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 August 1, 2011

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

10667

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

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

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

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

1.
Operator: Logos Operating, LLC OGRID #: 289408
Address: 4001 North Butler Avenue, Building 7101 Farmington, NM 87401
Facility or well name: Logos #3
API Number: 30-043-21135 OCD Permit Number: _____
U/L or Qtr/Qtr ___P___ Section ___5___ Township ___22N___ Range ___6W___ County: Sandoval
Center of Proposed Design: Latitude 36.16253° N Longitude 107.48650° W NAD: ☐1927 ☒ 1983
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Pit:** Subsection F or G of 19.15.17.11 NMAC
Temporary: ☒ Drilling ☐ Workover
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A
☒ Lined ☐ Unlined Liner type: Thickness ___20___ mil ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced
Liner Seams: ☒ Welded ☒ Factory ☐ Other _____ Volume: ___8,000___ bbl Dimensions: L__130_ x W__60__ x D__10__

RCVD NOV 28 '12
OIL CONS. DIV.
DIST. 3

3.
☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC
Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Applies to activities which require prior approval of a permit or notice of intent)
☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other _____
☐ Lined ☐ Unlined Liner type: Thickness _____ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other _____
Liner Seams: ☐ Welded ☐ Factory ☐ Other _____

4.
☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC
Volume: _____ bbl Type of fluid: _____
Tank Construction material: _____
☐ Secondary containment with leak detection ☐ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☐ Other _____
Liner type: Thickness _____ mil ☐ HDPE ☐ PVC ☐ Other _____

5.
☐ **Alternative Method:**
Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

20

6.

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

☐ Chain link, six feet in height, two strands of barbed wire at top *(Required if located within 1000 feet of a permanent residence, school, hospital, institution or church)*

☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet

☒ Alternate. Please specify 4' hog wire with one strand of barbed wire on top

7.

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

☐ Screen ☐ Netting ☐ Other

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

8.

Signs: Subsection C of 19.15.17.11 NMAC

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

☒ Signed in compliance with 19.15.16.8 NMAC

9.

Administrative Approvals and Exceptions:

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

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

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

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

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

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

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

11.
Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

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

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

12.
Closed-loop Systems Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

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

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

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

13.
Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

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

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

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

Proposed Closure Method:
- ☐ Waste Excavation and Removal
- ☐ Waste Removal (Closed-loop systems only)
- ☒ On-site Closure Method (Only for temporary pits and closed-loop systems)
  - ☒ In-place Burial ☐ On-site Trench Burial
- ☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

15.
Waste Excavation and Removal Closure Plan Checklist: (19.15.17.13 NMAC) ***Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.***

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

16.

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

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

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

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

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

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

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

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

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

17.

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

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

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

18.

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

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

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

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

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

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

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

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

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

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

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

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

19.
Operator Application Certification:

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

Name (Print): John C. Thompson Title: Engineer

Signature: John C. Thompson Date: 11/27/2012

e-mail address: john@walsheng.net Telephone: (505) 327-4892

20.
OCD Approval: ☒ Permit Application (including closure plan) ☐ Closure Plan (only) ☐ OCD Conditions (see attachment)

OCD Representative Signature: Jonathan D. Kelly **Approval Date:** 12/10/2012

Title: Compliance Officer **OCD Permit Number:**

21.
Closure Report (required within 60 days of closure completion): Subsection K of 19.15.17.13 NMAC

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

☐ **Closure Completion Date:**

22.
Closure Method:

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

☐ If different from approved plan, please explain.

23.
Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:

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

Disposal Facility Name: Disposal Facility Permit Number:

Disposal Facility Name: Disposal Facility Permit Number:

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

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

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

☐ Site Reclamation (Photo Documentation)

☐ Soil Backfilling and Cover Installation

☐ Re-vegetation Application Rates and Seeding Technique

24.
Closure Report Attachment Checklist: ***Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.***

☐ Proof of Closure Notice (surface owner and division)

☐ Proof of Deed Notice (required for on-site closure)

☐ Plot Plan (for on-site closures and temporary pits)

☐ Confirmation Sampling Analytical Results (if applicable)

☐ Waste Material Sampling Analytical Results (required for on-site closure)

☐ Disposal Facility Name and Permit Number

☐ Soil Backfilling and Cover Installation

☐ Re-vegetation Application Rates and Seeding Technique

☐ Site Reclamation (Photo Documentation)

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

25.
Operator Closure Certification:

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

Name (Print): Title:

Signature: Date:

e-mail address: Telephone:

Hydro geological report for Logos #3

Regional Hydro geological context:

The Logos #3 is located on federal land in Sandoval County, New Mexico. The well location is on the valley floor between two very minor drainages that run north and eventually drain into Largo Wash. The area around the location is mainly gently rolling sage brush covered hillsides of primarily dry, sandy soil with occasional boulders. Numerous small arroyos drain to the north.

A records search of the NM Office of the State Engineer – iWATERS database indicates that the closest known water well is 5450 meters away in Section 22, T23N, R6W. The depth to ground water is not listed but the well was drilled to 280'. The next well is 7777 meters away in Section 18, T23N, R6W. The depth to ground water is 200' and the well was drilled to 1500'.

Geologic maps of the area indicate that the surface formation at the proposed well site is the San Jose formation. The San Jose Formation of Eocene age occurs in New Mexico and Colorado and its outcrop forms the land surface over much of the eastern half of the central basin. It overlies the Nacimiento Formation in the area generally south of the Colorado – New Mexico State line and overlies the Animas Formation in the area generally north of the State line.

The San Jose Formation was deposited in various fluvial-type environments. In general, the unit consists of an interbedded sequence of sandstone, siltstone and variegated shale. Thickness of the San Jose Formation generally increases from west to east (200 feet in the west and south to almost 2,700 feet in the center of the structural basin).

Ground water is associated with alluvial and fluvial sandstone aquifers. Thus, the occurrence of ground water is mainly controlled by the distribution of sandstone in the formation. The distribution of such sandstone is the result of original depositional extent plus any post-depositional modification, namely erosion and structural deformation. Transmissivity data for San Jose Formation are minimal. Values of 40 and 120 feet squared or measured discharge from 46 water wells completed in San Jose Formation ranges from 0.15 to 61 gallons per minute and the median is 5 gallons per minute. Most of the wells provide water for livestock and domestic use.

The San Jose Formation is a very suitable unit for recharge from precipitation because soils that form on the unity are sandy and highly permeable and therefore readily absorb precipitation. However, low annual precipitation, relatively high transpiration and evaporation rates, and deep dissection of the San Jose Formation by the San Juan River and its tributaries all tend to reduce the effective recharge of the unit.

Stone et al, 1983, Hydrogeology and Water Resources of the San Juan Basin, New Mexico Socorro, New Mexico Bureau of Mines and Mineral Resources Hydrologic Report 6, 70p

Site specific information:

Surface hydrology:	The site is located at the upper end of the Largo Wash drainage and is drained by a number of small intermittent drainages
1st water-bearing formation:	San Jose, tertiary
Formation thickness:	200 - 700 feet
Underlying formation:	Nacimiento, Tertiary
Depth to groundwater:	Unknown. The closest water well in the valley bottom has a surface elevation 50' lower that the well pad.

need more site specific

LOGOS
RESOURCES LLC

4001 N. Butler Ave, Building 7101
Farmington, NM 87401
Phone: (505) 436-2627
kgraham@logosresourcesllc.com

Date: December 5, 2012

To: Jonathan Kelly, Compliance Officer - NMOCD

Re: C-144 Supporting Documents - Update to the Hydro Geological Report for the Logos #3

Dear Mr. Kelly,

Per your request, Logos Operating, LLC has modified the Depth to Ground Water verbiage on the Hydro Geological Report for the Logos #3 (Section 5, T22N, R6W, UL P) in Sandoval County, New Mexico. Please see attached.

Regards,

Kristy Graham
Director of Administration and Engineering Support

Hydro geological report for Logos #3

Regional Hydro geological context:

The Logos #3 is located on federal land in Sandoval County, New Mexico. The well location is on the valley floor between two very minor drainages that run north and eventually drain into Largo Wash. The area around the location is mainly gently rolling sage brush covered hillsides of primarily dry, sandy soil with occasional boulders. Numerous small arroyos drain to the north.

A records search of the NM Office of the State Engineer – iWATERS database indicates that the closest known water well is 5450 meters away in Section 22, T23N, R6W. The depth to ground water is not listed but the well was drilled to 280'. The next well is 7777 meters away in Section 18, T23N, R6W. The depth to ground water is 200' and the well was drilled to 1500'.

Geologic maps of the area indicate that the surface formation at the proposed well site is the San Jose formation. The San Jose Formation of Eocene age occurs in New Mexico and Colorado and its outcrop forms the land surface over much of the eastern half of the central basin. It overlies the Nacimiento Formation in the area generally south of the Colorado – New Mexico State line and overlies the Animas Formation in the area generally north of the State line.

The San Jose Formation was deposited in various fluvial-type environments. In general, the unit consists of an interbedded sequence of sandstone, siltstone and variegated shale. Thickness of the San Jose Formation generally increases from west to east (200 feet in the west and south to almost 2,700 feet in the center of the structural basin).

Ground water is associated with alluvial and fluvial sandstone aquifers. Thus, the occurrence of ground water is mainly controlled by the distribution of sandstone in the formation. The distribution of such sandstone is the result of original depositional extent plus any post-depositional modification, namely erosion and structural deformation. Transmissivity data for San Jose Formation are minimal. Values of 40 and 120 feet squared or measured discharge from 46 water wells completed in San Jose Formation ranges from 0.15 to 61 gallons per minute and the median is 5 gallons per minute. Most of the wells provide water for livestock and domestic use.

The San Jose Formation is a very suitable unit for recharge from precipitation because soils that form on the unity are sandy and highly permeable and therefore readily absorb precipitation. However, low annual precipitation, relatively high transpiration and evaporation rates, and deep dissection of the San Jose Formation by the San Juan River and its tributaries all tend to reduce the effective recharge of the unit.

Stone et al, 1983, Hydrogeology and Water Resources of the San Juan Basin, New Mexico Socorro, New Mexico Bureau of Mines and Mineral Resources Hydrologic Report 6, 70p

Site specific information:

Surface hydrology:	The site is located at the upper end of the Largo Wash drainage and is drained by a number of small intermittent drainages
1st water-bearing formation:	San Jose, tertiary
Formation thickness:	200 - 700 feet
Underlying formation:	Nacimiento, Tertiary
Depth to ground water:	Unknown. Due to the elevation difference of greater than 115' between the Logos #3 and the north branch of the Venado Canyon, we believe the depth to ground water is greater than 100' below the bottom of the pit.

FEMA Map – 100 year floodplain

The attached FEMA Map indicates that the proposed location is well outside 100 year floodplain.

Siting Criteria Compliance Demonstrations

The Logos #3 is not located in an unstable area. The location is not over a mine and is not on the side of a hill. The location of the excavated pit material will not be located within 300' of any continuously flowing watercourse or 200' from any other watercourse.

Logos Operating, LLC
Logos #3
Temporary Reserve Pit Application
Siting Criteria

1. According to the iWaters Database from the State Engineers Office, the closest known water well is 5450 meters from the Logos #3 location in Section 22, T23N, R6W and was drilled to a depth of 280'. See attached printout.

2. As shown on the attached topographic map and aerial photos, there are no continuously flowing watercourses within 300' of the well, or any significant watercourses, lakebeds, sinkholes or playa lakes within 200' of the well.

3. There are no permanent residences, schools, hospitals, institutions, or churches within 300' of the well.

4. There are no domestic water wells or springs within 500' of the well. See iWaters Database printout.

5. The well is not located within any municipal boundaries.

6. The well is not within 500' of any wetlands. See attached topographic map and aerial photos.

7. There are no subsurface mines in Section 5, T22N, R6W. See attached map from the NM EMNRD Mining and Mineral Division.

8. The Logos #3 is not located in an "unstable" area. The location is not over a mine and is not on the side of a hill. The location of the excavated pit material will not be located within 300' of a continuously flowing watercourse or 200' from any other watercourse.

9. The well is not located in a 100-year floodplain as visible on the topographic map and the FEMA Flood Insurance Rate Map.

10. In the event that the composite pit sample that is mixed 3:1 with native soils does not meet the requirements for onsite burial, the pit contents will be removed and disposed of at the Envirotech Land Farm #2 (NMOCD Permit #11).

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Code	Subbasin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
SJ 01506			SA	1	1	3	22	23N	06W	278535	4010015*	5450	280		
SJ 01156			RA	2	2	1	18	23N	06W	274330	4012555*	7777	1500	200	1300

Average Depth to Water: **200 feet**

Minimum Depth: **200 feet**

Maximum Depth: **200 feet**

Record Count: 2

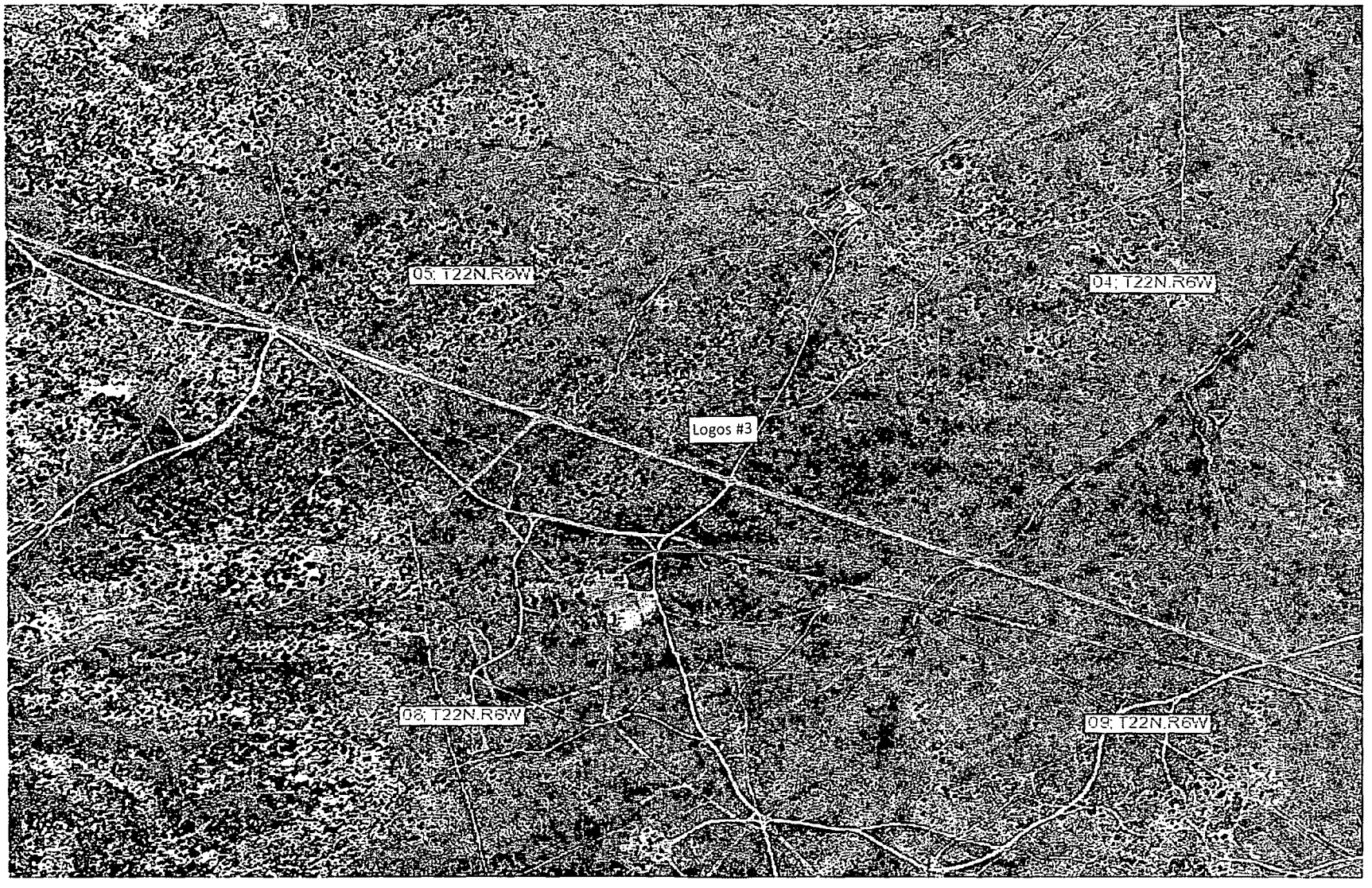
Basin/County Search:

Basin: San Juan

UTMNAD83 Radius Search (in meters):

Easting (X): 276318 **Northing (Y):** 4005036 **Radius:** 10000

***UTM location was derived from PLSS - see Help**

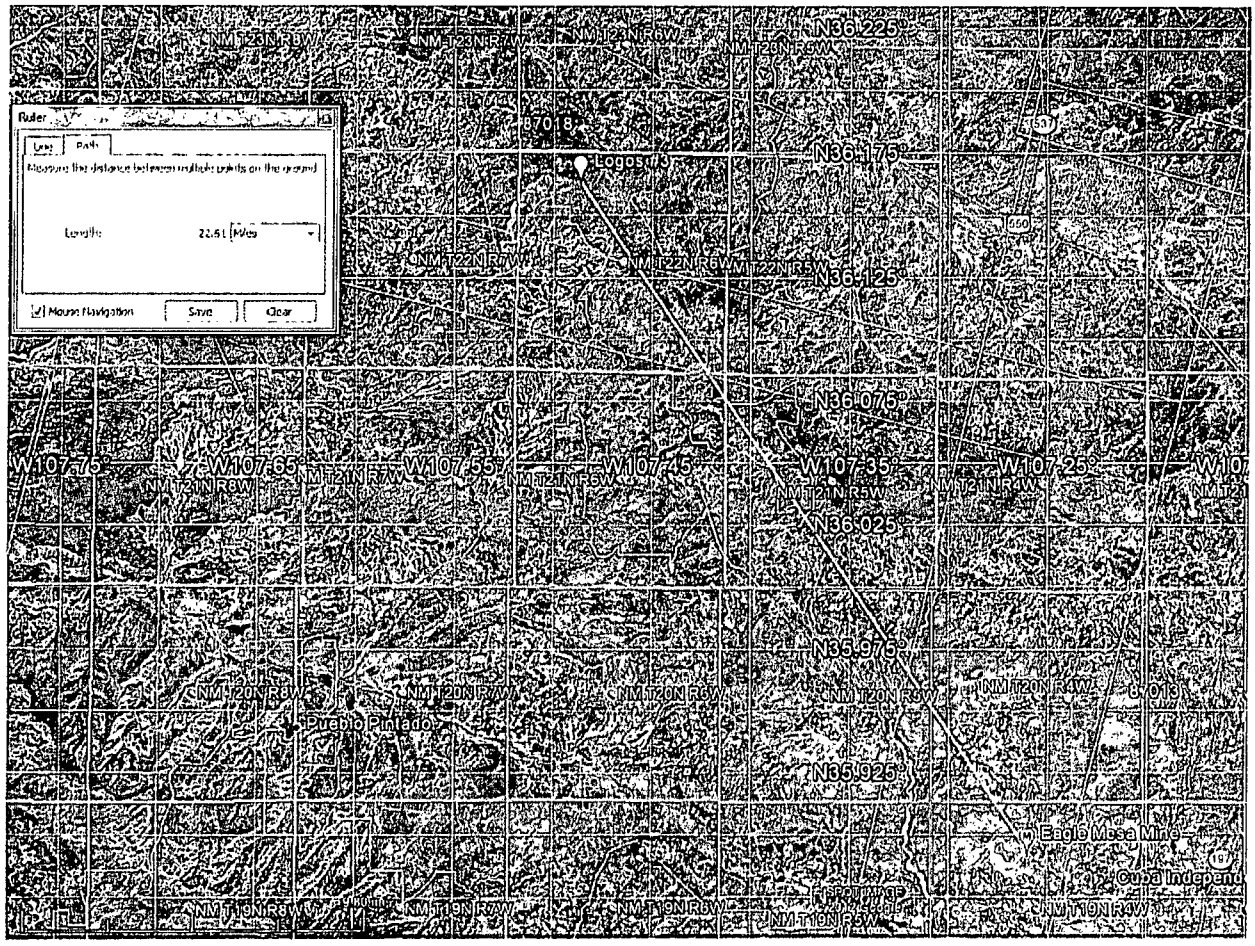


0 500 1000ft

N
W E
S

Petroleum Recovery Research Center	Logos #3	Figure: ##
	Logos Operating, LLC	Nov 08, 2012

Mines, Mills & Quarries

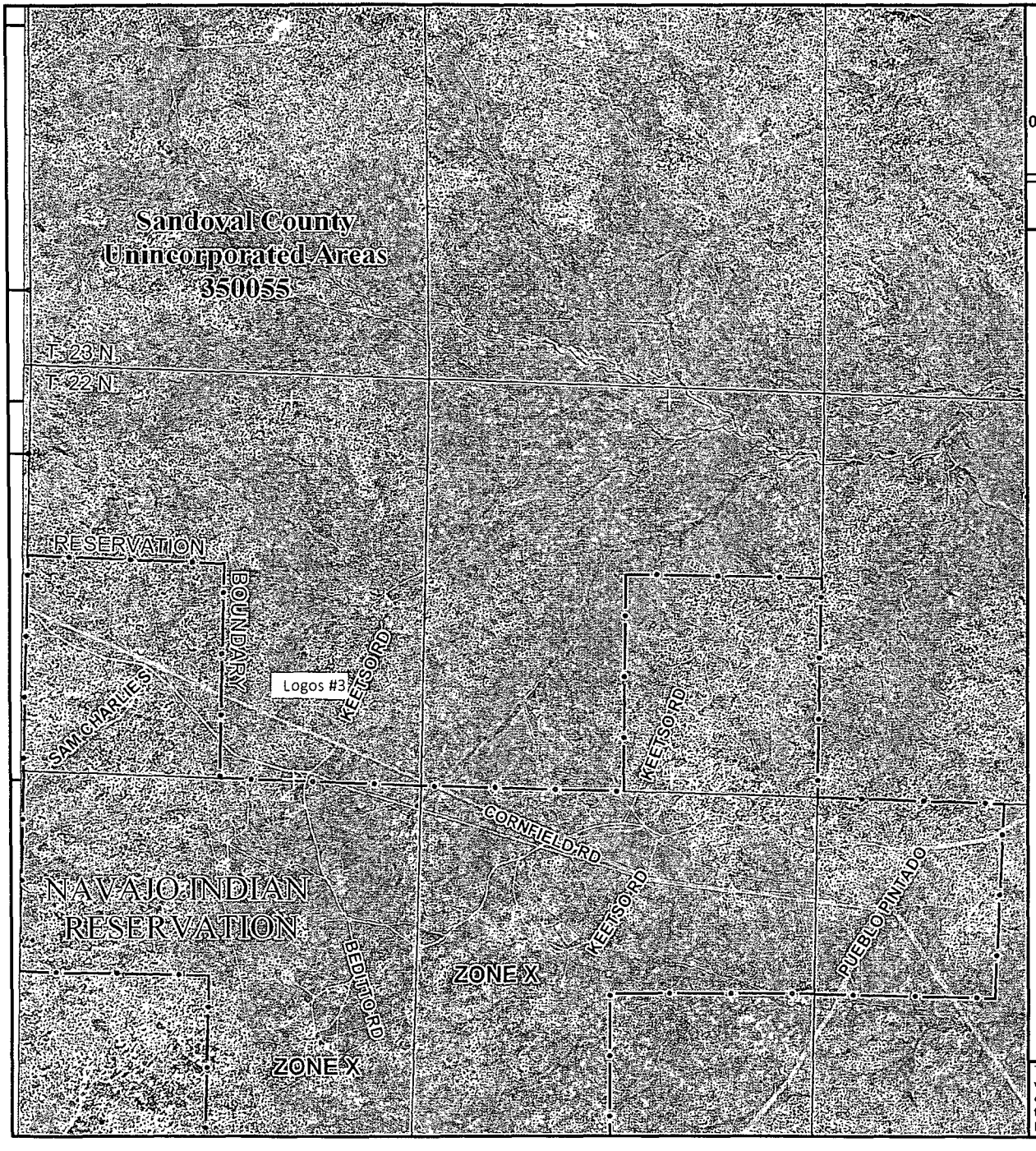


Logos #3 - Latitude 36.16253° N / Longitude 107.48650° W (NAD83)

Eagle Mesa Mine (Latitude 35.891403° N / Longitude 107.260122° W (NAD83) is closest to the Logos #3 @ 22.61 miles away.

Data Source: New Mexico Active Mines, Feb 2012 spreadsheet
http://www.emnrd.state.nm.us/MMD/gismapminedata.html

Name	County	Commodities	Quads	LatitudeDDNAD83	LongitudeDDNAD83
Bernalillo Pit	Sandoval	Aggregate	Bernalillo	35.311183	106.540252
American Gypsum Bernalillo Plant	Sandoval	Gypsum	Bernalillo	35.329920	106.528010
Placitas Pit	Sandoval	Aggregate, Clay & Shale	Bernalillo, Placitas	35.332000	106.505220
Santa Ana Pit	Sandoval	Aggregate, Other	Bernalillo, Placitas	35.354613	106.497892
Baca Pit	Sandoval	Aggregate	Placitas	35.361341	106.466132
Bar J Pit	Sandoval	Aggregate	San Felipe Pueblo NE	35.408843	106.414142
Santo Domingo Pit	Sandoval	Aggregate	San Felipe Pueblo NE	35.457187	106.274943
White Mesa Mine	Sandoval	Gypsum	San Ysidro	35.534694	106.799204
Pena Blanca Ulibarri Pit	Sandoval	Aggregate	Santo Domingo Pueblo	35.567481	106.336330
Cochiti Pumice Pit No. 1	Sandoval	Pumice	Canada	35.665224	106.364162
San Luis Mine	Sandoval	Humate	San Luis	35.690455	107.086325
U.S. Forest Service Mine	Sandoval	Pumice	Bear Springs Peak	35.738118	106.612346
Eagle Mesa Mine	Sandoval	Humate	Ojo Encino Mesa	35.891403	107.260122
Menefee Mill	Sandoval	Humate	San Pablo	35.989027	106.956868



MAP SCALE 1" = 2000'

000 0 2000 4000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0075D

FIRM

FLOOD INSURANCE RATE MAP

SANDOVAL COUNTY, NEW MEXICO

AND INCORPORATED AREAS

PANEL 75 OF 2225

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SANDOVAL COUNTY, UNINCORPORATED AREAS	350055	0075	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
35043C0075D

MAP REVISED
MARCH 18, 2008

Federal Emergency Management Agency

Logos Operating, LLC
San Juan Basin
Pit Design and Construction Plan

In accordance with Rule 19 15 17 the following information describes the design and construction for temporary pits on Logos Operating Company's locations; this is Logos Operating's standard procedure for all temporary pits. A separate plan will be submitted for any temporary pit that does not conform to this plan.

General Plan

1. Logos Operating will design and construct a temporary pit to contain liquids and solids and prevent contamination of fresh water and protect public health and environment
2. Prior to constructing the pit, topsoil will be stockpiled in the construction zone for later use in restoration
3. Logos Operating will post a well sign, not less than 12' by 14', on the well site prior to construction of the temporary pit. The sign will list the operator on record as the operator, the location of the well by unit letter, section, township rang, and emergency telephone numbers
4. Logos Operating shall construct all new fences unitizing 48' steel mesh field-fence (hogwire) on the bottom with a single strand of barbed wire on top. T-posts shall be installed every 12 feet and corners shall be anchored utilizing a secondary T-post. Temporary pits will be fenced at all times excluding drilling or overwork operations, when the front side of the fence will be temporarily removed for operational purposes
5. Logos Operating shall construct the temporary pit so that the foundation and interior slopes are firm and free of rocks, debris, sharp edges or irregularities to prevent liner failure
6. Logos Operating shall construct the pit so that the slopes are no steeper than two horizontal feet to 1 vertical foot
7. Pit walls will be walked down by a crawler type tractor following construction
8. All temporary pits will be lined with a 20-mil, string reinforced, LLDPE liner, complying with EPA SW-846 method 9090A requirements
9. Geotextile will be installed beneath the liner when rocks, debris, sharp edges or irregularities cannot be avoided
10. All liners will be anchored in the bottom of a compacted earth-filled trench at least 18 inches deep
11. Logos Operating will minimize liner seams and orient them up and down, not across a slope. Factory seams will be used whenever possible. Logos Operating will ensure all field seams are welded by qualified personnel. Field seams will be overlapped four to six inches and will be oriented parallel to the line of maximum slope. Logos Operating will minimize the number of field seams in corners and irregularly shaped areas
12. The liner shall be protected from any fluid force or mechanical damage through the use of mud pit slides, or a manifold system
13. The pit shall be protected from run-off by constructing and maintaining diversion ditched around the location or around the perimeter of the pit in some cases
14. The volume of the pit shall not exceed 10 acre-feet, including freeboard
15. Temporary blow pits will be constructed to allow gravity flow to discharge into lined drill pit
16. The lower half of the blow pit (nearest lined pit) will be lined with the same 20 mil liner. The upper half of the blow pit will remain unlined as allowed in Rule 19 15 17 11 F 11
17. Logos Operating will not allow freestanding liquids to remain on the unlined portion of temporary blow pit

Logos Operating, LLC
San Juan Basin
Maintenance and Operating Plan

In accordance with Rule 19 15 17 the following information described the operation and maintenance of temporary pits on Logos Operating Company locations. This is Logos Operating's standard procedure for all temporary pits. A separate plan will be submitted for any temporary pit that does not conform to this plan.

General Plan

1. Logos Operating will operate and maintain a temporary pit to contain liquids and solids and prevent contamination of fresh water and protect public health and environment
2. Logos Operating will conserve drilling fluids by transferring liquids to pits ahead of the rigs whenever possible. All other drilling fluids will be disposed at Basin Disposal, Inc. Permit # NM-01-005
3. Logos Operating will not discharge or store any hazardous waste in any temporary pit
4. If any pit liner's integrity is compromised or if any penetration of the liner occurs above the liquid's surface, then Logos Operating shall notify the Aztec Division office by phone or email within 48 hours of the discovery and repair the damage or replace the liner
5. If a leak develops below the liquid's level, Logos Operating shall remove all liquids above the damaged liner within 48 hours and repair the damage or replace the liner. Logos Operating shall notify the Aztec Division office by phone or email within 48 hours of the discovery for leaks less than 25 barrels. Logos Operating shall notify the Aztec division office as required pursuant to Subsection B of 19 15 3 116 NMAC shall be reported within twenty-four (24) hours of discovery of leaks greater than 25 barrels. In addition, immediate verbal notification pursuant to Subsection B, Paragraph (1) and Subparagraph (d) of 19 15 3 116 NMAC shall be reported to the division's Environmental Bureau Chief
6. The liner shall be protected from any fluid force or mechanical damage through the use of mud pit slides, or manifold system
7. The pit shall be protected from run-off by constructing and maintaining diversion ditches around the location or around the perimeter of the pit in some cases
8. Logos Operating shall immediately remove any visible layer or oil from the surface of temporary pit after cessation of a drilling or workover operation. Oil absorbent booms will be utilized to contain and remove oil from the pit's surface. An oil absorbent boom will be stored on-site until closure of pit
9. Only fluids generated during the drilling or workover process may be discharged into a temporary pit
10. Logos Operating will maintain the temporary pit free of miscellaneous solid waste or debris
11. During drilling or workover operations, Logos Operating will inspect the temporary pit at least once daily to ensure compliance with this plan. Inspections will be logged in the IADC reports. Logos Operating will file this log with the Aztec Division office upon closure of the pit
12. After drilling or workover operations, Logos Operating will inspect the temporary pit weekly so long as liquids remain in the temporary pit. A log of the inspections will be stored at Logos Operating's office electronically and will be filed with the Aztec Division office upon closure of the pit
13. Logos Operating shall maintain at least two feet of freeboard for a temporary pit
14. Logos Operating shall remove all free liquids from a temporary pit within 30 days from the date the operator releases the drilling or workover rig
15. Logos Operating shall remove all free liquids from a cavitations put within 48 hours after completing cavitations. Logos Operating may request additional time to remove liquids from Aztec Division office if it is not feasible to remove liquids within 48 hours

Logos Operating, LLC
San Juan Basin
Closure Plan

In accordance with Rule 19.15.17.12 NMAC the following information describes the closure requirements of temporary pits on Logos Operating Company's locations. This is Logos Operating's standard procedure for all temporary pits. A Separate plan will be submitted for any temporary pit that does not conform to this plan.

All closure activities will include proper documentation and be available for review upon request and will be submitted to OCD within 60 days of the pit closure. Closure report will be filed on C-144 and incorporated the following:

- Detail on Capping and Covering, where applicable
- Plot Plan (Pit diagram)
- Inspection reports
- Sampling Results
- C-105
- Copy of Deed Notice will be filed with County Clerk

General Plan

1. All free standing liquids will be removed at the start of the pit closure process from the pit and disposed of in a division-approved facility or recycle, reuse or reclaim the liquids in a manner that the appropriate division district office approves
2. The preferred method of closure for all temporary pits will be on-site burial, assuming that all criteria listed in sub-section (B) of 19.15.17.13 are met
3. The surface owner shall be notified of Logos Operating's proposed closure plan using a means that provides proof of notice i.e., certified mail, return receipt requested
4. Within 6 months of the Rig Off status occurring Logos Operating will ensure that temporary pits are closed, re-contoured, and reseeded
5. Notice of Closure will be given to the Aztec Division office between 72 hours and one week of closure via email, or verbally, The notification of closure will include the following:
    i. Operator's name
    ii. Location by Unit Letter, Section, Township, and Range. Well name and API Number
6. Liner of temporary pit shall be removed above "mud level" after stabilization. Removal of liner will consist of manually or mechanically cutting liner at mud level and removing all remaining liner. Care will be taken or remove "All" of the liner i.e., edges of liner entrenched or buried. All excessive liver will be disposed of at a licensed disposal facility
7. Pit contents shall be mixed with non-waste containing, earthen material in order to achieve the solidification process. The solidification process will be accomplished using a combination of natural drying and mechanically mixing. Pit contents will be mixed with non-waste, earthen material to a consistency that is deemed a safe and stable. The mixing ratio shall not exceed 3 parts clean soil to 1 part pit contents
8. A five point composite sample will be taken of the pit using sampling tools and all samples rested per Subsection B of 19.15.17.13(B)(1)(b). In the event that the criteria are not met, all contents will be handled per Subparagraph (a) of Paragraph (1) of Subsection B of 19.15.17.13 i.e., Dig and haul

Components	Tests Method	Limit (mg/Kg)
Benzene	EPA SW-846 8021B or 8260B	0.2
BTEX	EPA SW-846 8021B or 8260B	50
TPH	EPA SW-846 418.1	2500
GRO/DRO	EPA SW-846 8015M	500
Chlorides	EPA 300.1	1000

9 Upon completion of solidification and testing, the pit area will be backfilled with compacted, non-waste containing, earthen material. A minimum of four feet of cover shall be achieved and the cover shall include one foot of suitable material to establish vegetation at the site, or the background thickness of topsoil, whichever is greater

10 Re-contouring of location will match fit, shape, line, form and texture of the surrounding area. Re-shaping will include drainage control, prevent ponding, and prevent erosion. Natural drainages will be unimpeded and water bars and/or silt traps will be placed in areas where needed to prevent erosion on a large scale. Final re-contour shall have a uniform appearance with smooth surface, fitting the natural landscape

11 Notification will be sent to OCD when the reclaimed area is seeded

12 Logos Operating shall seed the distributed areas the first growing season after the operator closes the pit. Seeding will be accomplished via drilling on the contour whenever practical or by other division-approved methods. BLM or Forest Service stipulated seed mixed will be used on federal lands. Vegetative cover will equal 70% of the native perennial vegetative cover (un-impacted) consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintain that cover thorough twp successive growing seasons. Repeat seeding or planting will be continued until successful vegetative growth occurs

13 The temporary pit will be located with a steel marker, no less than four inches in diameter, cemented in a hole three feet deep in the center of the onsite burial upon the abandonment of all the wells on the pad. The marker will be a four foot tall riser with the operator's information at the time of all wells on the pad are abandoned. The operator's information will include the following: Operator Name, Lease Name, Well Name and Number, unit Number, Section, Township, Range and an indicator that the marker is an onsite burial location

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		WILDCAT DAKOTA

[4] Property Code	[5] Property Name	[6] Well Number
	LOGOS	3

[7] OGRID No.	[8] Operator Name	[9] Elevation
	LOGOS OPERATING, LLC	7181'

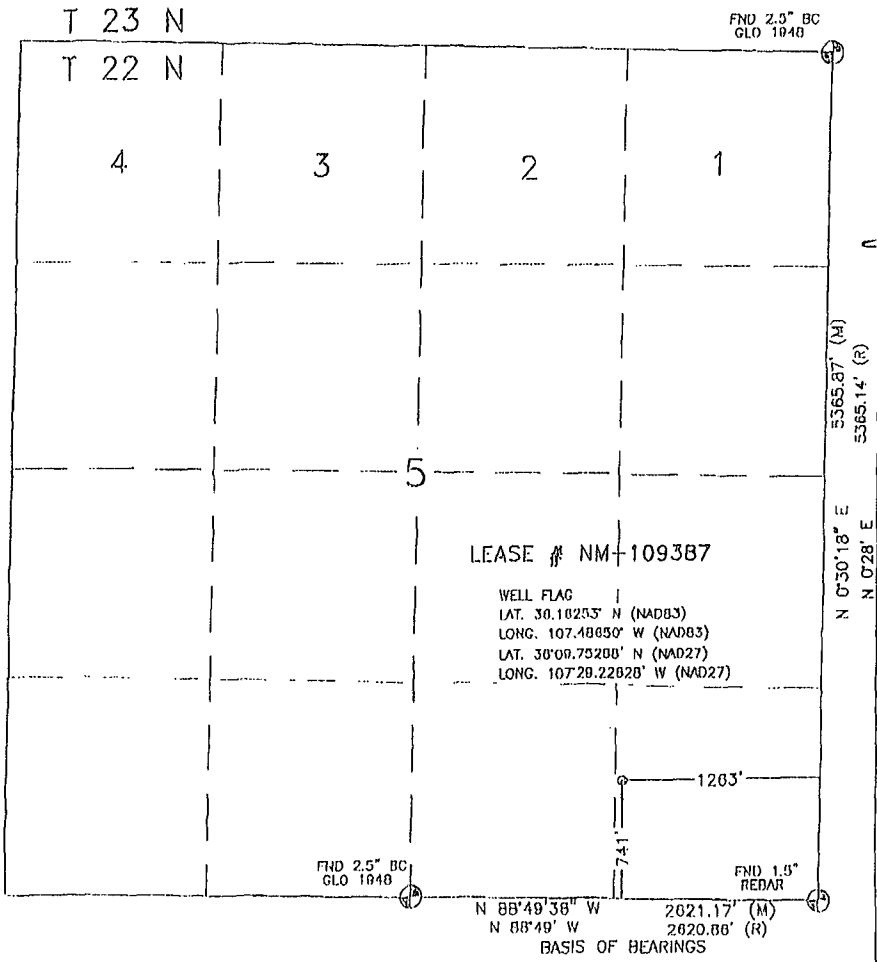
[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	5	22N	6W		741'	SOUTH	1263'	EAST	SANDOVAL

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

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



[17] OPERATOR CERTIFICATION

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

Signature — Date: 10/17/12

John C. Thompson
Printed Name

johnw@walsheng.net
E-mail Address

[18] SURVEYOR CERTIFICATION

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

OCTOBER 1, 2012
Date of Survey

Signature and Seal of Professional Surveyor:

NEW MEXICO — DAVID R. RUSSELL — 10201 — REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL
Certificate Number 10201

WELL FLAG
LATITUDE: 36.16253° N
LONGITUDE: 107.48650° W
CENTER OF PIT
LATITUDE: 36.16254° N
LONGITUDE: 107.48633° W
ELEVATION: 7171.0'
DATUM: NAD83 & NAVD88

NOTES:

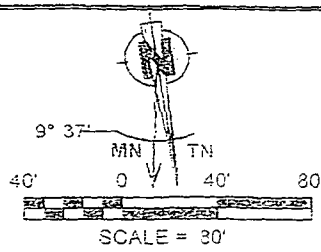
1.) BASIS OF BEARING: BETWEEN FOUND MONUMENTS AT THE SOUTHEAST CORNER AND THE SOUTH QUARTER CORNER OF SECTION 5, TOWNSHIP 22 NORTH, RANGE 6 WEST, N.M.P.M. SANDOVAL COUNTY, NEW MEXICO.
LINE BEARS: N 88°49'36" W A DISTANCE OF 2621.17 FEET AS MEASURED BY G.P.S.

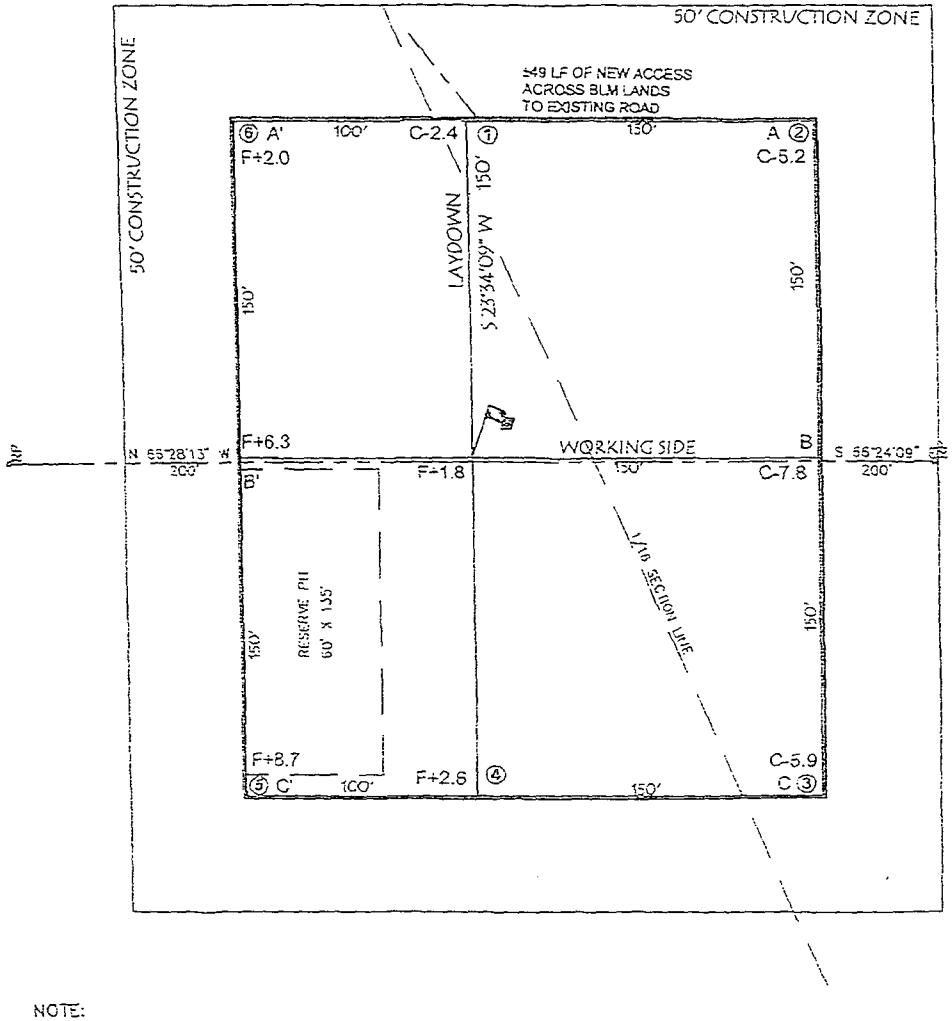
2.) LATITUDE, LONGITUDE AND ELLIPSOIDAL HEIGHT BASED ON AZTEC CORS L1 PHASE CENTER.
DISTANCES SHOWN ARE GROUND DISTANCES USING A TRAVERSE MERCATOR PROJECTION FROM A WGS84 ELLIPSOID, CONVERTED TO NAD83.
NAVD88 ELEVATIONS AS PREDICTED BY GEOID03.

3.) LOCATION OF UNDERGROUND UTILITIES DEPICTED ARE APPROXIMATE. PRIOR TO EXCAVATION UNDERGROUND UTILITIES SHOULD BE FIELD VERIFIED. ALL CONSTRUCTION ACTIVITIES SHOULD BE FIELD VERIFIED WITH NEW MEXICO ONE-CALL AUTHORITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

LOGOS OPERATING, LLC
LOGOS #3
741' FSL & 1263' FEL
LOCATED IN THE SE/4 SE/4 OF SECTION 5,
T22N, R6W, N.M.P.M.,
SANDOVAL COUNTY, NEW MEXICO
GROUND ELEVATION: 7181', NAVD 88
FINISHED PAD ELEVATION: 7183.0', NAVD 88

Plat #2





SLOPES TO BE CONSTRUCTED TO MATCH THE ORIGINAL CONTOURS AS CLOSE AS POSSIBLE.

TOTAL PERMITTED AREA
350' x 400' = 3.21 ACRES
SCALE: 1" = 80'
JOB No.: LGS006
DATE: 10/03/12
DRAWN BY: TWT

NOTE:
Scorpion Survey & Consulting, L.L.C., INC. IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES. CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED, BURIED PIPELINES OR CABLES ON WELL PAD, IN CONSTRUCTION ZONE AND/OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

Scorpion Survey & Consulting, L.L.C.
55 County Road 3312
Aztec, New Mexico 87410
(505) 333-2945