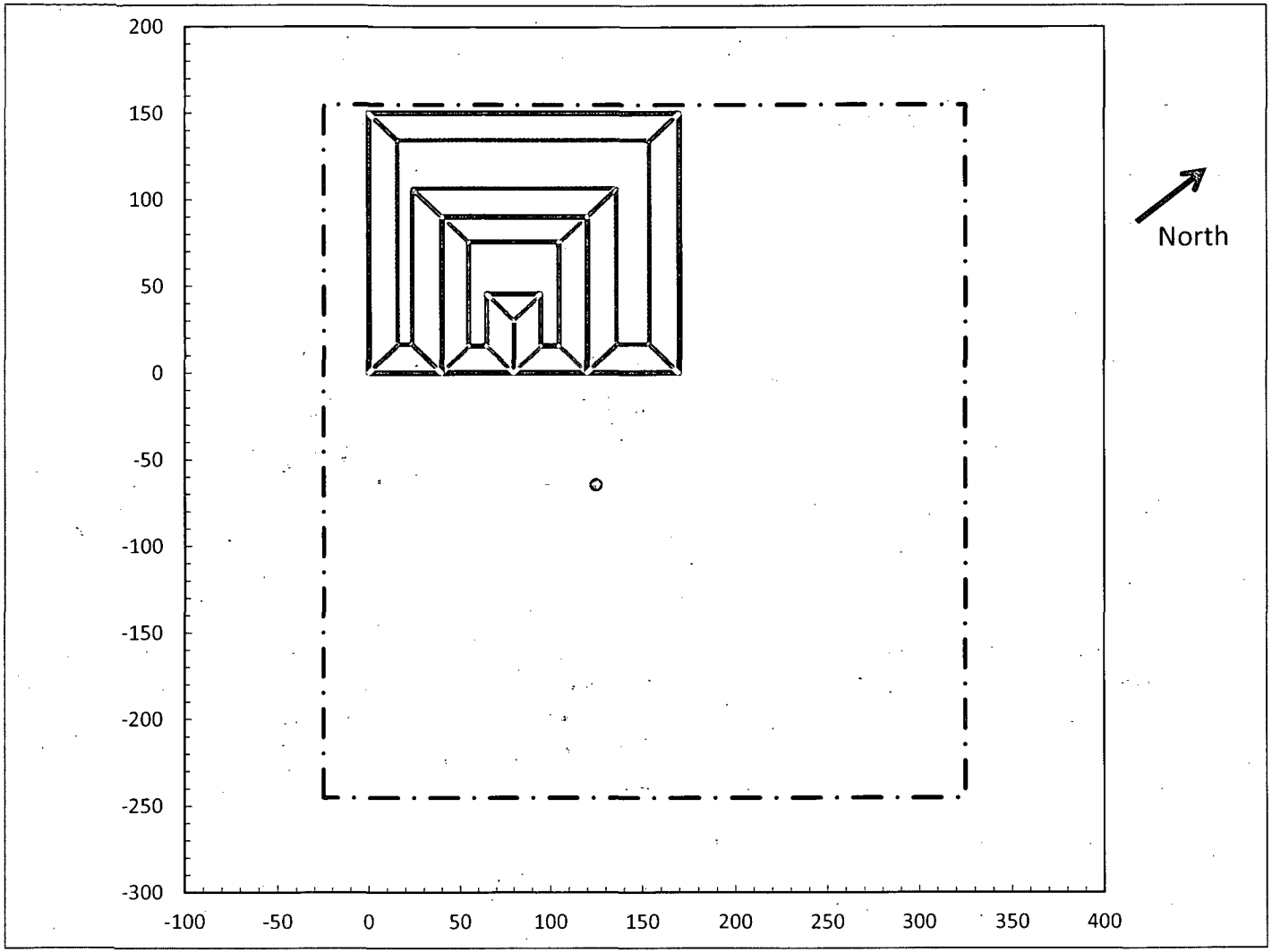
Albuquerque, N. M. 87104

Drawing of Drilling Cell	Plate 1
Murchison - War Horse Federal Com #3H	October 2013



- Black Lines are on the ground surface.
- Red Lines are on the Pit Floors.
- The Blue Contour Lines are at a depth of 4 feet in both pits.
- The origin (0,0) is at the southwest corner of the Outer Horseshoe Pit.

R.T. Hicks Consultants 901 Rio Grande Blvd. NW Suite F-142 Albuquerque, N. M. 87104	**Drawing of Drilling Pit and Well in Relation to Pad**	**Plate 2**
	Murchison - War Horse Federal Com #3H	**October 2013**

Appendix SSI-A

Summary of Groundwater Data From NMBMMT Open File Report 95 & USGS Database

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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.
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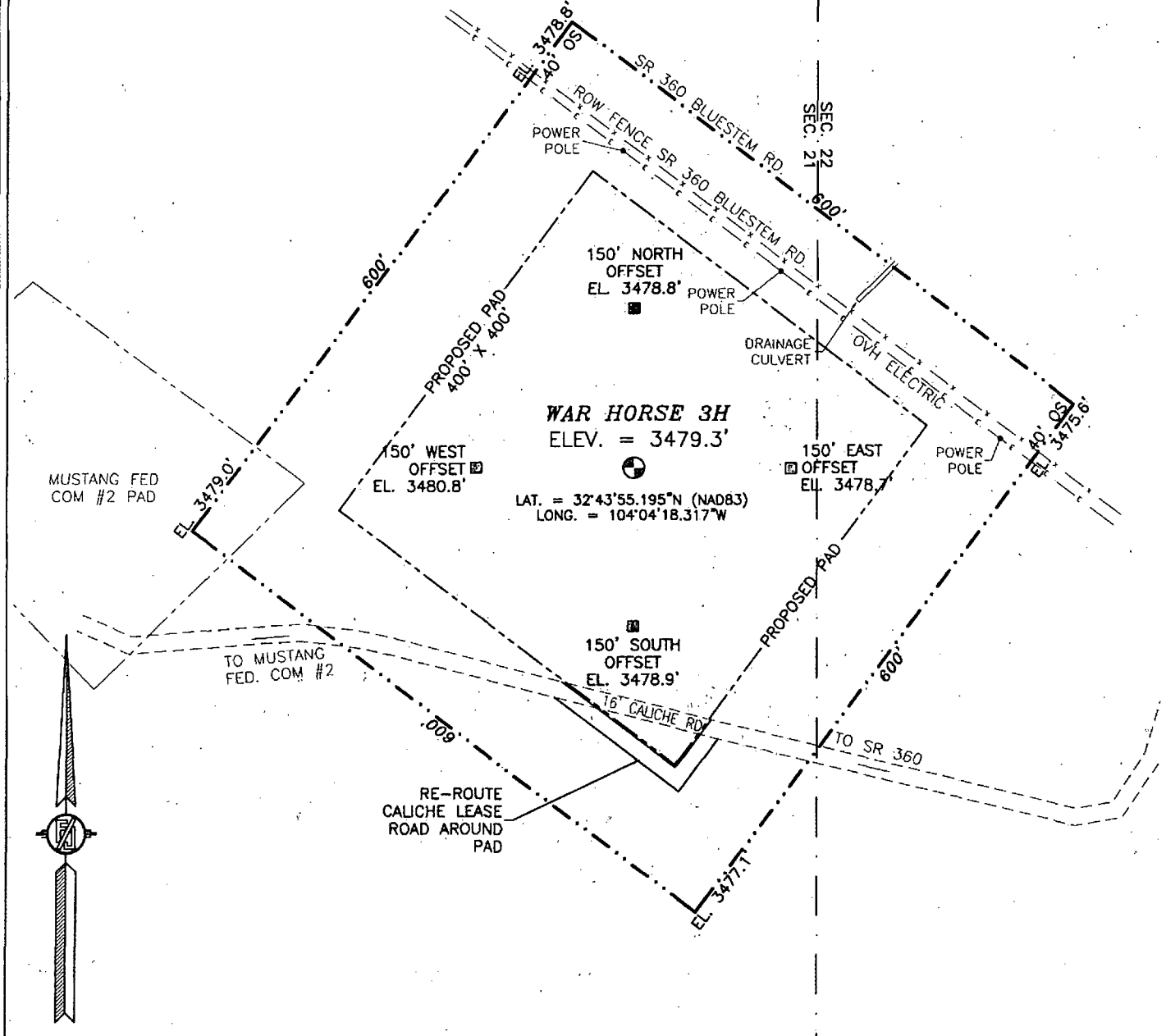
Albuquerque, NM 87104

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

SEPTEMBER 24, 2012

SURVEY NO. 1245A

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/Construction Plan

Plates 1 and 2 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 consists of the following:

1. A cell for drilling fluid circulation and cuttings storage consisting of:
   a. An inner horseshoe for fresh water fluid and cuttings
   b. An outer horseshoe for brine and cut brine fluid and cuttings
2. A cell for the storage of fresh water (drilling/stimulation) and stimulation flow-back water prior to re-use or disposal (OPTIONAL)

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 lie on 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 can house a solar-powered pump. The drainage system for the brine-cut brine cell removes water to an above-ground tank, the fluids cell of the pit, or directly to a truck for re-use or disposal. The drainage system in the cut brine-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 cut brine-brine cell 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

Stockpile Topsoil

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

Signage

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

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

The sign will also provide emergency telephone numbers.

Fencing:

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

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

Earthwork

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

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

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

If the transmittal letter identifies concerns relating to the presence of karst and associated instability, during construction of the pit the contractor will compact the earth material that forms the foundation for the pit liner. An expected proctor density of greater than 90% will be achieved by

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

Liner Installation

The geomembrane liner will consist of 20-mil string reinforced LLDPE or equivalent liner material identified in the transmittal letter or on Form C-144 (that the appropriate division district office approves through approval of this permit application). 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.

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.

Temporary Pit Operating and Maintenance Plan

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

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

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

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

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

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

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

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

The operator will only discharge fluids or mineral solids (including cement) generated or used during the drilling, completion, or workover processes into the pit.
The operator will maintain the temporary pit free of miscellaneous solid waste or debris.
Immediately after cessation of drilling or a workover operation, the operator will remove any visible or measurable layer of oil from the surface of the pit.

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

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

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

Temporary Pit In-Place Closure Plan

The wastes in the temporary pit are destined for in place burial at the drilling location or, if stated in the permit transmittal letter, a nearby site on the same lease.

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

Siting Criteria Compliance Demonstration

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

Proof of Surface Owner Notice

The application package was transmitted to the surface landowner and OCD via email.

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 Plates 1-2. The drainage system described in the design and construction plan (above) is not shown on the Plates but can be important element of the closure plan.

General Protocols and Procedures

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

Waste Material Sampling Plan

Prior to closure, a five-point (minimum) composite sample of the residual solids in the 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 mixed in a ratio of 3:1 with the earth material to be used for mixing and stabilization of the residual cuttings and mud.

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.

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 waste material in a way 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 or an equivalent cover approved by the district office that is composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions and complies with EPA SW-846 Method 9090A.
3. Over the sloping, stabilized material and liner, place the **Soil Cover Design**:
   a. at least 3-feet of compacted, uncontaminated, non-waste containing earthen fill with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0.
   b. either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater, over the 3-foot earth material.
4. Contour the cover to blend with the surrounding topography and to prevent erosion of the cover and ponding over the cover.

Closure Notice

The operator will notify the surface owner by certified mail, return receipt requested, that the operator plans closure operations at least 72 hours, but not more than one week, prior to any closure operation. The notice will include the well name, API number, and location.

After approval for in-place burial, the operator shall notify the district office verbally and in writing at least 72 hours but not more than one week before any closure operation. Notice will include the operator's 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

iv. if burial is in a nearby trench/pit, a separate C-105 showing the exact location

Unless the permit transmittal letter requests an alternative maker 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 or workover rig was released from the site. This date will be noted on form C-105 or C-103 filed with the division upon the well's or workover's completion.

Reclamation and Re-vegetation Plan

In addition to the area of the in-place burial, the operator will reclaim to a safe and stable condition that blends with the surrounding undisturbed area

1. the pit location not used for burial
2. other areas associated with the in-place burial including access roads

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.

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 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.