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

RECEIVED
JAN 21 2014
NMOCD ARTESIA

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: Mack Energy Corporation OGRID #: 013837
Address: PO Box 960, Artesia, NM 88210-0960
Facility or well name: Galaxy State # 1 Workover Pit for Produced Water
API Number: 30-005-64165 and various others – see attachment OCD Permit Number: 2-13-0008
U/L or Qtr/Qtr S 1/2 of SW ¼ of SE 1/4 Section 5 Township 14S Range 29E County: Chaves
Center of Proposed Design: Latitude 33.1255437 Longitude 104.0497660 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 & 30 mil ☒ LLDPE ☒ HDPE ☐ PVC ☐ Other
☒ String-Reinforced 30 mil LLDPE Primary Liner Dura-Skrim K30B and Secondary Liner is 20-mil LLDPE
Liner Seams: ☒ Welded ☐ Factory ☐ Other Volume 15,000 bbl Dimensions: L 120 x W 120 x D 12

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

4.
☐ **Alternative Method:**
Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

5.
Fencing: Subsection D of 19.15.17.11 NMAC *(Applies to permanent pits, temporary pits, and below-grade tanks)*
☐ Chain link, six feet in height, two strands of barbed wire at top *(Required if located within 1000 feet of a permanent residence, school, hospital, institution or church)*
☒ Four foot height, four strands of barbed wire evenly spaced between one and four feet
☐ Alternate. Please specify

6.

Netting: Subsection E of 19.15.17.11 NMAC *(Applies to permanent pits and permanent open top tanks)*

☐ Screen ☐ Netting ☐ Other_____

☐ Monthly inspections (If netting or screening is not physically feasible)

7.

Signs: Subsection C of 19.15.17.11 NMAC

☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

☒ Signed in compliance with 19.15.16.8 NMAC

8.

Variances and Exceptions:

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

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

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

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

9.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

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

General siting	
Ground water is less than 25 feet below the bottom of a low chloride temporary pit or below-grade tank. - ☐ NM Office of the State Engineer - iWATERS database search; ☐ USGS; ☐ Data obtained from nearby wells	☐ Yes ☐ No ☒ NA
Ground water is less than 50 feet below the bottom of a Temporary pit, permanent pit, or Multi-Well Fluid Management pit . NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells **See Figures 1 & 2**	☐ Yes ☒ No ☐ NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. **(Does not apply to below grade tanks) See Figure 5** - Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within the area overlying a subsurface mine. **(Does not apply to below grade tanks) See Figure 7** - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	☐ Yes ☒ No
Within an unstable area. **(Does not apply to below grade tanks) See Figure 8** - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	☐ Yes ☒ No
Within a 100-year floodplain. **(Does not apply to below grade tanks) See Figure 9** - FEMA map	☐ Yes ☒ No
Below Grade Tanks	
Within 100 feet of a continuously flowing watercourse, significant watercourse, lake bed, sinkhole, wetland or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Within 200 horizontal feet of a spring or a fresh water well used for public or livestock consumption;. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Temporary Pit using Low Chloride Drilling Fluid (maximum chloride content 15,000 mg/liter)	
Within 100 feet of a continuously flowing watercourse, or any other significant watercourse or within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). (Applies to low chloride temporary pits.) - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Within 300 feet from a occupied permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☐ No
Within 200 horizontal feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or 300feet of any other fresh water well or spring, in existence at the time of the initial application. NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	☐ Yes ☐ No

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

Signature: W. Lee Livingston Date: 1/15/2014

e-mail address: leel@mec.com Telephone: 575-748-1288

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

OCD Representative Signature: Signed By Mike Bratcher **Approval Date:** FEB 10 2014

Title: ES-O **OCD Permit Number:** 2-13-0008

19.
Closure Report (required within 60 days of closure completion): 19.15.17.13 NMAC

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

☐ **Closure Completion Date:**

20.
Closure Method:

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

21.
Closure Report Attachment Checklist: ***Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.***

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

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

22.

Operator Closure Certification:

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

Name (Print): _____ Title: _____

Signature: _____ Date: _____

e-mail address: _____ Telephone: _____

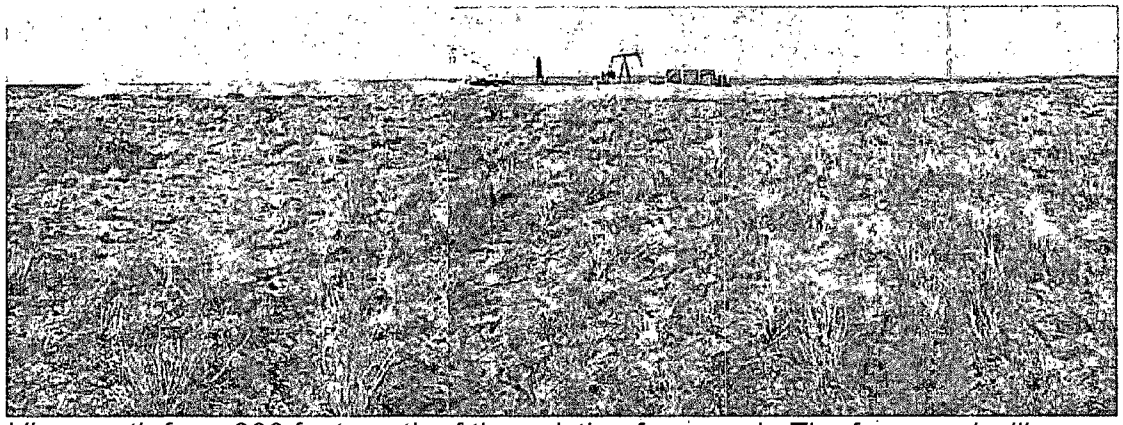
RE: Mack Energy Corporation
Galaxy State 001
30-005-64165
O-5-14s-29e
Chaves County, New Mexico

Conditions of Approval for workover pit – NMOCD Permit Number 2-13-0008

- Notify the OCD District 2 office once construction has been scheduled.
- OCD requests the pit inspection log be provided to the District 2 office upon cessation of use of the pit.
- Pit will not be considered for final closure until OCD receives notification as required by 19.15.17.13.H(5) and an onsite inspection completed by OCD.

January 2014

C-144 Permit Package for Galaxy State #1 Workover Pit Section 5 T14S R29E Chaves County



View north from 300 feet south of the existing frac pond. The frac pond will serve as the foundation for the temporary workover pit used to store treated produced water.

Prepared for
Mack Energy Corporation
Artesia, New Mexico

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

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

January 17, 2014

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

RE: Mack Energy – Galaxy State #1 Workover Pit

Dear Mike:

Enclosed is a C-144 permit application for a temporary workover pit located at the Mack Energy Galaxy State #1 well site. The purpose of this pit is to facilitate the reuse of produced water for well stimulation and well drilling in lieu of using fresh water.

The pit is neither a permanent pit nor a multi-well fluid management pit as the operational lifespan of the pit is limited to six months and the total capacity of the pit is less than 3 acre-feet (20,000 bbls). However, the design of this temporary pit does incorporate several important elements common to these longer-lived pits, including

- a more robust primary liner (30-mil LLDPE) than is required for temporary pits,
- a secondary liner
- leak detection system and
- "clean closure" with no plan for on-site burial of pit materials

We believe this application meets the intent and letter of the Pit Rule; but is an unexpected use of a temporary pit. Therefore, I have copied OCD's Pit Rule expert witness, Daniel Sanchez and Scott Dawson in the hope that it leads to and constructive dialog and a cooperative effort to encourage cost-effective and time-effective methods to reduce the use of fresh water.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
President

Copy: Mack Energy
Ed Martin, Daniel Sanchez, Scott Dawson NMOCD Santa Fe
State Land Office (surface owner)

C-144 and Site Specific Information for Temporary Pit

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

Distance to Groundwater

Figure 1, Figure 2, and the discussion presented below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 80 feet beneath the temporary workover pit.

Figure 1 is an area geologic and topographic map that shows:

1. The location of the temporary pit is an orange square.
2. Water wells from the Misc.Water Wells database appear as colored squares that indicate well depth. Depth to water measurements and the date of the measurement are presented adjacent to the symbol. This database is drawn from published sources and Hicks Consultants site visits; these wells may or may not be included in the OSE or USGS databases.
3. Data from the OSE database are shown as triangles within colored circles that indicate the reported depth of the well. OSE wells are often miss-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range. Depth to water data based upon driller's observations and the time of well completion are presented next to the symbol.
4. Water wells from the USGS database as purple triangles with the depth to water and measurement date next to the symbol.

Figure 2 is an area topographic map that shows:

1. The location of the temporary pit as an orange square.
2. Water wells with calculated water table elevation data based upon static depth to water measurements made by professionals.
3. Our interpretation of the water table elevation (blue contour lines).

Hydrologic Report

The proposed temporary pit are located in the Great Plains physiographic province. The Plains are considered a Cenozoic depositional feature composed of erosional materials from the eastern front of the Rocky Mountains and similarly aligned Basin and Range mountain chains further to the south. In the area of interest, they are uncomformably deposited on top of Triassic beds (Dockum and Santa Rosa Formations) which are in turn unconformably deposited on Permian age marine sediments. Much of the Plains material that comprises the surface was deposited between 40 and 50 million years ago (ma). With some uplift of the Plains, depositional rates slowed to a stop from 30 to 40 ma. Beginning 30 ma, additional deposition spreading from the north to the south and reworking of the earlier materials resulted in the deposition of the Ogallala formation. The later formation of the Pecos Valley by headward erosion due to either uplift to the west or solution/subsidence of the valley resulted in partial stripping of material from the fronts of the mountains (Reeves, 1972). This action has left the Great Plains isolated from the mountain fronts.

The pit location is between the Mescalero rim, the western edge of the Ogallala formation, and the Pecos River. The above mentioned development of the Pecos Drainage removed and reworked the remnants of the Ogallala formation between the Mescalero rim and the Pecos River. This surface is called the Mescalero Plain and is composed of relatively thin pediment deposits and alluvium of fluvial and eolian origins deposited on top of Triassic and older

formations. The Santa Rosa formation (Triassic) crops out about 2 miles south of the location (Figure 1).

The site location is in the southern portion of Section 5 on a slight topographic high (see Figure 3) at an elevation of about 3670-feet above sea level (asl), based upon the surveyed ground elevation of the adjacent Galaxy State #1 well. Drainage is generally to the west and mapped drainages near the pit exist north, southeast and south of the site.

Hydrogeology of the Pit Location

Figure 2 shows measured water level elevation data and a potentiometric surface west the Mescalero Rim (about 13 miles to the east of the temporary pit) to the Long Arroyo drainage, which lies about 7 miles to the west.. The Mescalero Rim is the divide between groundwater flowing southeast underneath the Llano Estacado (within the Ogallala Aquifer) and groundwater flowing southwest beneath the Mescalero Plain to the Pecos drainage (within alluvium and the Santa Rosa and Rustler Formations). Due to the relatively complicated geology and topography of the Mescalero Plain, groundwater may be locally moving from south-southeast to north-north west. Groundwater does not exist everywhere beneath the Mescalero Plain (e.g. beneath Loco Hills).

Figure 2 suggests that the water table beneath the pit is relatively flat and is about 3560-3590 feet above sea level. Groundwater is generally flowing west, toward the Pecos River and/or Long Arroyo. However, the data used to create the potentiometric surface spans 30 years (from 1977 to 2014). At the Misc-73 site located south-southeast of the Galaxy workover pit, the depth to water measurement in 1977 was 62 feet and the measured depth to groundwater in 2013 was 122 feet – a 60-foot decline at this site. At the USGS 2274 location, 5 miles west of the workover pit, the water level elevation has remained constant between 1989 and 2007. Mr. Robert Jolly of the Anchor D Ranch stated that his well (Misc. 114) has shown a significant water level decline over the past decade.

Depth to Water

Although the span of time between measurements used to produced Figure 2 is more than 30 years, we feel confident that the distance between the bottom of the workover pit and ground water is at least (3670-3590=) 80 feet.

Distance to Surface Water

Figure 3 and the site visit demonstrates that the location is not within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).

- The nearest stream (intermittent) is about 800 feet to the southeast and more than 1000 feet to the north (see Figure 2).
- The area within 300 feet from the proposed workover pit is characterized by small stabilized dunes.

Distance to Permanent Residence or Structures

Figure 4 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.

- There is a tank battery located on the Galaxy State #1 pad immediately east of the pit location.
- Currently, well pads and roads are under construction in the general area.

Distance to Non-Public Water Supply

Figures 1 and Figure 2 demonstrates that the location is not within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.

- Figure 1 and 2 show the locations of all area water wells, active or plugged/abandoned
- The nearest active well is Misc-114 located aobut 1 mile west-southwest of the location.
- There are no known domestic water wells located within 1000 feet of the location.
- No springs were identified within the mapping area (see Figure 3).

Distance to Municipal Boundaries and Fresh Water Fields

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

- The closest municipality is Hagerman, NM approximately 16 miles to the west.
- There are no public well fields closer than 18 miles (southeast).

Distance to Wetlands

Figure 6 demonstrates the location is not within 500 feet of wetlands.

- The nearest designated wetland is mapped as a "lake" and is located more than 4 miles east.

Distance to Subsurface Mines

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

Distance to High or Critical Karst (Unstable) Areas

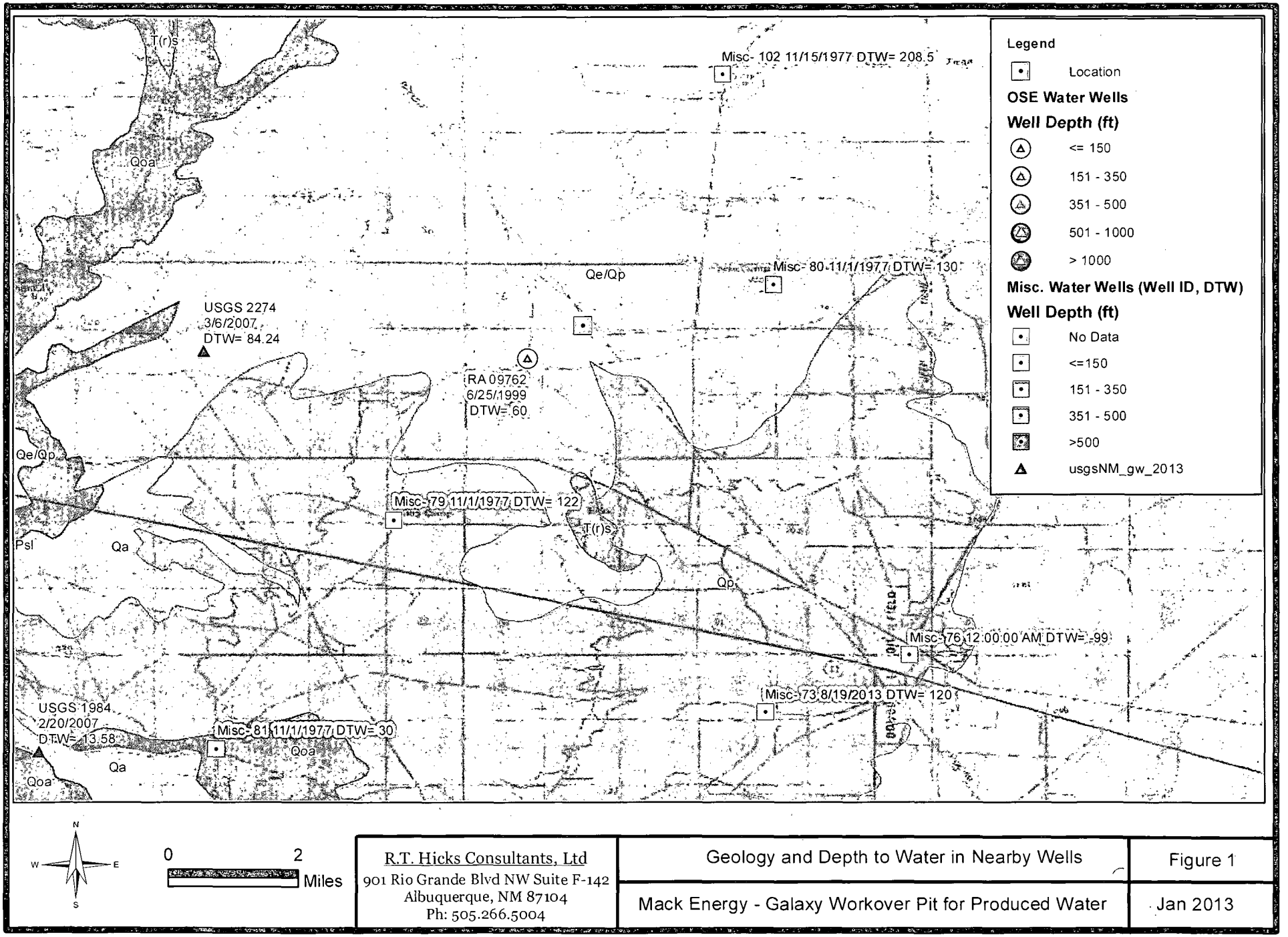
Figure 8 shows the location of the temporary pit with respect to BLM Karst areas

- The proposed temporary pit location is in a "Low Potential" karst area.
- No evidence of solution voids were observed near the site during the field inspection.
- No evidence of unstable ground was observed.

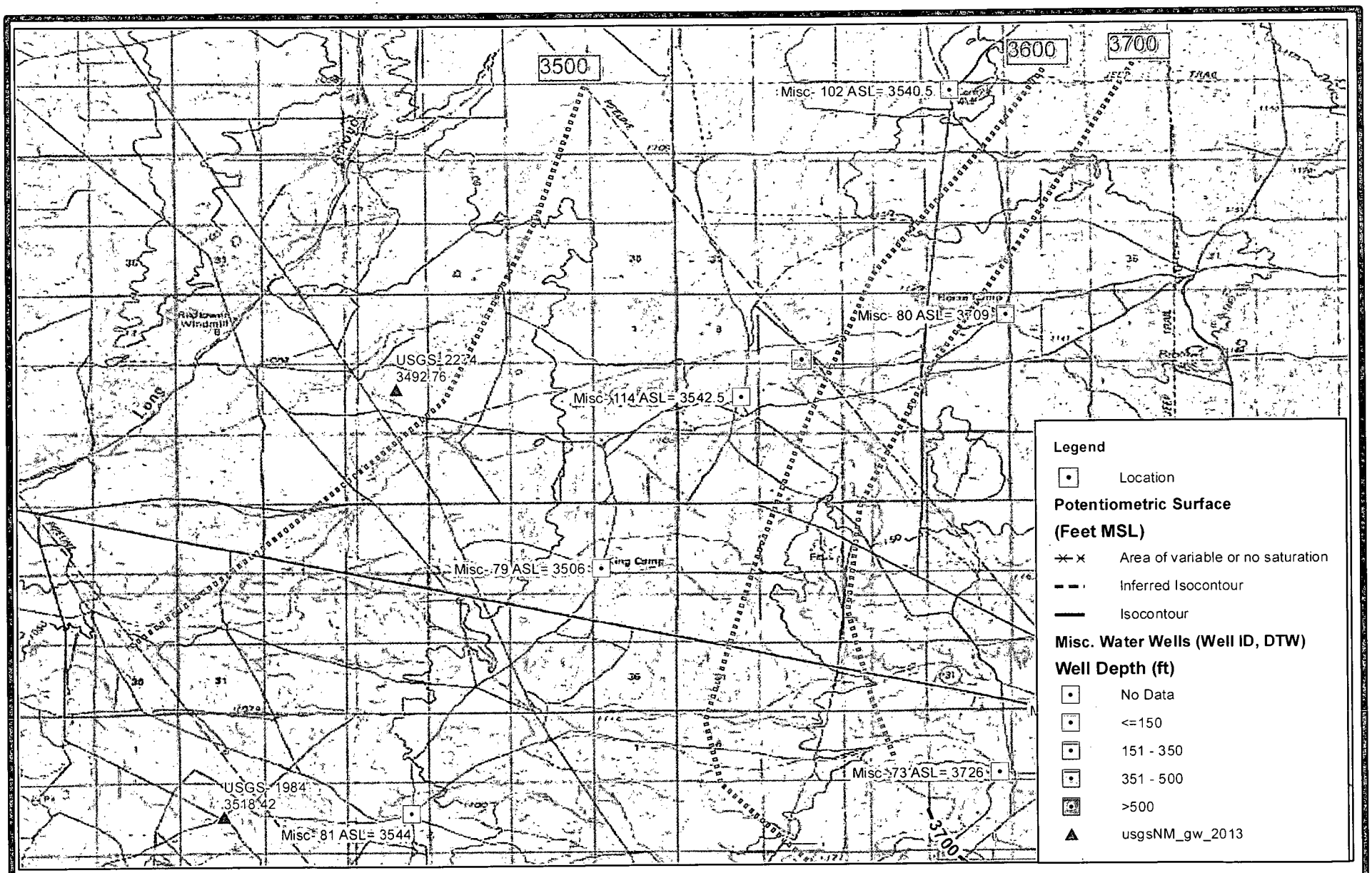
Distance to 100-Year Floodplain

Figure 9 demonstrates that the location is within an area that has not yet been mapped by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.

- Areas that are not mapped are generally considered minimal flood risk
- Our field inspection and examination of the topography permits a conclusion that the location is not within any floodplain



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Geology and Depth to Water in Nearby Wells	Figure 1
	Mack Energy - Galaxy Workover Pit for Produced Water	Jan 2013



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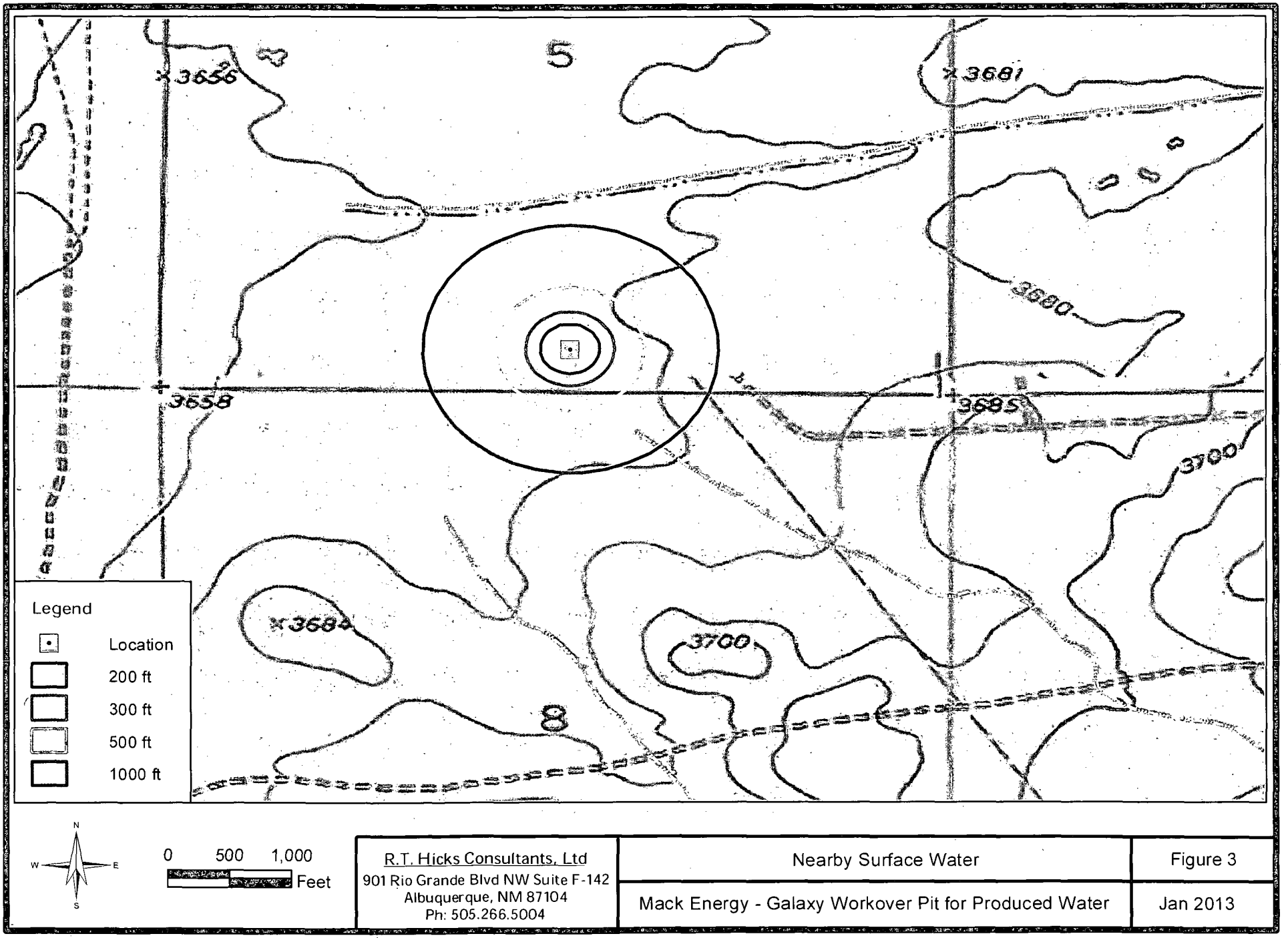
Albuquerque, NM 87104
Ph: 505.266.5004

Measured Groundwater Elevation

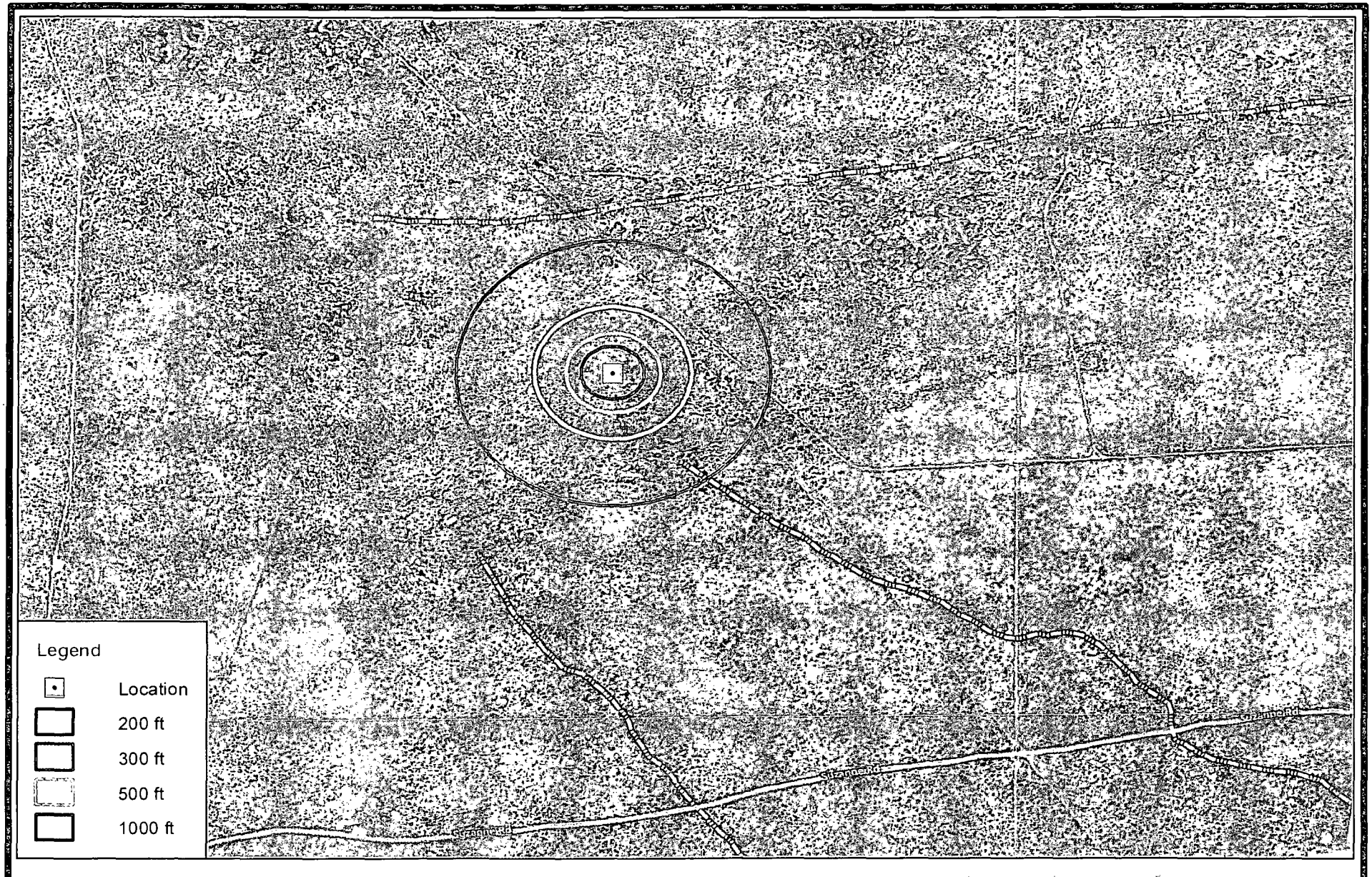
Figure 2

Mack Energy - Galaxy Workover Pit for Produced Water

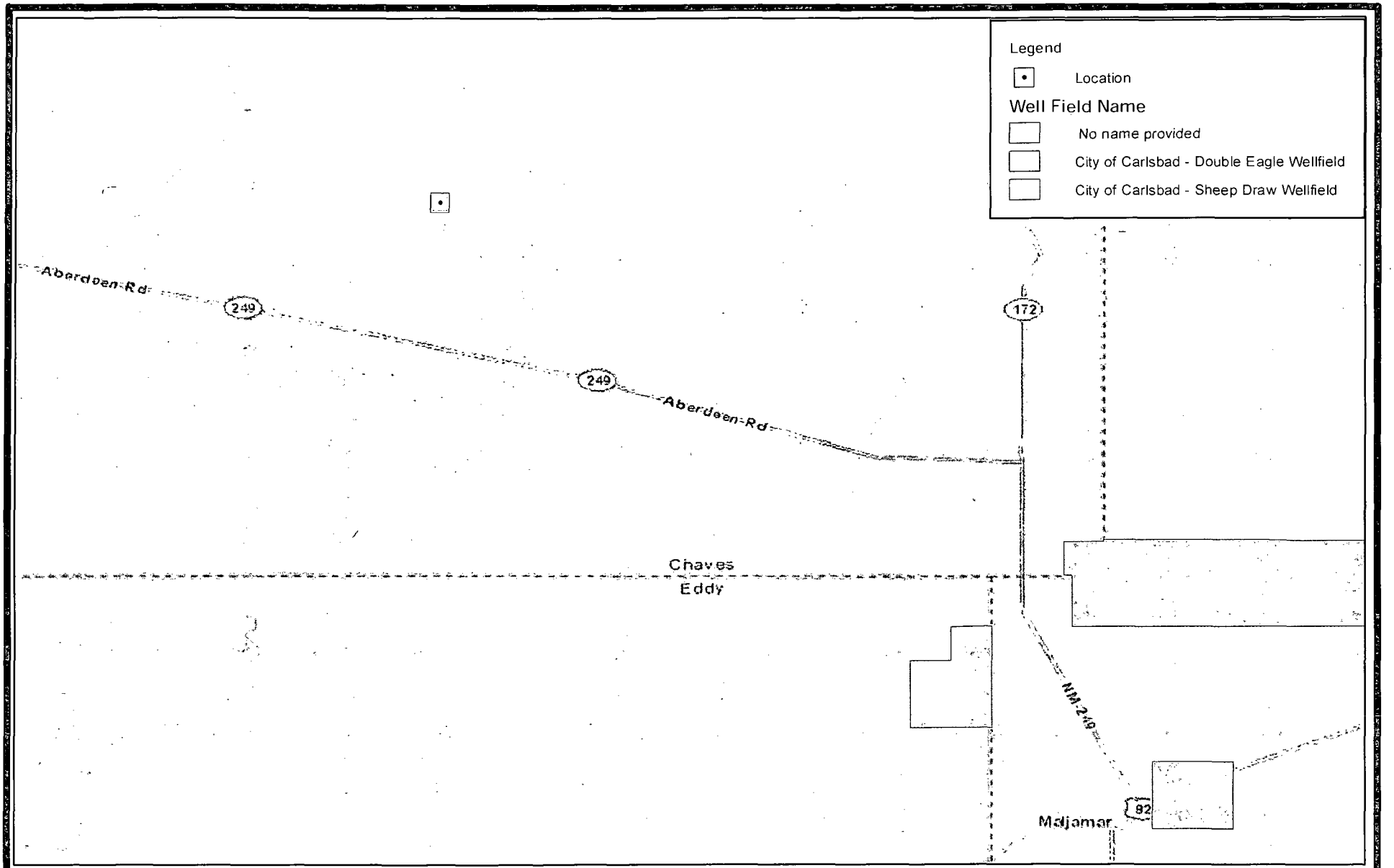
Jan 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Surface Water	Figure 3
	Mack Energy - Galaxy Workover Pit for Produced Water	Jan 2013



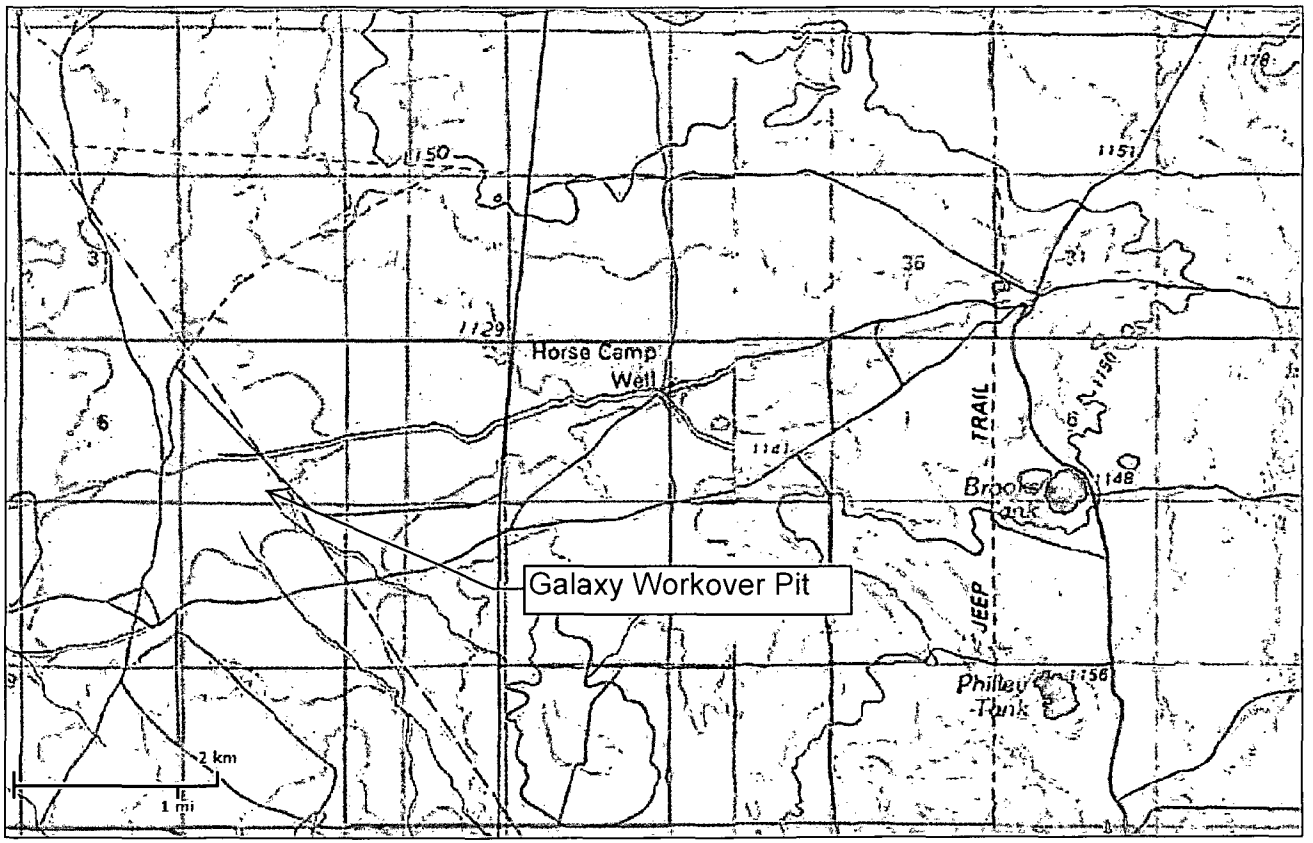
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Structures	Figure 4
	Mack Energy - Galaxy Workover Pit for Produced Water	Jan 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Municipalities and Wellfields	Figure 5
	Mack Energy - Galaxy Workover Pit for Produced Water	Jan 2013

U.S. Fish and Wildlife Service

National Wetlands Inventory



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

Figure 6- Nearby Wetlands

Jan 12, 2014

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

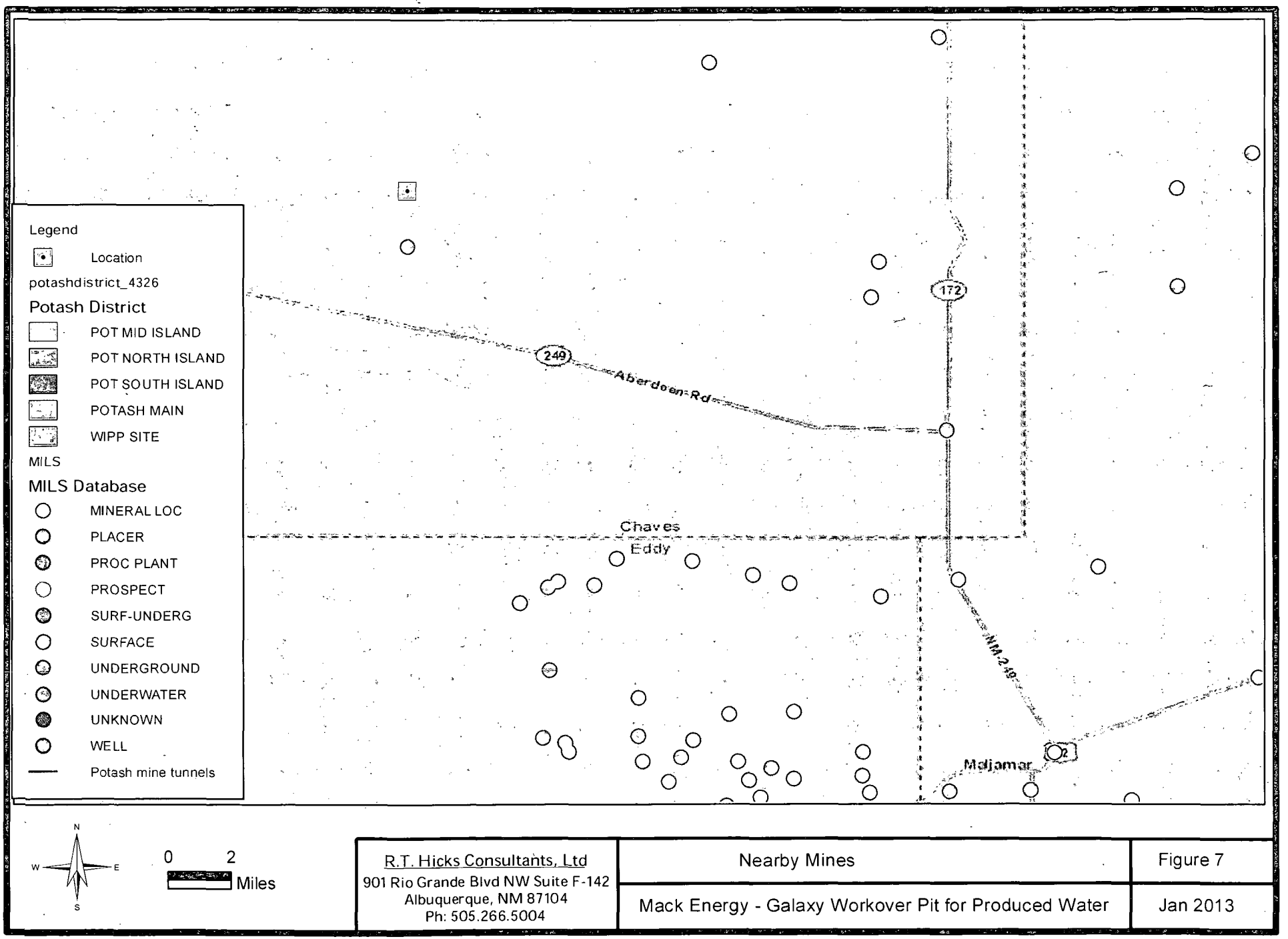
- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

User Remarks:

Mack Energy - Galaxy State #1 Workover Pit



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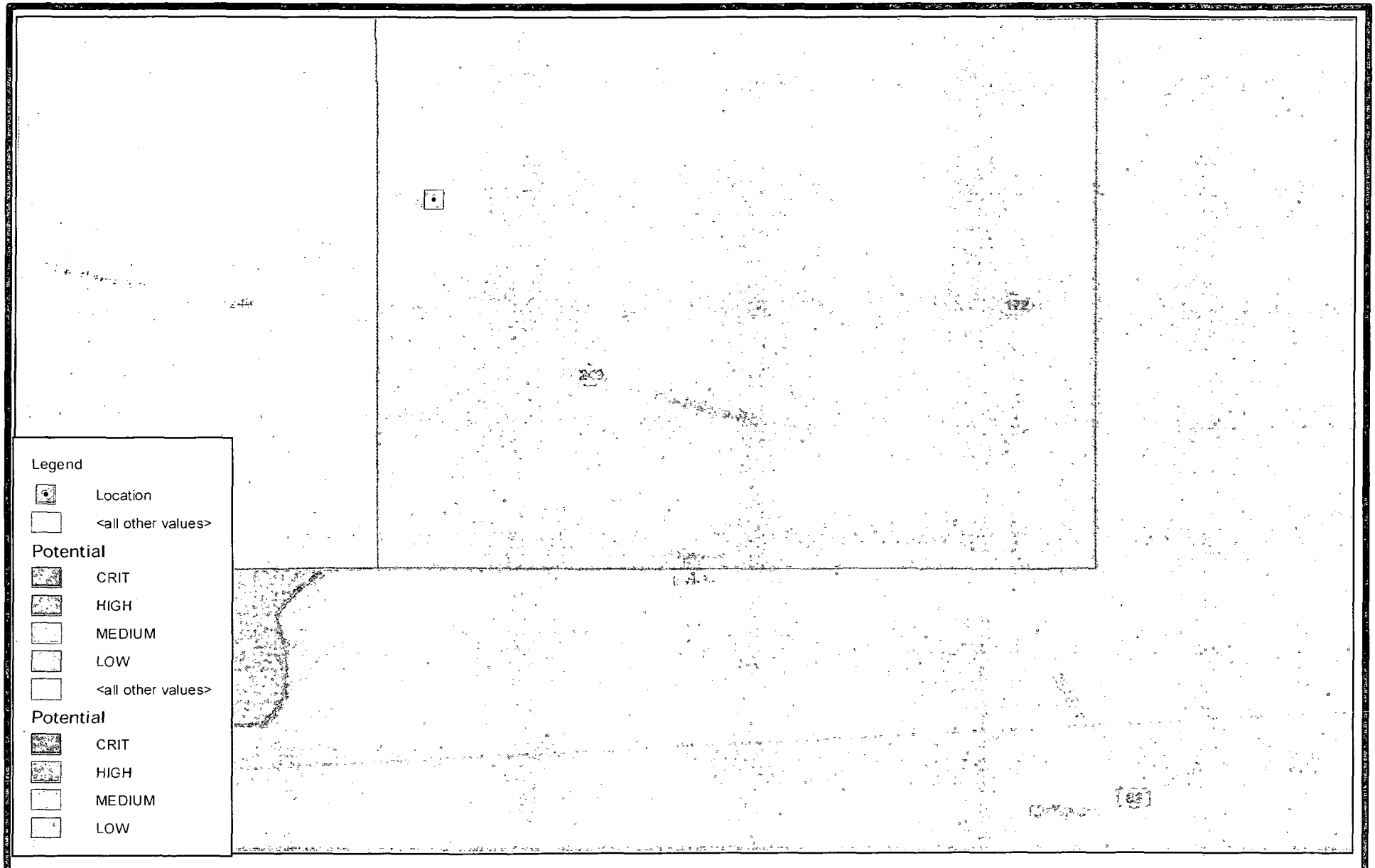
Albuquerque, NM 87104
Ph: 505.266.5004

Nearby Mines

Figure 7

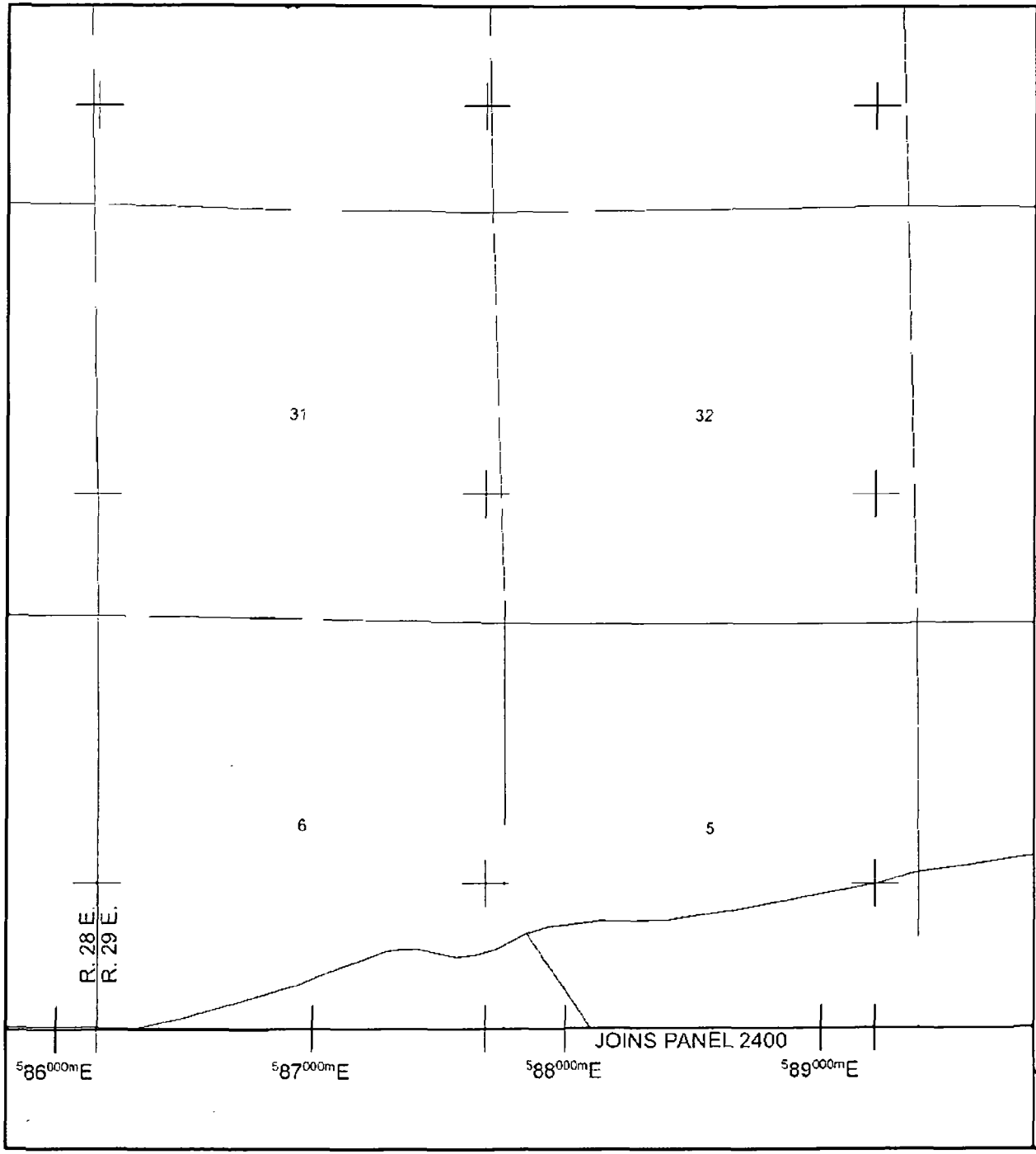
Mack Energy - Galaxy Workover Pit for Produced Water

Jan 2013



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	BLM Karst Potential Map	Figure 8
	Mack Energy - Galaxy Workover Pit for Produced Water	Jan 2013

Figure 9 - FEMA Map



MAP SCALE 1" = 2000'

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

METE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2075D

FIRM

FLOOD INSURANCE RATE MAP

CHAVES COUNTY, NEW MEXICO

AND INCORPORATED AREAS

PANEL 2075 OF 3150

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHAVES COUNTY, UNINCORPORATED AREAS	350125	2075	D

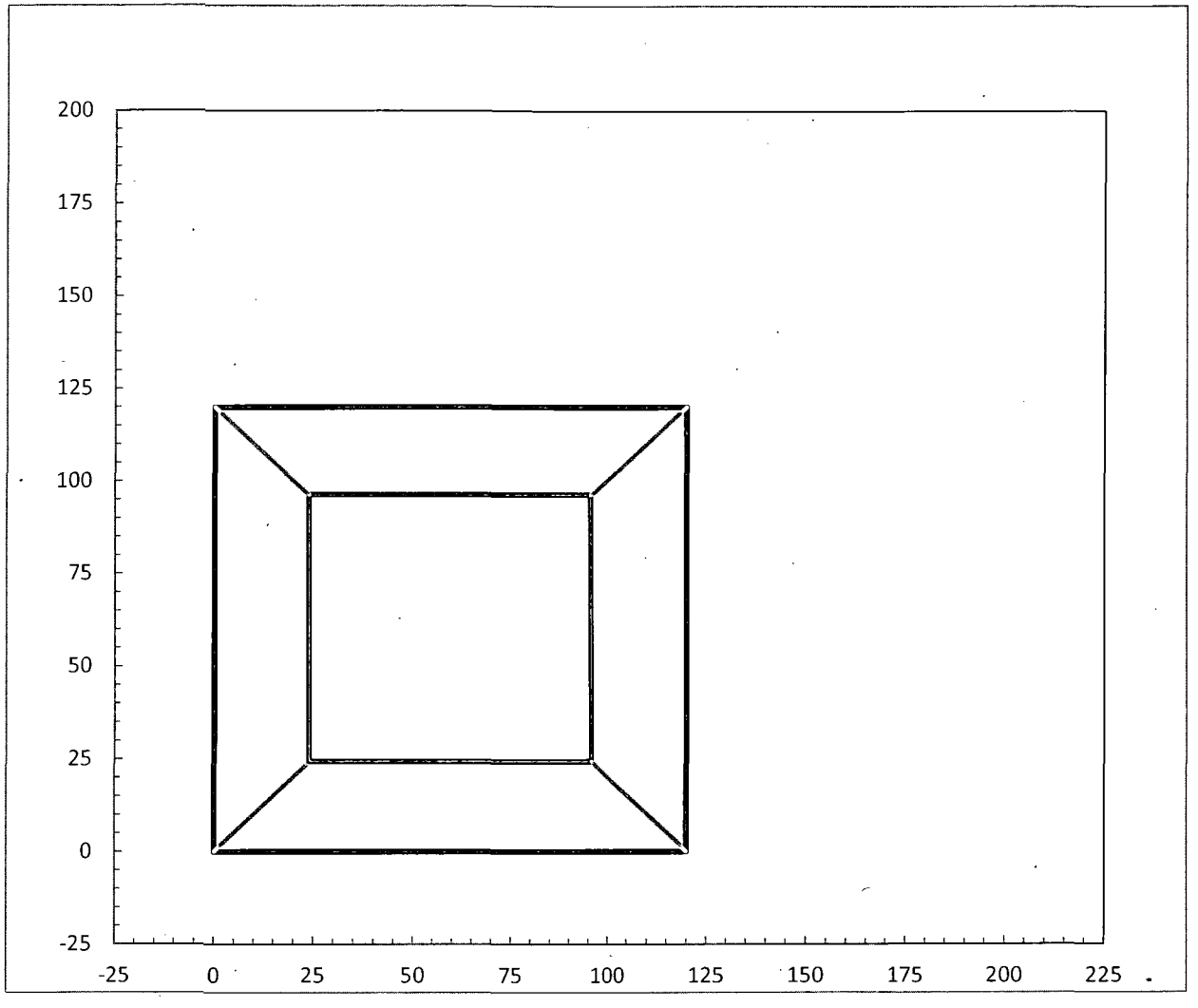
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
35005C2075D

EFFECTIVE DATE
SEPTEMBER 25, 2009

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



Slopes of Pit Horizontal Distance	2.00
Slopes of Pit Vertical Distance	1.00

Workover pit Dimensions	
Total Width (left right)	120.0
Total Length (up down)	120.0
Depth	12.0
Length of Divider	0.0
Divider Width	0.0
Width of discharge floor	24.0
Width of suction floor	0.0

Total Capacity 20,107.58 bbls
Fluid Capacity 15,312.46 bbls with 2-feet freeboard

North

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

Drawing of Workover Pit

Mack Energy - Galaxy State #1 Workover Pit

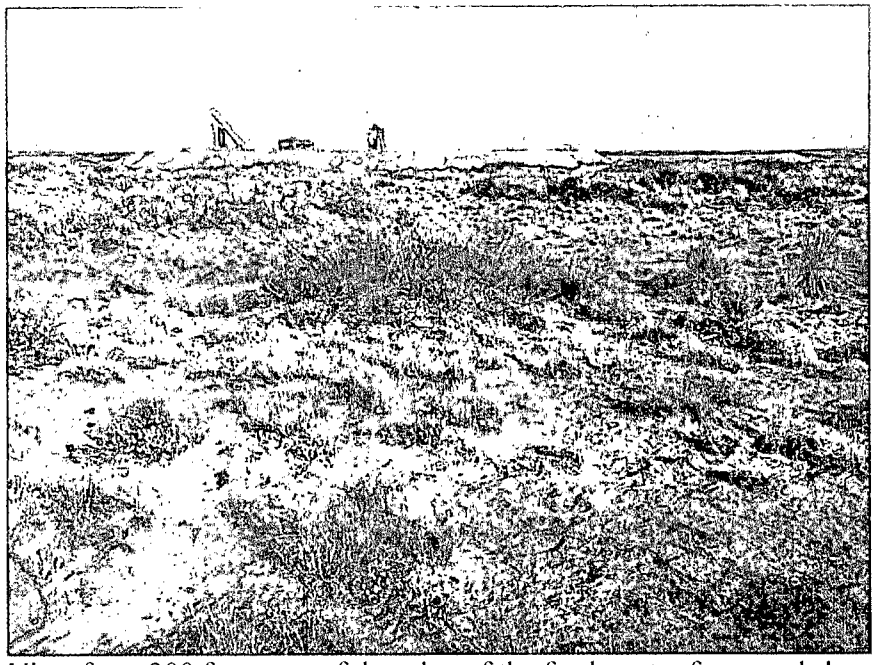
Plate 1

Jan 2014

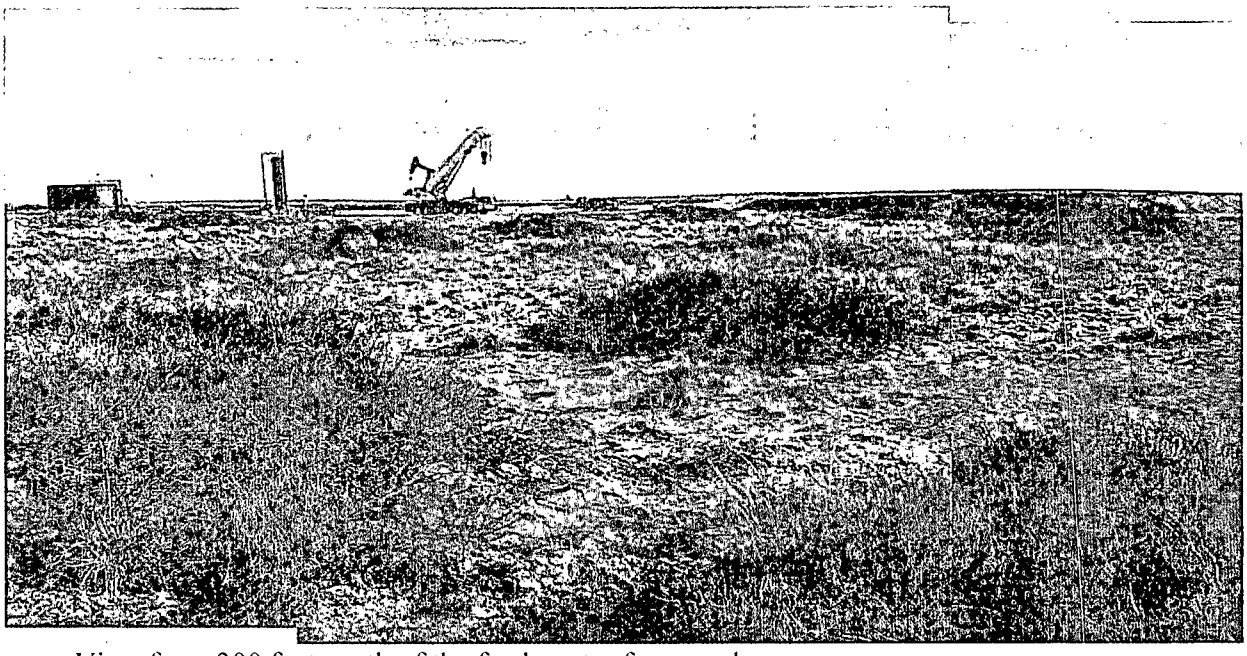
Site Inspection Photographs

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

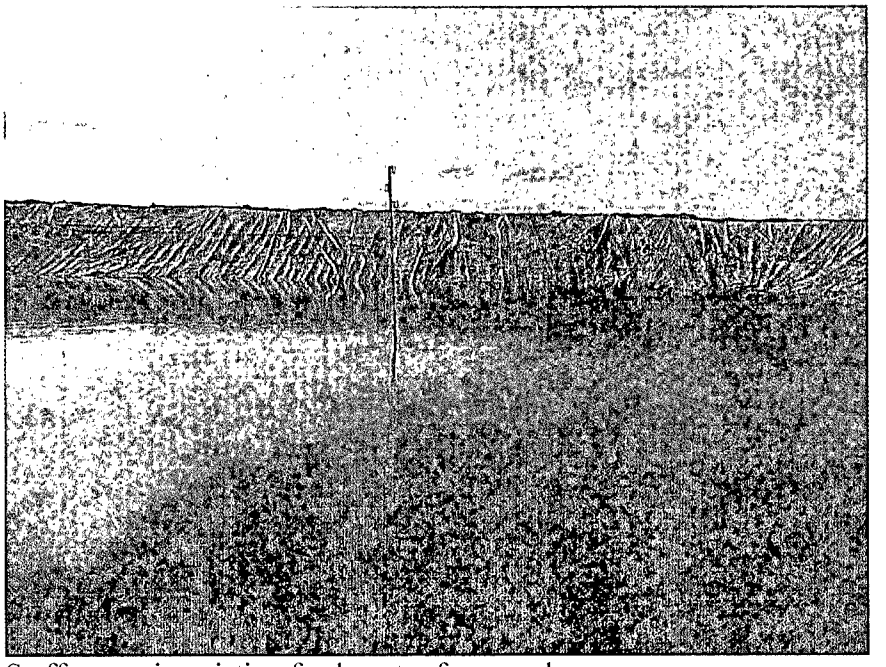
Randall T. Hicks of Hicks Consultants conducted a site inspection of the proposed Galaxy State #1 workover pit location on January 9, 2014. Photographs documenting the nature of the existing fresh water frac pond, which will serve as the foundation for the workover pit and the surrounding area are presented below.



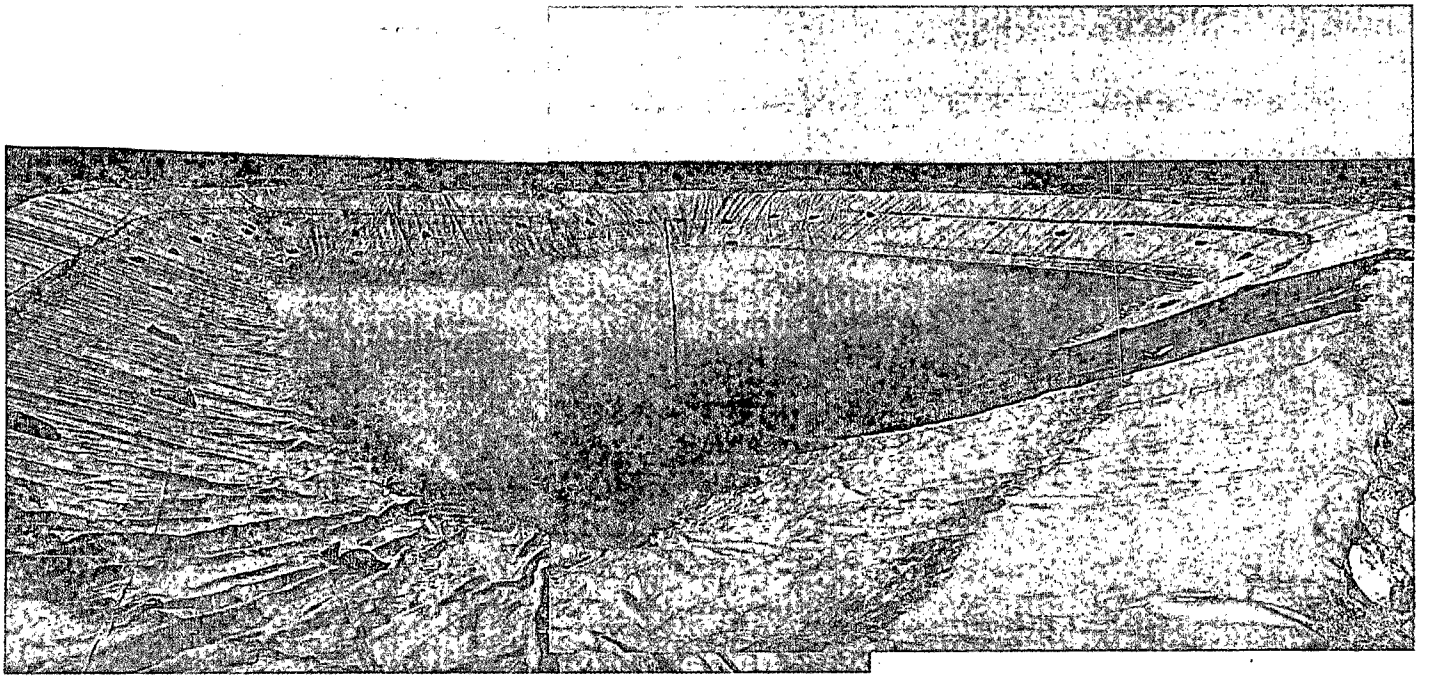
View from 300 feet west of the edge of the fresh water frac pond showing the stabilized dunes that characterize the area.



View from 300 feet south of the fresh water frac pond



Staff gauge in existing fresh water frac pond



View from the southeast corner of the existing fresh water frac pond.

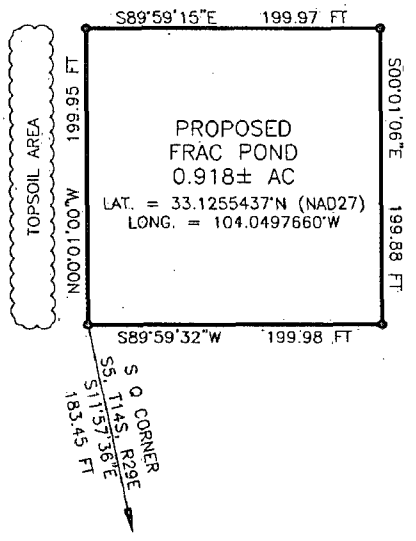
Survey Information

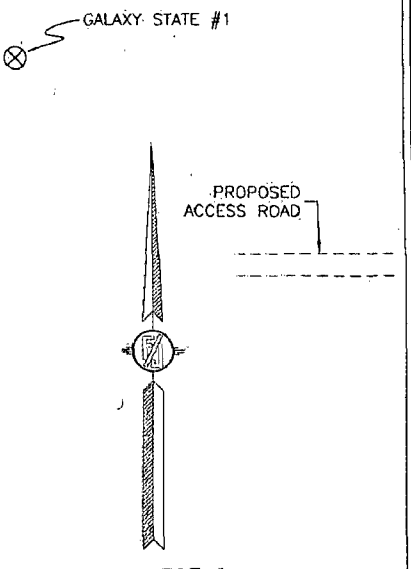
R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

GALAXY STATE #1 FRAC POND

MACK ENERGY CORPORATION
IN THE S/2 SW/4 SE/4 OF
SECTION 5, TOWNSHIP 14 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

AUGUST 15, 2013





DIRECTIONS TO LOCATION
FROM THE INTERSECTION OF CR 161 (KATRINA) AND CR 27 (TERESA) GO NORTH ON CR 27 FOR APPROX. 3.2 MILES. TURN SOUTHWEST ON 2-TRACK ROAD (NORTH OF CATTLE GUARD) GO SOUTHWEST-WEST APPROX. 1.2 MILES. CONTINUE NORTHWEST APPROX. 500'. LOCATION IS APPROX. 700' WEST.

LEGEND
● SET #4 REBAR W/JARAMILLO CAP

100 0 100
Scale: 1" = 100'

DESCRIPTION

A CERTAIN PIECE OR PARCEL OF LAND AND REAL ESTATE LYING IN THE S/2 SW/4 SE/4 OF SECTION 5, TOWNSHIP 14 SOUTH, RANGE 29 EAST N.M.P.M., CHAVES COUNTY, NEW MEXICO.

BEGINNING AT THE SOUTHWEST CORNER OF THE PARCEL, WHENCE THE SOUTH QUARTER CORNER OF SECTION 5, TOWNSHIP 14 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S11°57'36"E, A DISTANCE OF 183.45 FEET;
THENCE N00°01'00"W A DISTANCE OF 199.95 FEET TO THE NORTHWEST CORNER OF THE PARCEL;
THENCE S89°59'15"E A DISTANCE OF 199.97 FEET TO THE NORTHEAST CORNER OF THE PARCEL;
THENCE S00°01'06"E A DISTANCE OF 199.88 FEET TO THE SOUTHEAST CORNER OF THE PARCEL;
THENCE S89°59'32"W A DISTANCE OF 199.98 FEET TO THE SOUTHWEST CORNER OF THE PARCEL, TO THE POINT OF BEGINNING;
CONTAINING 0.918 ACRES MORE OR LESS.

GENERAL NOTES
1.) THE INTENT OF THIS SURVEY IS TO ACQUIRE A BUSINESS LEASE FOR THE PURPOSE OF BUILDING A FRAC POND

2.) BASIS OF BEARING IS NEW MEXICO STATE PLANE EAST ZONE

SURVEYOR CERTIFICATE

I, FILIMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 19TH DAY OF AUGUST 2013

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

FILIMON F. JARAMILLO PLS 12797

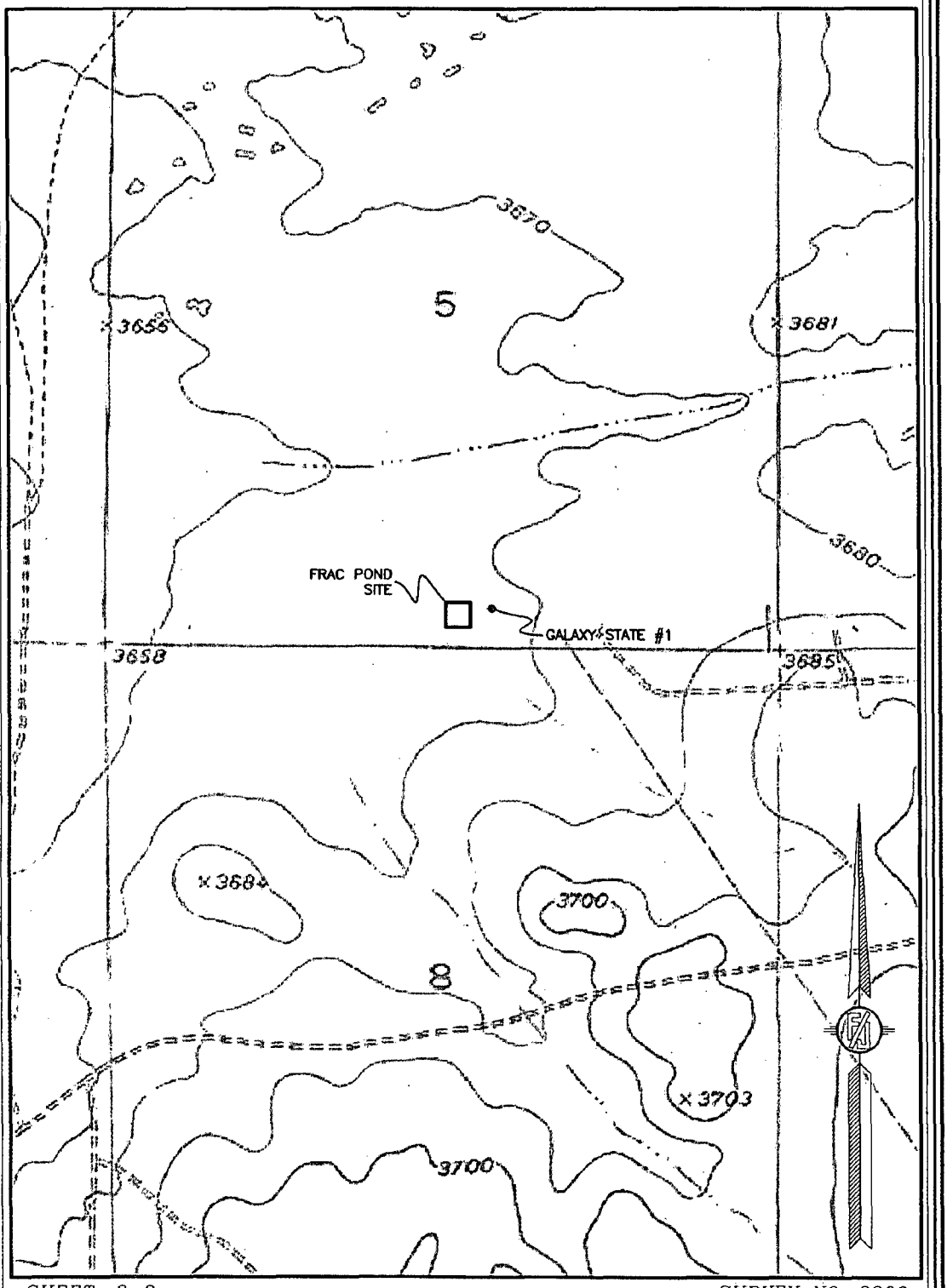
GALAXY STATE #1 FRAC POND

MACK ENERGY CORPORATION

IN THE S/2 SW/4 SE/4 OF
SECTION 5, TOWNSHIP 14 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

AUGUST 15, 2013

QUAD MAP



SHEET: 2-3 SURVEY NO. 2200

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

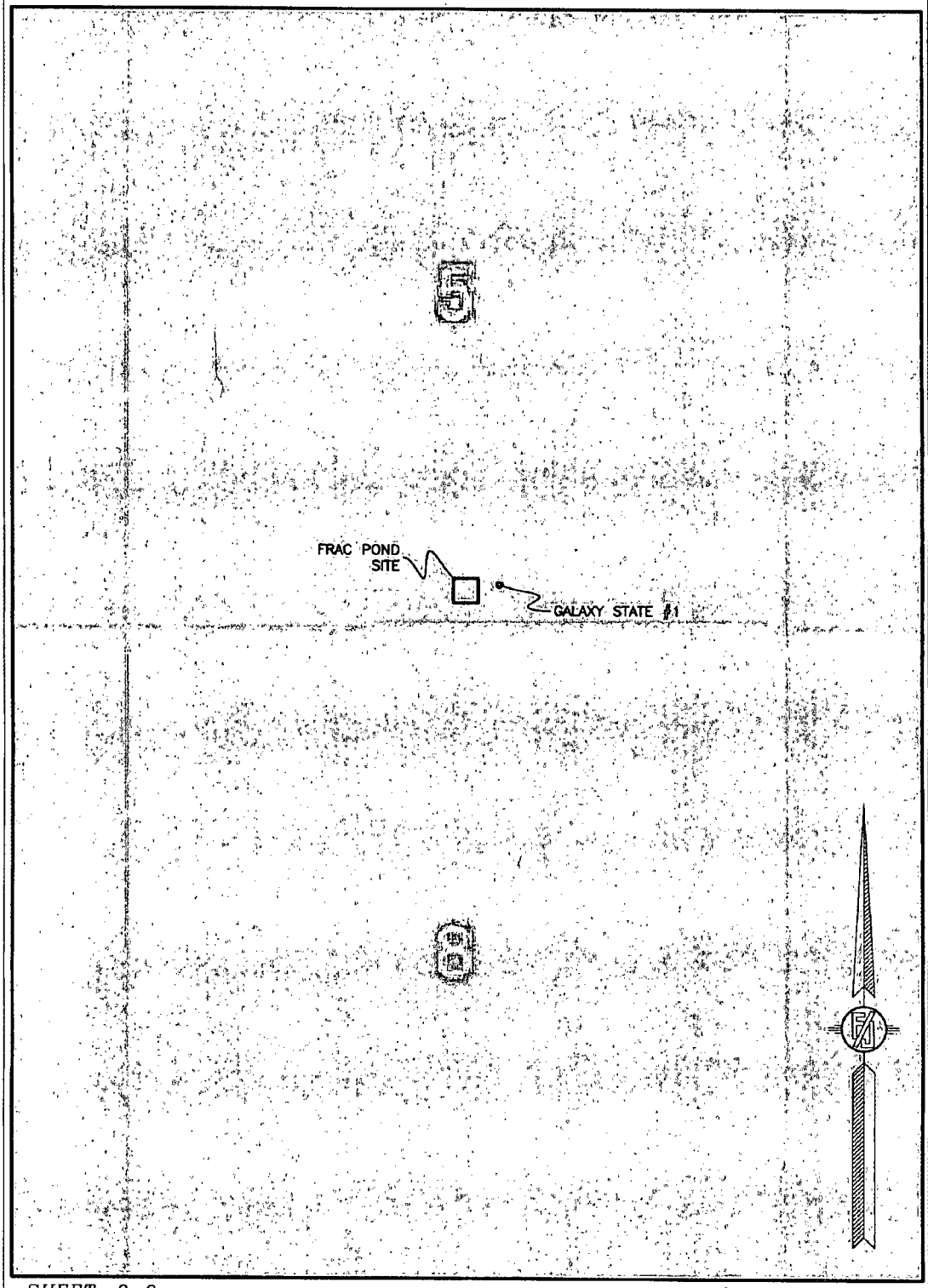
GALAXY STATE #1 FRAC POND

MACK ENERGY CORPORATION

IN THE S/2 SW/4 SE/4 OF
SECTION 5, TOWNSHIP 14 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

AUGUST 15, 2013

AERIAL PHOTO



SHEET: 3-3

SURVEY NO. 2200

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

Plans for Workover Pit

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

Temporary Pit Design/Construction Plan

Plate 1 shows the design of the temporary workover pit proposed for this project. The workover pit will store treated produced water for use in E&P operations in lieu of fresh water. The workover pit will be constructed over an existing fresh water "frac pond". Appendix A presents photographs of the existing frac pond.

The design features of the proposed workover pit include

1. A primary liner consisting of 30-mil LLDPE (specifications attached)
2. A 16-oz geotextile drainage mat beneath the primary liner (see specifications)
3. The existing 20-mil string reinforced LLDPE liner as the secondary liner (see specifications)
4. A 2-inch diameter leak detection port (PVC) that is placed between the primary and secondary liner.

The existing fresh water frac pond is square with rounded corners and will serve as the foundation for the proposed temporary workover pit. The perimeter distance of the frac pond measures 480 feet and the depth from the top of the pond levee to the bottom of the pit is 12 feet. Site inspection photographs of the frac pond are attached to this application.

The side slopes of the existing frac pond are 2H:1V. Therefore, the volume of the frac pond and the proposed workover pit is approximated as a square pit with sides of 120 feet; and the values are shown below:

Total Volume	844,521	gallons	2.59174	acre-feet	20,107.64	bbls
Fluid Volume (2-ft freeboard)	643,125	gallons			15,312.50	bbls

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.

Construction/Design Plan of Temporary Pit

Stockpile Topsoil

Prior to constructing the existing frac pond, the qualified contractor striped and stockpiled the topsoil for use as the final cover or fill at the time of closure. The soil stockpile is part of the above-grade levee. Attachment A provides information regarding the construction of the frac pond

Signage

The operator has posed an upright sign in a conspicuous place in compliance with 19.15.16.8 NMAC as the pit is located at one of the wells operated by the same operator that will be served by this temporary workover pit. The signage at the Galaxy State #1 well also provides emergency telephone numbers.

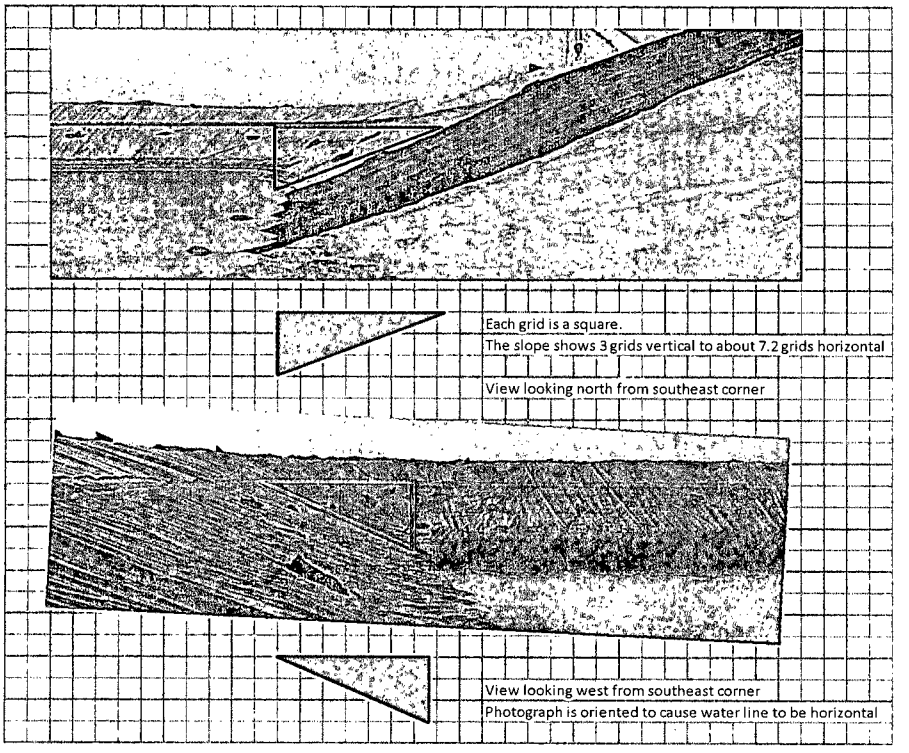
Fencing:

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

Earthwork

As stated in Appendix A, the existing frac pond has a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities (see attached letter). After filling and emptying the frac pond once, there is no evidence of liner strain or tears. Nor is there any evidence of erosion or slumping associated with the levee that surrounds the existing frac pond.

The slopes of the pit will be no steeper than two horizontal feet to one vertical foot (2H:1V) because the existing frac pond, on which the temporary workover pit will be constructed, exhibits this same 2H:1V slope. Below are two views of the existing frac pond showing the 2H:1V slopes.



As the existing frac pond is elevated above ground surface, a berm or ditch need not surround the temporary pit to prevent run-on of surface water.

Liner Installation

The primary geomembrane liner will consist of 30-mil string reinforced LLDPE, as indicated above. The primary 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 is described in the Appendix.

The secondary liner is the existing liner in the frac pond. It is 20-mil string reinforced LLDPE, as indicated above. The secondary liner is composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Geotextile material underlies the secondary liner. Appendix A provides additional information regarding the lining of the existing frac pond.

For the primary liner, 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 a thick, 16-oz geotextile material under the primary liner to act as a drainage mat for leak detection.
8. anchor the edges of all liners in the bottom of a compacted earth-filled trench that is at least 18 inches deep

After installation of the primary liner is complete, the operator will install a manifold and diverter for the inflow and outflow from the pit 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. The inflow and outflow system to deliver treated produced water to the pit and to E&P operations consists of

- A produced water pipeline that originates at the Runway SWD #1 in Unit B Section 20 14S 29E and terminates at the treatment system located at the Galaxy State 1H location
- A 4-inch HDPE pipeline that transfers treated produced water from the treatment system to the the bottom of the double-lined pit (the inflow pipe)
- At the termination of the inflow pipe, a Y coupling connects the 4-inch HDPE delivery pipe to two 6-inch pipes that extend across the bottom of the pit
- The upper half of the 6 inch pipe is perforated (drilled 2-inch holes) to cause the inflow water to move upward into the pit rather than downward onto the liner
- The outflow pipe originates at the bottom of the pit using the same system of perforated 6-inch pipe and Y-coupling as described above
- The 6-inch outflow pipe connects to a pump that delivers the water for stimulation of various wells, some of which are listed in the Operations and Maintenance Plan
- Between the primary liner and all inflow and outflow piping is a thick layer of felt that is secured to the bottom of the pit by welded strips of liner and/or sandbags.

As the top of the workover pit is about 3-6 feet above ground surface, a berm or ditch will not surround the temporary pit to prevent run-on of surface water.

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 maintain the integrity of the liner to prevent contamination of fresh water and protect public health and the environment. Solids, other than blow-sand, are not expected to accumulate in the workover pit.

The purpose of this workover pit is to facilitate the use of produced water in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment. If re-use of any residual fluids in the workover pit not possible, the fluids will be sent to disposal at a division-approved facility (i.e. the Runway SWD #1, API 30-005-64109)

In addition to a workover planned for the Galaxy State #1 well (30-005-64165), the following wells will be stimulated using produced water stored in the workover pit:

Mosquito State #1	30-005-64167
Skyray State #1	30-005-64169
Tomcat State #1	30-005-64171
Warthog State #1	30-005-64177
Crusader State #1	30-005-64178
Skyhawk State #1	30-005-64181
Hercules State #1	30-005-64182
Corsair State #1	30-005-64186
Hornet State #1	30-005-64185
Citation State #1	30-005-64184
Racer State #1	30-005-64166

The operator will identify additional wells scheduled for stimulation. However, the pit will not be used (contain produced water) for longer than 6-months.

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 installs and use the header and diverter described in the design/construction plan in order to prevent damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes during injection or withdrawal of liquids.

As described in the design/construction plan, diversion ditches and berms around the pit are not necessary to prevent the collection of surface water run-on.

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

The operator will only discharge treated produced water, untreated produced water or fresh into the pit.

The operator will maintain the temporary pit free of miscellaneous solid waste or debris. Immediately after cessation of workover operations on any well, 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 remove all free fluids from the temporary pit within 60 days from the date that the last workover rig (stimulation 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).

Monitor, Inspection, and Reporting Plan

Mack will inspect the pit weekly while the pit contains treated or untreated water and document such inspections at least monthly until the pit is closed. In addition to weekly inspections, Mack will perform a more detailed "low water" inspection on a weekly basis after a stimulation event empties the pit.

On a weekly basis Mack will

- Visually inspect the liner. If a liner's integrity is compromised, or if any penetration of the liner occurs above the water surface, then Mack will notify the appropriate Division district office within 48 hours (phone or email).
- Mack will inspect the system for injection or withdrawal of liquids from the pits and document that the design prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes is working appropriately (see Design and Construction Plan for data relating to this equipment).
- Mack will inspect the pond surface for visible oil
- Mack will measure the freeboard

On a monthly basis Mack will:

- Inspect the levee around the pit to check for erosion and collection of surface water run-on.
- Measure H_2S concentrations on the down-wind side of the pit that is nearly full

- Inspect the leak detection system for evidence of damage or malfunction and monitor for leakage (see Design and Construction Plan for data relating to this equipment).
- Inspect the pits for dead migratory birds and other wildlife. Within 30 days of discovery, Mack will report such findings to the appropriate wildlife agency and to the appropriate Division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

Pit Inspection Form Galaxy State #1 Workover Pit

Month Jun-14

Day	Weekly	Low Water	Activity	Monthly	Staff Gauge	Comments
1 - Sun						
2	x				8.75	Gate unlocked upon arrival - notified Lee, no birds in pit
3					9	
4					9	
5			x			Water transfer to frac - pipes are good
6			x			Water transfer to frac - pipes are good
7		x			2.5	No visible liner problems
8					3	
9	x				3.5	All OK - no oil on surface, no birds in pit
10					4	
11					4.5	
12					5	
13					5.25	
14					5.75	
15				x	6.25	No fluid in ports, outer berm and stormater diversion OK, H2S - no alarm,
16					7	
17					7.75	
18					8	
19	x				8.5	All OK
20					8.75	
21					9	
22			x			Water transfer to frac - no problems
23			x			Water transfer to frac - no problems
24		x			1.75	No visible liner problems
25					2.25	
26	x				3.75	High wind - liner is OK, no birds
27					4.75	
28					5.5	
29					6.75	
30					7.75	
31					8.5	

C-144 Supplemental Information: Closure Plan
Workover Pit for Produced Water Storage

The workover pit is expected to contain a small volume of solids, the majority of which will be windblown sand and dust with some mineral precipitates from the water.

Closure Notice

Mack will not commence closure without first obtaining approval of the closure plan submitted with the C-144 application. To allow for review time and site inspection, Mack will notify the Division's Artesia office at least 60 days prior to cessation of operations and provide a proposed schedule for closure. Mack will close the permitted workover pit within 60 days of cessation of operation of the pit or after 6 months of operation (fluid in the pit) in accordance with an approved closure plan.

At least 72 hours, but not more than one week, prior to any closure activities, Mack will notify the surface owner (State Land Office) by certified mail, return receipt requested. This notice will include the project name and location description.

Excavation and Removal Closure Plan – Protocols and Procedures

1. Mack will remove all liquids from the pits and either:
    a. Dispose of the liquids in a division-approved facility (e.g. Runway SWD #1, API 30-005-64109), or
    b. Recycle, reuse or reclaim the water for reuse in drilling and stimulation.
2. Mack will remove all solid pit contents and transfer those materials to the following division-approved facility:
    Disposal Facility Name: R360 Permit Number NM 01-0006
3. If approved by NMOCD, the pit liners may be recycled for use in secondary containment structures for tank batteries rather than sent to R360 for disposal.
4. After the removal of the pit contents and liners, soils beneath the workover pit will be tested as follows
    a. Collect a five-point (minimum) composite from beneath the pit liner sample to include any obviously stained or wet soils, or any other evidence of impact from the pit for laboratory analyses for the constituents listed in Table I of 19.15.17.13 NMAC.
    b. If any concentration is higher than the parameters listed in Table I, additional delineation may be required and closure activities will not proceed without Division approval.
5. If all constituents' concentrations are less than or equal to the parameters listed in Table I, then Mack will proceed to backfill the former pit location in accordance with the **Soil Cover Design** (below) with non-waste containing, uncontaminated, earthen material blended to the surrounding topography and arranged in a manner that prevents surface erosion.
6. Re-vegetation as outlined below

Soil Cover Design

Mack will backfill the former pit locations and the soil cover will consist of

1. 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.
2. Either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater, over the 3-foot earth material.

3. Contours to blend with the surrounding topography and to prevent erosion of the cover and ponding over the cover.

Closure Documentation

1. Within 60 days of closure completion, Mack 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.
2. In the closure report, Mack will certify that all information in the report and attachments is correct and that Mack has complied with all applicable closure requirements and conditions specified in the approved closure plan.

Reclamation and Re-vegetation

Mack will reclaim to a safe and stable condition that existed prior to oil and gas operations and that blends with the surrounding undisturbed area

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.

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

1. Replace topsoils and subsoils to their original relative positions
2. Grade so as to achieve erosion control, long-term stability and preservation of surface water flow patterns
3. 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.

Mack will notify the Division when the surface grading work element of reclamation is complete.

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

Appendix A

Information on Construction and Liners

AKOME, INC.

P.O. Box 2038 • Hobbs, N.M. 88241-2038 • Phone 575 393-2910 • Fax 575 397-0042

January 13, 2014

To whom it may concern,

The Mack Galaxy Frac Pit was smooth and free from any objects that could compromise the liner.

The liner was 20mil string reinforced liner with only one field seam needed. The seam was done using a Wedge It wedge welder. The seam was thoroughly inspected. All remaining seams were factory seams, which were also inspected after field installation.

An eight ounce (8oz.) geotextile felt apron was installed at fill and suction area of pit for protection of liner. The sandbags were put in to reduce shifting and stress of liner when not filled to full capacity.

Sincerely,

Jack Duffey

Akome, Inc.

RAVEN
INDUSTRIES

Raven Industries
821 W Algonquin St.
Sioux Falls, SD 57104

12/2/13

K30B

Dear RT Hicks Consultants,

K30B is a polyethylene geomembrane with string reinforcement that is resistant to UV light, salts, and acidic and alkaline solutions. The material has a hydraulic conductivity less than 1 x 10-9 cm/s. Test methods EPA SW-846 and EPA 9090A have not been performed on K30B.

The materials that Raven K30B is comprised of are compatible with the chemical components described in the water analysis provided by the RT Hicks Consulting firm. These compounds included ions: sodium, calcium, magnesium, barium, potassium, iron, strontium, manganese, chloride, sulfate, carbonate, and bicarbonate. The analysis also included a small amount of hydrogen sulfide and carbon dioxide. Stating these chemical species are compatible with the liner in this context means beneficial properties such as strength, elongation, and flexibility of the liner would not be significantly affected by long-term contact with the components described in the water analysis.

Sincerely,

Justin Norberg

Justin Norberg
Product Development Specialist
Engineered Films Division
Raven Industries
1813 E Ave.
Sioux Falls, SD 57104
(605)335-0288
Justin.Norberg@Ravenind.com

DURA•SKRIM® K30B, K36B & K45B

Scrim Reinforced Polyethylene - NSF/ANSI Standard 61 Certified

RAVEN INDUSTRIES

Product Description

DURA•SKRIM® K30B, K36B and K45B are linear low density polyethylene geomembranes reinforced with a heavy dense scrim reinforcement. In addition to excellent dimensional stability the K-Series reinforcement provides unmatched tear and tensile strength. DURA•SKRIM® K-Series membranes are formulated with thermal and UV stabilizers to assure a long service life.

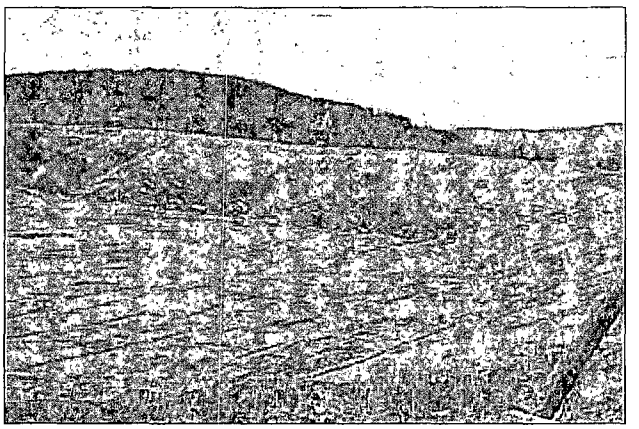
Product Use

DURA•SKRIM® K30B, K36B and K45B are used in applications that require exceptional outdoor life and demand high tear strength and resistance to thermal expansion.

DURA•SKRIM® K30B, K36B and K45B are manufactured from a very chemical-resistant, Linear Low Density Polyethylene with excellent cold crack performance. The DURA•SKRIM®, K30B, K36B & K45B are certified under the NSF/ANSI Standard 61, Drinking Water System Components - Health Effects.

Size & Packaging

DURA•SKRIM® K30B, K36B and K45B are available in a variety of widths and lengths to meet the project requirements. Large diameter mill rolls are available to assure an efficient seaming process. Factory welded panels are accordion folded and tightly rolled on a heavy-duty core for ease of handling and time saving installation.



Containment Liner

Product	Part #
DURA•SKRIM	K30B
DURA•SKRIM	K36B
DURA•SKRIM	K45B

APPLICATIONS

- Waste Lagoon Liners
- Floating Covers
- Daily Landfill Covers
- Modular Tank Liners
- Tunnel Liners
- Remediation Liners
- Earthen Liners
- Interim Landfill Covers
- Remediation Covers
- Landfill Caps
- Erosion Control Covers
- Canal Liners
- Disposal Pit Liner
- Water Containment Ponds
- Heap Leach Liner
- Secondary Containment Fertilizer

DURA•SKRIM® K30B, K36B & K45B

ISO 9001:2008 CERTIFIED MANAGEMENT SYSTEM

Scrim Reinforced Polyethylene - NSF/ANSI Standard 61 Certified

PRO-FORMA DATA SHEET

PROPERTIES	TEST METHOD	DURA•SKRIM K30B		DURA•SKRIM K36B		DURA•SKRIM K45B	
		Minimum Roll Averages	Typical Roll Averages	Minimum Roll Averages	Typical Roll Averages	Minimum Roll Averages	Typical Roll Averages
Appearance		Black	Black	Black	Black	Black	Black
Thickness		27 mil	30 mil	32 mil	36 mil	40 mil	45 mil
Weight lbs/msf, (oz/yd²)		116 (16.7)	125 (18.0)	136 (19.6)	155 (22.3)	175 (25.2)	200 (28.8)
Construction		Dense scrim reinforced polyethylene					
*Ply Adhesion - lbf/in	ASTM D 6636	17 or FTB	20 or FTB	21 or FTB	28 or FTB	24 or FTB	32 or FTB
Tensile Strength - lbf/in	ASTM D 7003	165 MD 159 TD	182 MD 170 TD	170 MD 166 TD	186 MD 175 TD	178 MD 170 TD	195 MD 180 TD
Tensile Elongation at Break % (film break)	ASTM D 7003	480 MD 430 TD	540 MD 500 TD	500 MD 450 TD	575 MD 520 TD	520 MD 470 TD	590 MD 550 TD
Tensile Elongation at Break % (scrim break)	ASTM D 7003	32 MD 32 TD	35 MD 35 TD	32 MD 32 TD	35 MD 35 TD	32 MD 32 TD	35 MD 35 TD
Tongue Tear Strength - lbf	ASTM D 5884	185 MD 160 TD	195 MD 185 TD	160 MD 120 TD	180 MD 140 TD	140 MD 120 TD	175 MD 145 TD
Grab Tensile - lbf (scrim break)	ASTM D 7004	260 MD 245 TD	270 MD 255 TD	280 MD 270 TD	300 MD 290 TD	260 MD 245 TD	270 MD 255 TD
Grab Tensile Elongation at Break % (scrim break)	ASTM D 7004	25	32	25	32	25	32
High Pressure OIT (HPOIT)	ASTM D 5885	1000 min	2400 min	1000 min	2400 min	1000 min	2400 min
Puncture Resistance - lbf	ASTM D 4833	85	100	110	120	120	133
Maximum Use Temperature		180° F		180° F		180° F	
Minimum Use Temperature		-70° F		-70° F		-70° F	

*Raven modified QC procedure

PRO-FORMA Sheet Contents:

The data listed in this Pro-Forma data sheet is representative of initial production runs. These values may be revised at anytime without notice as additional test data becomes available.

DURA•SKRIM® K30B, K36B and K45B are linear low density polyethylene geomembranes reinforced with a heavy dense scrim reinforcement. In addition to excellent dimensional stability the K-Series reinforcement provides unmatched tear and tensile strength. DURA•SKRIM® K-Series membranes are formulated with thermal and UV stabilizers to assure a long service life.

RAVEN INDUSTRIES

Engineered Films Division
P.O. Box 5107
Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333

Toll Free: 800-635-3456
Email: efdsales@ravenind.com
www.ravenefd.com

1/11 EFD 1251

Scan QR Code to download current technical data sheets via the Raven website.

BULLSEYE
CONSTRUCTION LLC

Oil Conservation Division
511 South 1st Street
Artesia, NM 88210

Dear Sirs:

Bullseye Construction LLC constructed a fresh water frac pond adjacent to the Galaxy State # 1 well, located in Section 5, TI4S R29E 330 FSL & 2310 FEL. Bulldozers were used to push material from the inside out. The excavated depth of the pit is 4' below ground level. Cut material was used to build the levee that lies above ground level. The walls were compacted and smoothed using the dozer to walk up and down levee. The slopes of the levee are built at a 2.5H:1 V slope. The levee is 7' above ground level. Pit was lined by Akome, Inc. The pit was then fenced using four strand barbed wire to prevent livestock entry.

Sincerely,
BULLSEYE CONSTRUCTION LLC

C. Jerry Sherrell
Manager

CJS/jws

PO Box 1112
Artesia, NM 88211-1112
Office 575.746.5183
Fax 575.746.9539
jerrysherrell@bullseyeconstruction.us.com