Western Refining

WNR LISTED NYSE

APPROVED

P1-06579

November 12, 2015

Mr. Jim Griswold, Chief
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Permit Application – Permanent Pit (Brine Pond)
Jal LPG Storage Facility
Lea County, New Mexico

Dear Mr. Griswold:

Western Refining Company, LP ("Western") proposes to construct an additional 300,000 barrel brine storage pond at the above referenced Facility. The additional storage capacity is necessary to increase utilization of the LPG storage wells. The Permanent Pit Application (Form C-144), civil construction plans stamped by a professional engineer and supporting documentation are attached to this letter.

Western is requesting a variance to allow construction of a 49 ac-ft pond consisting of approximately 300,000 barrels (~38.7 acre-feet) of brine storage and 10.3 ac-ft of freeboard capacity. As you know, 19.15.17.11.G(10) NMAC limits the size of permanent pits to 10 ac-ft including freeboard volume. Without the variance, five ponds would be required to meet the additional storage requirements. Operationally, it seems better to have a single system to monitor for leaks than to have to manage five.

Western will contact your office in the next few weeks to discuss the permit application. If there are any questions, please contact Mr. Allen Hains at (915) 534-1483.

Sincerely,

Bruce D. Davis
Director, Commercial Coordination and Special Projects

Attachments

cc Ken Parker, Western Refining
Allen Hains, Western Refining

Pit Permit Application

Proposed Brine Pond
Jal LPG Storage Facility
Lea County, New Mexico

Prepared for and submitted by:

Western Refining, LLP

6501 Trowbridge Drive

El Paso, Texas

(915)775-3206

Prepared by:

JCB Engineering, Inc.

89 Camino Alto

Sandia Park, New Mexico

(505)281-6694

TABLE OF CONTENTS

This document is the Western Refining Company, L. P. permit application for the proposed pond at the Jal LPG Storage facility. In addition to the Form C-144, the required supporting documents are included as part of this permit application package. This application has been organized into the following sections:

Section

1

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-144
Revised June 6, 2013

For temporary pits, below-grade tanks, and multi-well fluid management pits, submit to the appropriate NMOCD District Office.
For permanent pits submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

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

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

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

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

1.

Operator: Western Refining Company, L. P._____ OGRID #:248440_____

Address: 6501 Trowbridge Drive, El Paso, Texas _____

Facility or well name: Jal LPG Storage Facility

API Number: _____ OCD Permit Number:

U/L or Qtr/Qtr SW/4, SW/4 Section 32_____ Township 23S_____ Range 37E_____ County: Lea_____

Center of Existing Design: Latitude: 32 15' 21.4" Longitude: 103 11' 35.10" 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: Thickness60/60 ___mil ☐ LLDPE ☒ HDPE ☐ PVC ☐ Other

☐ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 305,384_bbl Dimensions: L 469.3' W 334' x D 24'

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: Remote facility with some fencing to prevent public access._____

6.

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

☐ Screen ☐ Netting ☒ Other: Fresh water is applied over brine water surface for bird protection

☒ 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. SEE LETTER END OF FORM.

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

10.

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

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

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

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

11.

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

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

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

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

12.

Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC

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

- ☒ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Climatological Factors Assessment
- ☒ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Quality Control/Quality Assurance Construction and Installation Plan
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☒ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Nuisance or Hazardous Odors, including H_2S, Prevention Plan
- ☒ Emergency Response Plan
- ☒ Oil Field Waste Stream Characterization
- ☒ Monitoring and Inspection Plan
- ☒ Erosion Control Plan
- ☒ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

13.

Proposed Closure: 19.15.17.13 NMAC

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

Type: ☐ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Multi-well Fluid Management Pit ☐ Alternative

Proposed Closure Method: ☐ Waste Excavation and Removal
☐ Waste Removal (Closed-loop systems only)
☐ On-site Closure Method (Only for temporary pits and closed-loop systems)
☐ In-place Burial ☐ On-site Trench Burial
☐ Alternative Closure Method

14.

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

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

15.

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

Instructions: Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria require justifications and/or demonstrations of equivalency. Please refer to 19.15.17.10 NMAC for guidance.

Ground water is less than 25 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☐ No ☐ NA
Ground water is between 25-50 feet below the bottom of the buried waste - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☐ No ☐ NA
Ground water is more than 100 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☐ No ☐ NA
Within 100 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☐ No
Within 300 horizontal feet of a private, domestic fresh water well or spring used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☐ No
Within 300 feet of a wetland. US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☐ No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance	

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

16.
On-Site Closure Plan Checklist: (19.15.17.13 NMAC) ***Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.***

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

17.
Operator Application Certification:

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

Name (Print): Bruce D. Davis Title: Director, Commercial Coordination and Special Projects

Signature: Bruce D. Davis Date: November12, 2015

e-mail address: bruce.davis@wnr.com Telephone: (602) 286-1929

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

OCD Representative Signature: _____ **Approval Date:** 02/08/2016

Title: Environmental Specialist **OCD Permit Number:** P1-06579

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: _____

JCB Engineering, Inc.
89 Camino Alto
Sandia Park, NM 87047
(505) 281-6694

October 22, 2015

Allen Hains, PE
Western Refining Company
123 W. Mills Ave.
El Paso, TX 79901

RE: Size Alternatives to Proposed New Brine Pond, Jal Facility

Dear Allen:

We have considered your question of meeting the size requirement of permanent pits under the Pit Rule. As you know, 19.15.17.11.G(10) limits the size of permanent pits to 10 ac-ft. However, we understand your operations require a brine storage capacity of 300,000 bbl, or 38.7 ac-ft. The pond has been designed to hold that volume plus freeboard. This will result in a single pond of 49 ac-ft, as currently designed, or 5 ponds, each with a capacity just under 10 ac-ft. We have not identified any other alternative that will meet your operational requirements.

Based on our review of the civil construction drawings, the proposed design satisfies the fresh water, public health, and environmental protection requirements of the Rule. Assuming the five ponds would be the same design, there is no benefit from a design standpoint to five ponds instead of one, other than to meet the size limit of the Rule. Operationally, it seems better to have a single system to monitor for leaks than to have to manage five. We have found that the simpler the operation, the more likely operators are to catch and resolve problems early.

The only problem we foresee with a single large impoundment over fives smaller ones, would be with the volume of release in the event of a berm breach. However, the operations plan and emergency action procedures, if followed, should provide adequate protection. Those plans are similar to what is normally required for dam safety. The pond as designed is a non-jurisdictional dam under the New Mexico Dam Safety Regulations, which would indicate the NM OSE Dam Safety bureau does not consider the public health risk of such an impoundment to be significant.

Furthermore, a berm breach of one pond within a cluster of five could cause additional failures, thereby releasing the same volume as in a single pond. It will be easier to control a single berm breach than up to five separate breaches. JCB Engineering did some preliminary berm breach and inundation modeling, which indicates a catastrophic breach of the berm would not result in significant offsite hazards.

JCB Engineering, Inc.
89 Camino Alto
Sandia Park, NM 87047
(505) 281-6694

It is therefore our opinion that the current design of the brine pond will result in equal or better protection of fresh water, public health, and the environment than would be provided by the alternative of multiple smaller ponds to meet the Pit Rule size requirement.

Should you have any additional questions or alternatives, please do not hesitate to contact me at (505) 281-6694 or by email at mbrazie@jcbengineering.com.

Sincerely,
JCB Engineering, Inc.

Mike E. Brazie, PE
Vice President

Section 2

1.0 INTRODUCTION AND PURPOSE

This Hydrologic Report has been prepared to address the pit permitting requirements of 19.15.17.9(B)(1) NMAC for hydrologic reports. Western Refining, Inc. (WNR) operates a Liquefied Petroleum Gas (LPG) storage facility approximately 10 miles north of Jal, New Mexico, just west of New Mexico Highway 18 (Figure 2-1). The facility, formerly owned and operated by El Paso Natural Gas Company, contains two brine ponds to which WNR wishes to add a third pond and permit it under the OCD Pit Rule, 19.15.17 NMAC. This Hydrologic Report addresses the proposed new brine storage pond at the facility, which is located in the SW1/4, SW1/4 Section 32, T23S, R37E, Lea County, New Mexico (Figure 2-2). This pond is to be permitted as a permanent pit under the Pit Rule. The pond will be used for the storage of brine displaced from the underground storage caverns by LPG. The pit will be 334 ft wide and 469 ft long. The depth from the top of the berm to the bottom of the pit will be 24 ft with the bottom elevation approximately 3297 ft. above mean sea level (MSL). The top of the berm will be 6 ft above ground surface, therefore the pond is non-jurisdictional under the Dam Safety Regulations. Copies of the Civil Construction Plans for the new pond are included as Appendix A.

2.0 GEOLOGY AND SOILS

2.1 Soils

The facility is within the Eunice Plain subdivision of the Great Plains Physiographic Province. The Eunice Plain is in the Delaware Basin, part of the Permian Basin, and is underlain by a hard caliche surface and almost entirely covered by a reddish-brown dune sand. The soils on the site are of the Berino-Cacique Association (BE) and Pyoto-Maljamar Association (PU) (U. S Department. of Agriculture, 2014). Figure 2-3 is a soil map of the facility.

The Berino soil is typically a reddish brown, loamy fine sand surface layer and a red, light sandy clay loam subsoil, becoming strongly limy at a depth of 48 inches. The Cacique soils are reddish-brown to yellowish-red, loamy fine sand in the surface layer and red sandy clay loam subsoil with indurated caliche at about 28 inches. These soils formed in sandy alluvium and mixed wind deposited sediments. They are classified as SC on the Unified Soil Classification (USC) System, with 100% passing #10 and 35% to 45% passing #200. They are Hydrologic Group C soils, with infiltration rates in the range of 0.63 to 2.0 in/hr.

The Pyoto has a thick, light brown, fine sand surface layer over reddish-yellow to light brown, fine sandy loam subsoil. The Maljamar soils have yellowish-red, fine sand to loamy sand surface layer, and a red sandy clay loam subsoil. Both soil associations are well drained. The Berino-Cacique is present on relatively level to gently sloping areas, while the Pyoto-Maljamar is found on gently undulating uplands (U. S Department of Agriculture, 1974). The USC classification is SP-SM, with 100% passing #10 and 30% to 50% passing #200. They are Hydrologic Group A soils, with infiltration rates in the range of 2.0 to 20.0 in/hr.

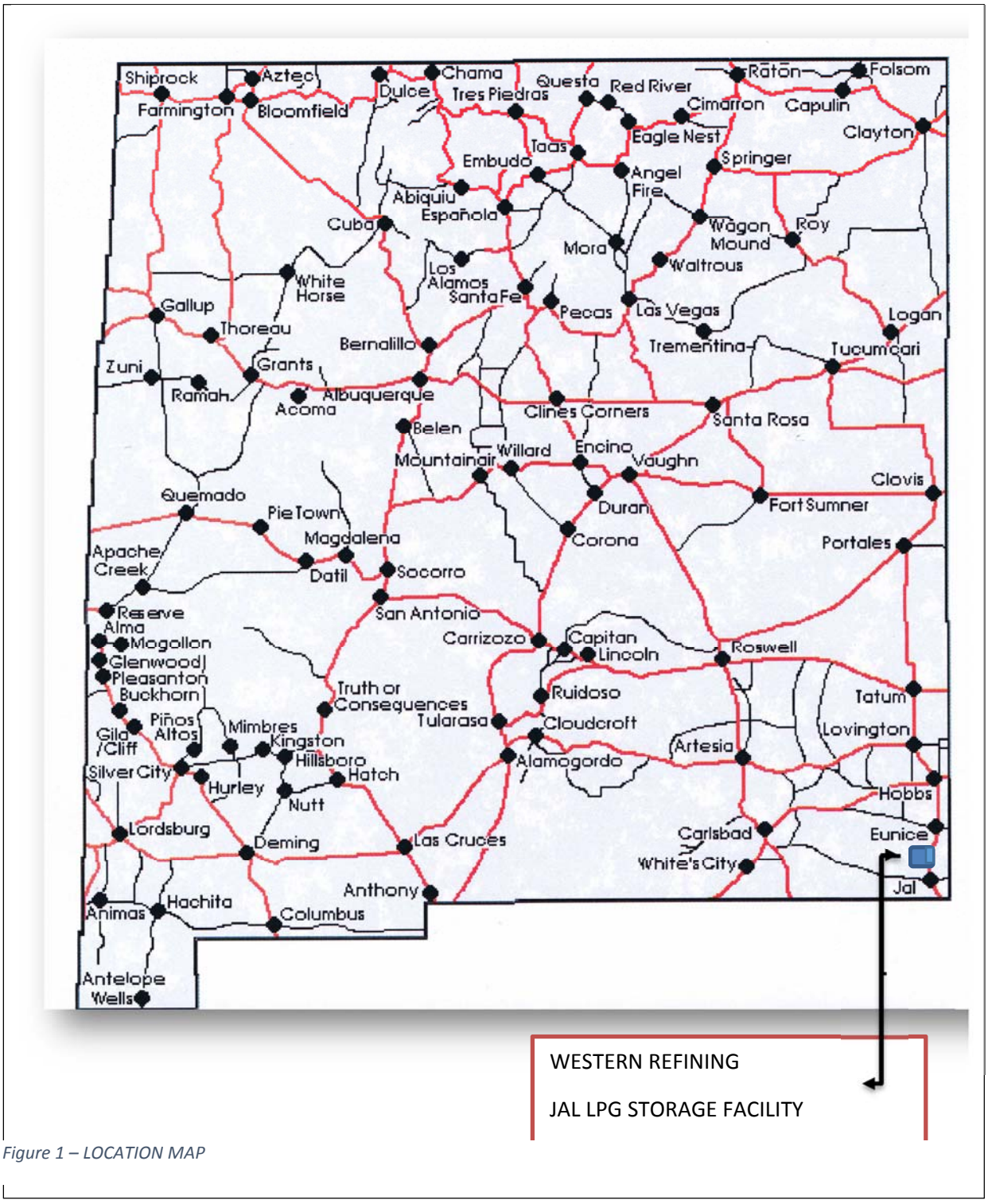


Figure 1 – LOCATION MAP

Figure 2-1 – LOCATION MAP

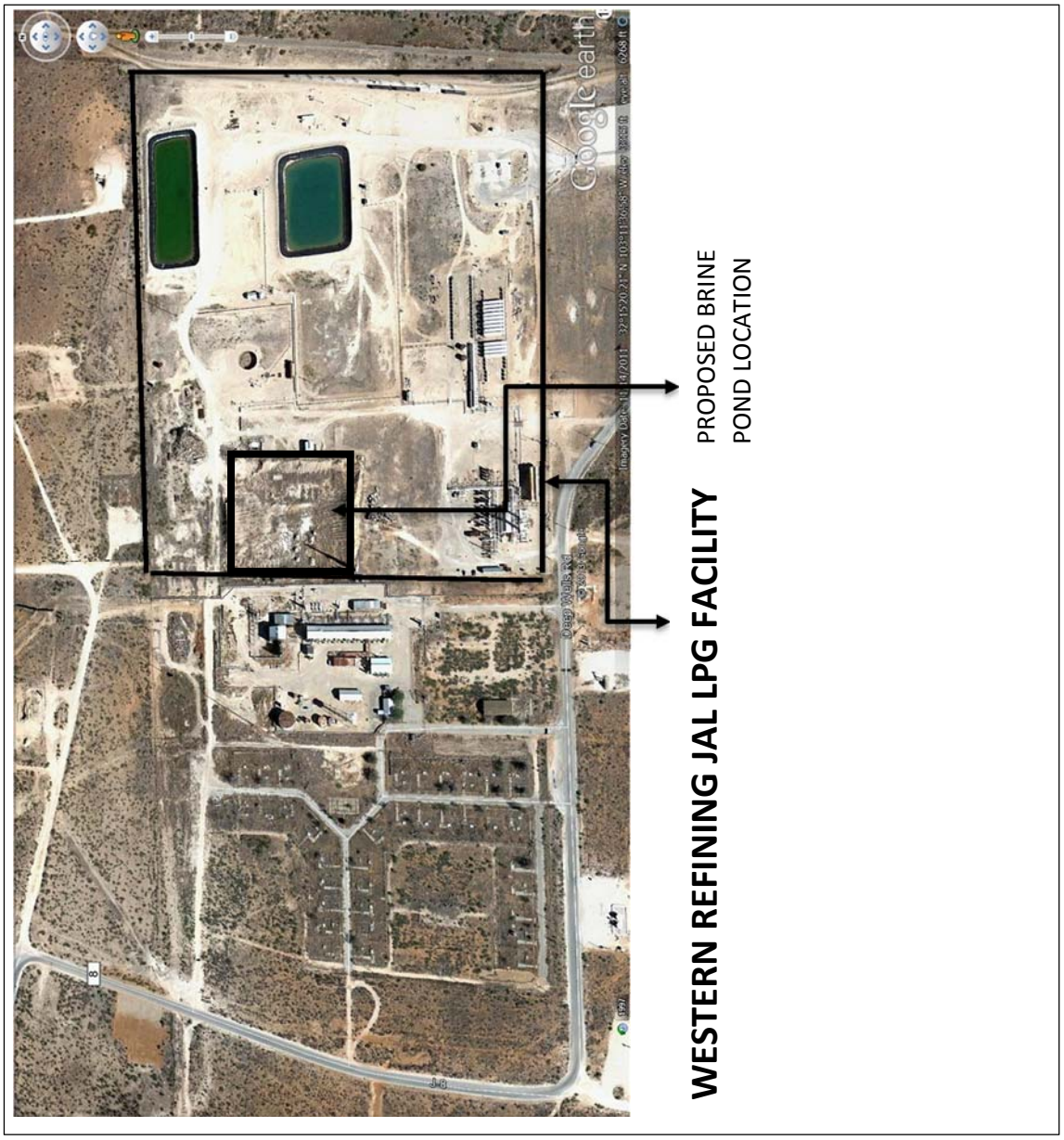


Figure 2-2 – SITE MAP

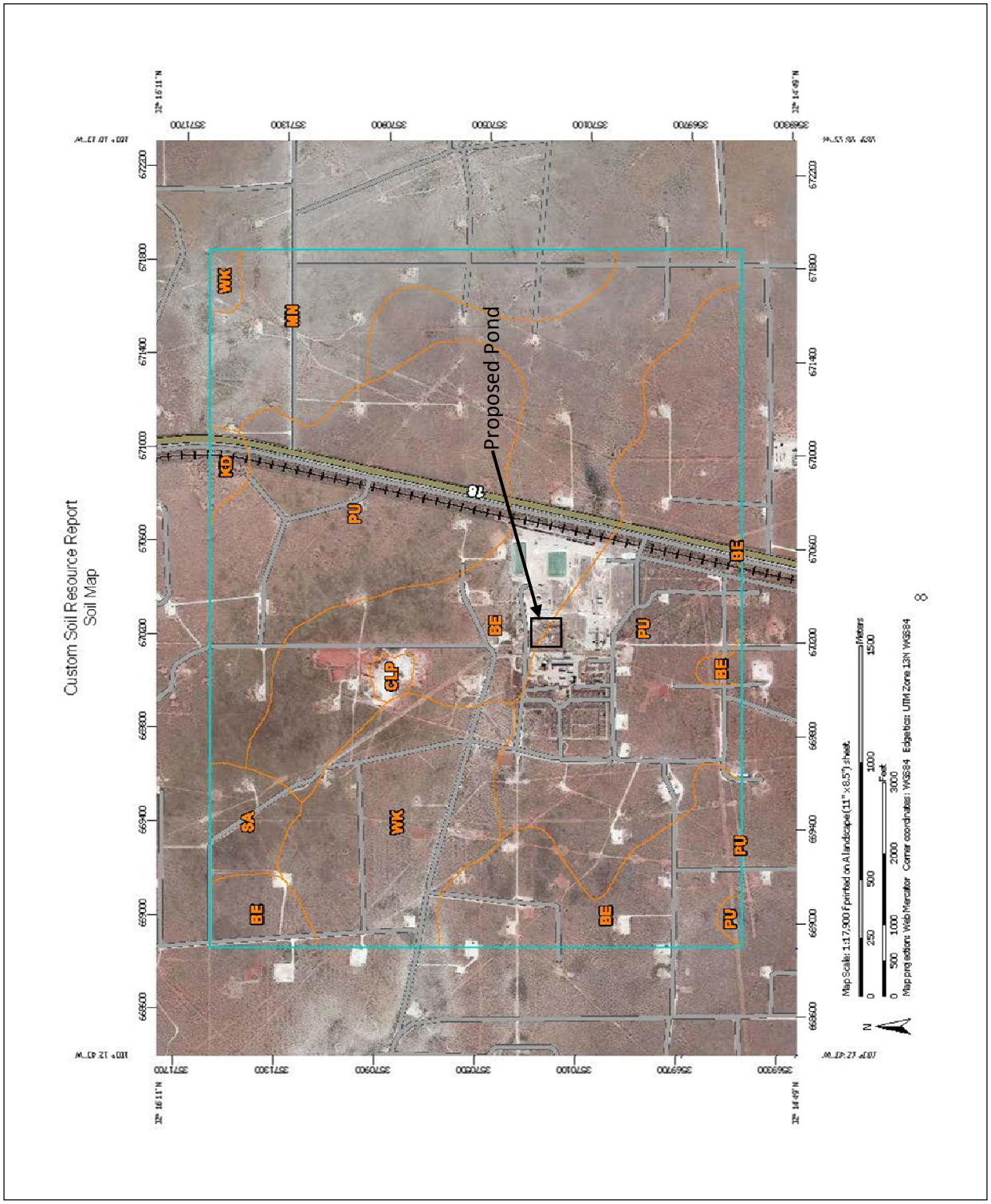


Figure 2-3 – Soil Map

There is no surface water in the vicinity of the site, and ground water is at an approximate depth of 105 feet in the Tertiary Ogallala formation. The site is underlain by clastic and chemical rocks ranging in age from Ordovician through Triassic overlain by Tertiary and Quaternary Age alluvial sediments (K. W. Brown and Assoc., 1990).

2.2 Stratigraphy

Figure 2-4 is a geologic map of the facility, and Figure 2-5 a geologic cross section. The Delaware Basin, part of the Permian Basin, was an extensive inland sea in which huge quantities of sediment and organic material accumulated during most of the Paleozoic. The basin deposits range in age from Ordovician through Permian. The older rocks are comprised of mainly limestone, shaley limestone and dolomite. There is an unconformity at the base of the Pennsylvanian Age, and Mississippian sediments are missing in Lea County. On the Central Basin Platform the Pennsylvanian rocks are a lower shale and a mixed sequence of limestone, shale and conglomerate, in the basin they are dark shale and limestone. As the basin subsided faster than the platform in the east, the sediments are thicker in the basin and the Permian is represented by a fine-grained sandstone, black shale and argillaceous limestone ringed on the edge of the basin with reef deposits. The Central Basin Platform was covered with dolomite and limestone. As the sea retreated in the Permian, the sea water evaporated, depositing thick layers of gypsum, salt, anhydrite, and potash. At the end of the Permian into the beginning of the Triassic the basin was filled with clastic sediments, called “Red Beds.” After this, several periods of emergence and inundation occurred. During one of the inundations the Triassic Dockum Group was deposited consisting of the Santa Rosa, a fine to coarse grained red sandstone and the Chinle, a red and green claystone with interbedded sandstones and siltstones. The Dockum Group is a source of ground water. Rocks of the Jurassic have not been found in southern Lea County and only remnants of the Cretaceous are present. The last inundation, in the Pleistocene Age, resulted in the deposition of the Tertiary Ogallala Formation, which is one of the principal sources of ground water in the area. The Ogallala is a semi-consolidated fine grained calcareous sand capped with caliche. The beginning of the Quaternary period started a new cycle of erosion, which has continued to this day (Nicholson, Clebsch, 1961).

3.0 Structural Geology

Figure 2-6 shows the major geologic structural features in the area of the site. The Delaware Basin and the Central Basin Arch are the major structural features of southern Lea County. The only other structural features are major unconformities and collapse structures. The unconformity before the Permian removed the Mississippian Age rocks in this part of the basin and is an angular unconformity across the Arch. There was folding in the Pennsylvanian and the basin subsided faster compared to the Arch. In the Permian the sea began to recede, due to the filling of the basin and a lessening in subsidence in the basin. In the early Triassic the area was emergent and this unconformity slopes at less than 1 degree to the southeast. Since the close of the Permian there has been almost no tectonic movement in the Permian Basin, thus the large structural features of the basin are reflected only indirectly in the Mesozoic and Cenozoic rock (Nicholson and Clebsch, 1961). No active faults have been identified in the area of the site, and the maximum anticipated earthquake acceleration is 0 .2 g, from Figure 2-7 (U. S. Geological Survey, 2008). Therefore, the site is in a geologically stable area. Because of the very flat terrain, slope stability is not an issue.

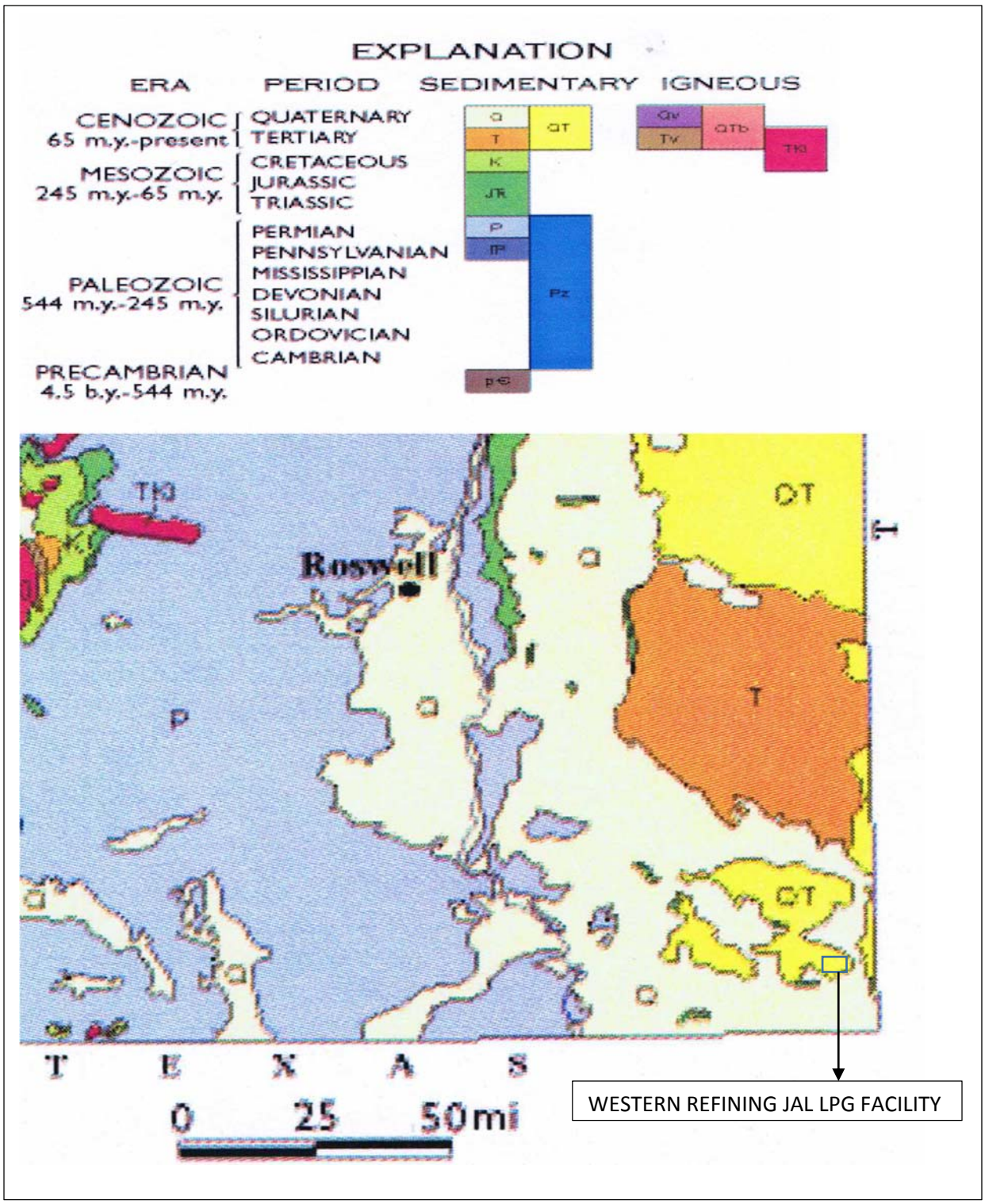


Figure 2-4 – Geologic Map

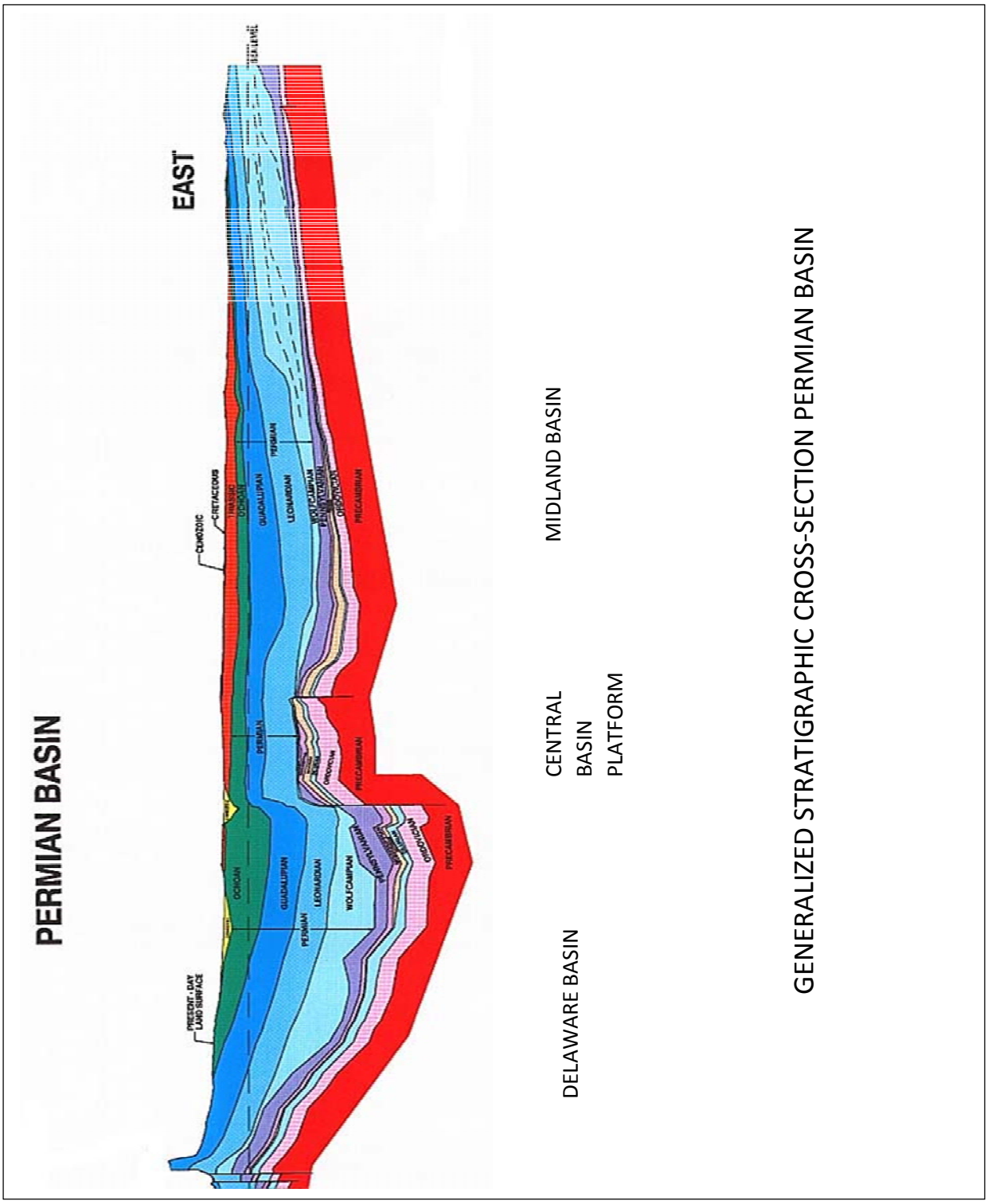
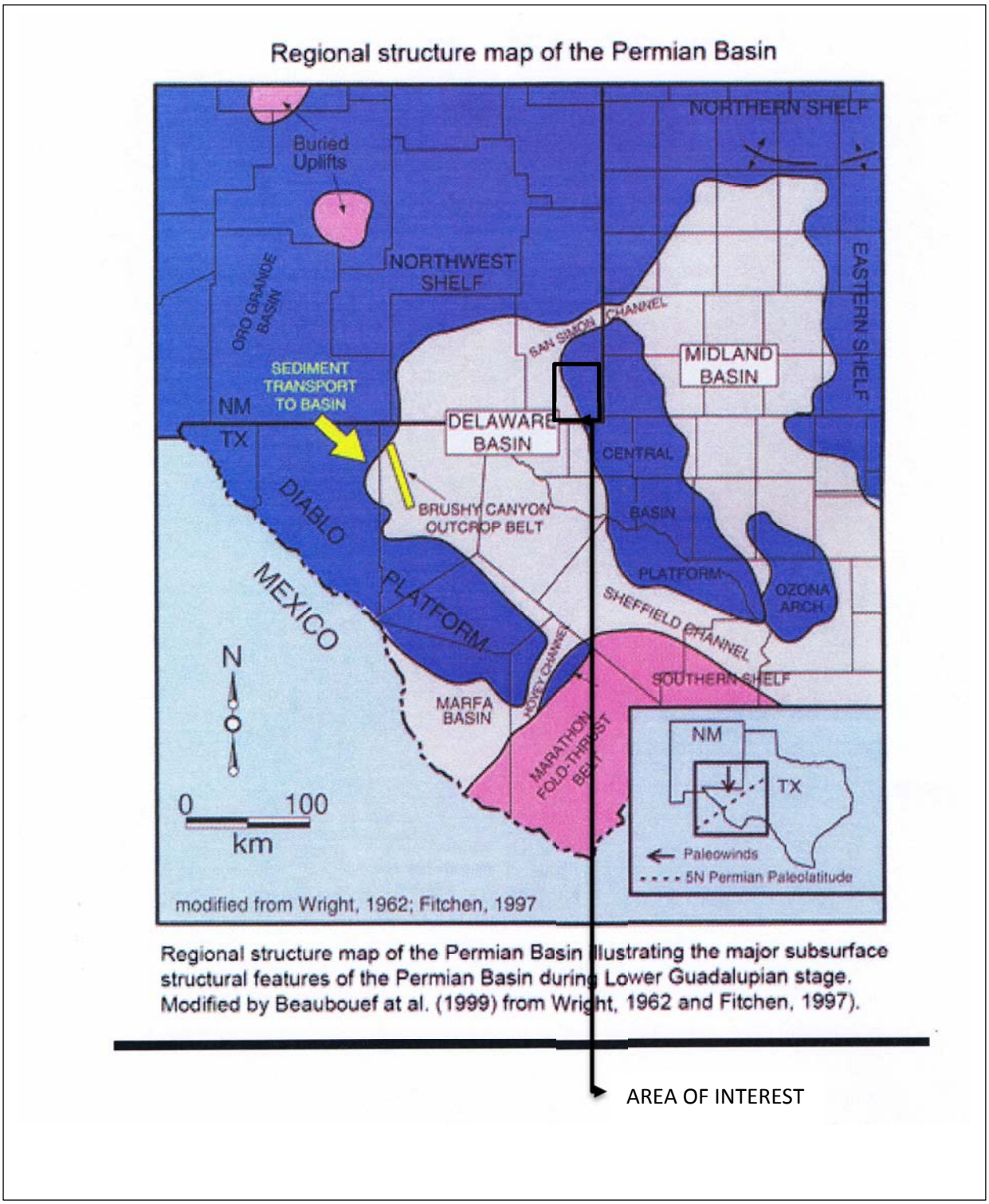


Figure 2-5 – STRATIGRAPHIC CROSS-SECTION



Regional structure map of the Permian Basin illustrating the major subsurface structural features of the Permian Basin during Lower Guadalupian stage. Modified by Beaubouef at al. (1999) from Wright, 1962 and Fitchen, 1997).

Figure 2-6 – STRUCTURAL MAP

Earthquake Hazards Program

US Seismic Hazard 2008

U, S. GEOLOGICAL SURVEY

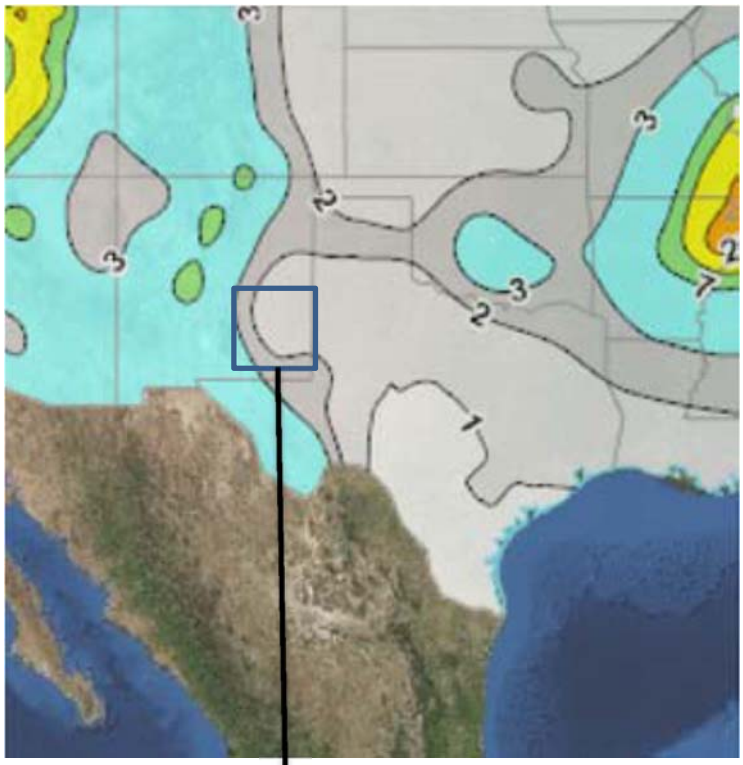


Figure 2-7 – SEISMIC HAZARD MAP

4.0 GROUNDWATER

The Tertiary Ogallala Formation and Quaternary alluvium are the principal sources of ground water in the area. The Tertiary Dockum is a source of ground water, primarily farther west. Its water is of lesser quality and quantity (Nicholson and Clebsch, 1961). Depth to ground water is 100-115 feet as seen in the monitoring wells documented in the 2011 annual groundwater remediation report prepared for El Paso Natural Gas (SAIC, 2012). The ground water is recharged solely by direct precipitation and infiltration. The ground water flow is in an east-southeast direction. The ground water has been undergoing remediation by Kinder-Morgan (formerly El Paso Natural Gas) (ENSR, 1989). The USGS 7.5 minute topographic maps for Rattlesnake Ridge and Jal NW quadrangles show no surface water bodies or perennial streams within a mile of the site, no ground water wells within a ¼ mile of the facility(Figure 2-8), and no springs within several miles. There are no wetlands shown anywhere near the proposed pond. Visual inspection of the site and surrounding area have confirmed the lack of surface water bodies near the facility.

5.0 TOPOGRAPHY AND DRAINAGE

The general elevation of the site is 3310 feet above MSL, and there is approximately 8 ft of relief from the west boundary to the east boundary of the site. The natural ground surface generally slopes down to the east at .005 feet per foot. Drainage is to the east, with site drainage conveyed beneath NM 18, through a highway culvert. There is no perennial surface water in the vicinity. The nearest surface water body is the Pecos River, approximately 50 miles to the southwest. Figure 2-8 shows the site topography.

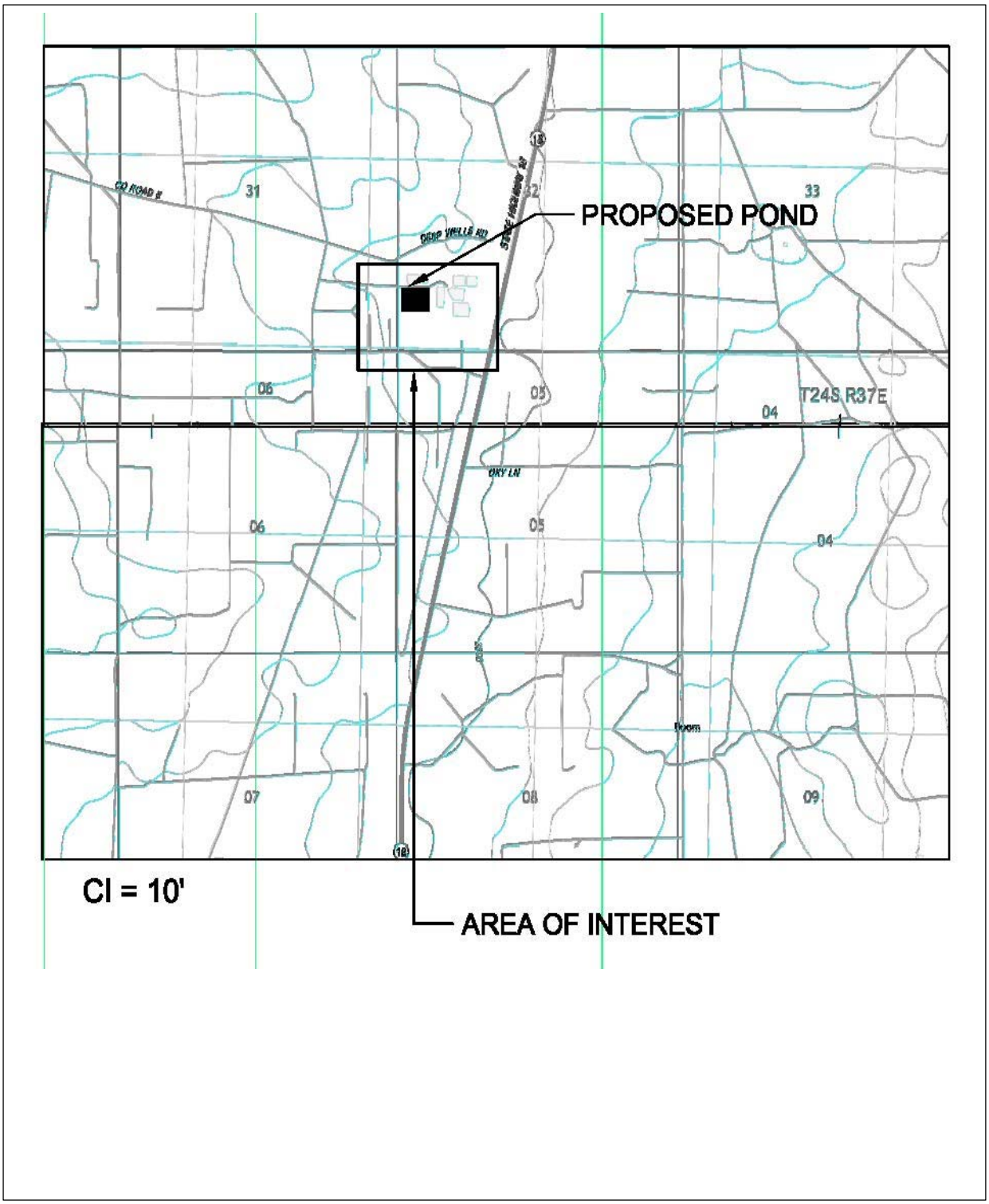


Figure 2-8 – TOPOGRAPHIC MAP

6.0 REFERENCES

ENSR Consulting and Engineering, 1989, Ground Water Quality Assessment *prepared for* El Paso Natural Gas Company Jal Number 4 Facility, Jal New Mexico, ENSR Consulting and Engineering Document Number 2467-003, 120 p.

K. W. Brown and Assoc., 1990, Expanded Hydrogeology Study for the El Paso Natural Gas Company Jal 4 Facility, 103 p.

Nicholson, A. Jr., and A. Clebsch, Jr., 1961, Geology and Ground-Water Conditions in Southern Lea County, New Mexico: State Bureau of Mines and Mineral Resources, Ground-water Report 6, 120 p.

SAIC Energy, Environment & Infrastructure, LLC, 2012, Annual Groundwater Remediation Report Jal No. 4 Plant, Lea County, New Mexico: NMOCD Case AP-101, Prepared for El Paso Natural Gas Company, 132 p.

U. S. Department of Agriculture, Natural Resources Conservation Service, 2014, Soil Resource Report for Lea County, New Mexico (www.nrcs.usda.gov), 23 p.

U. S. Department of Agriculture, Natural Resources Conservation Service In Cooperation with New Mexico Agricultural Experiment Station, 1974, Soil Survey Lea County, New Mexico, USDA Soil Conservation Services, 96 p.

U. S. Department of Commerce, NOAA, Data Jal Climate Summaries, 2014, (www.climate.gov)

U. S. Geological Survey, Documentation for the 2008 Update of the United States National Seismic Hazard Maps, Open-File Report 2008-1128

U. S. Geological Survey, 2013, Rattlesnake Canyon Quadrangle Map, 1:24,000

U. S. Geological Survey, 2013, Jal NW Quadrangle Map, 1:24,000

Section 3

1.0 SITING CRITERIA

This section addresses the specific siting criteria under 19.15.17.10.A(5) NMAC The ground water under the proposed pond location is at a depth of approximately 100 to 115 ft as documented in the monitoring wells used for the groundwater remediation currently being done by Kinder-Morgan. Examination of the USGS Rattlesnake Canyon and Jal NW Quadrangles (Figure 3-1) shows no continuously flowing water courses, lakebeds, sinkholes or playas within 300 feet of the site. Neither are there springs, domestic wells, or wetlands within 500 feet of the proposed pond. The site is not in any municipal area, as the closest town, Jal, is approximately 10 miles south, nor are there any residences, schools, institutions, or hospitals within 1000 ft. The site is outside of the potash mining area (Barker, 2008), but there is a caliche pit to the north. There are no known unstable areas. The area is outside the 100 year floodplain, as indicated by the absence of FEMA panels.

2.0 GROUND WATER DEPTH - 19.15.17.10.A(5)(a) NMAC

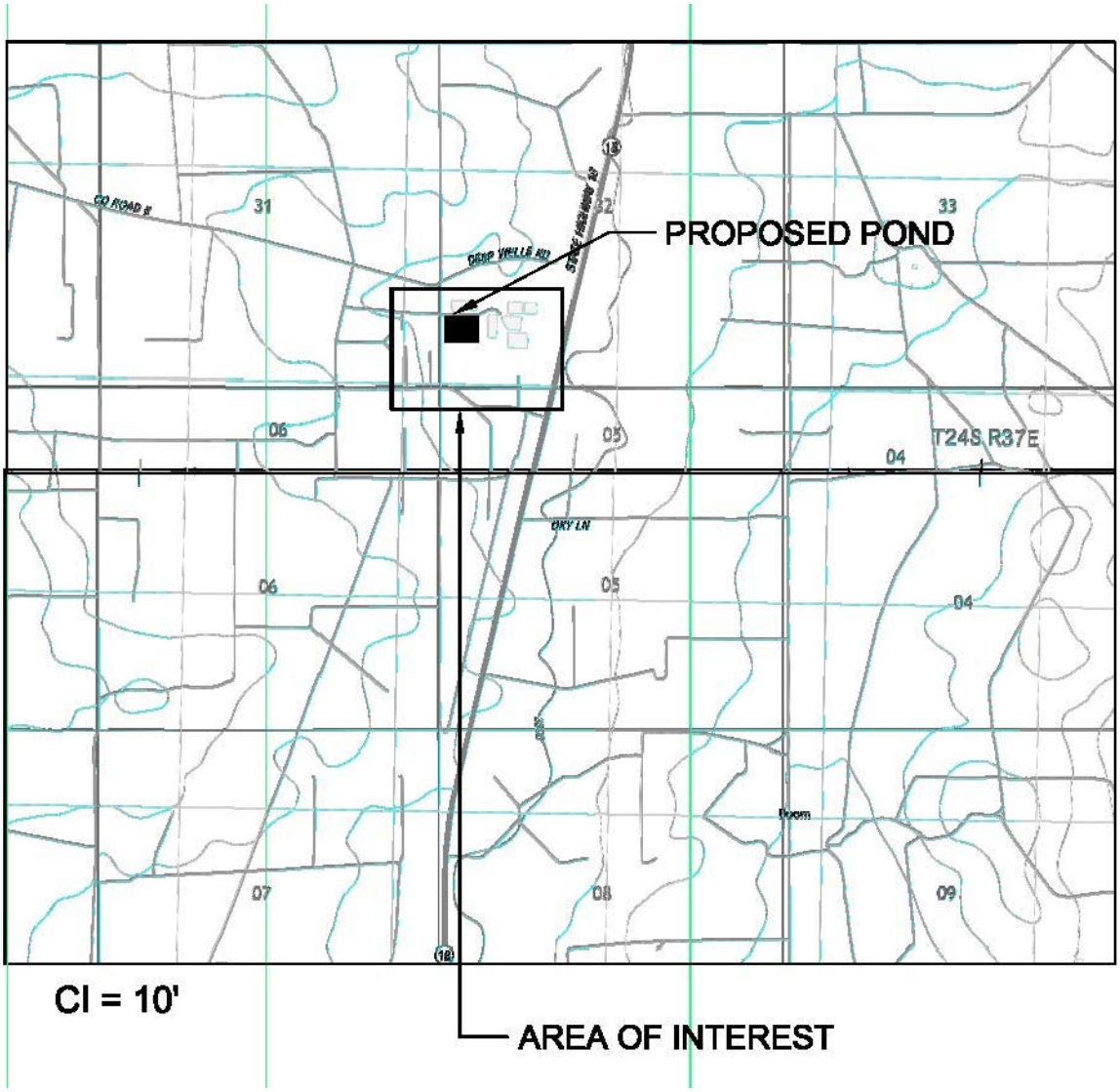
As stated in Section 1.0, groundwater has been measured at a depth of 100 to 115 feet below the ground surface in monitor wells at the site. This corresponds to an elevation of approximately 3190 ft above mean sea level. The elevation of the bottom of the pit is approximately 3297. Therefore, groundwater is at a depth of more than 50 ft below the bottom of the pit. This satisfies the siting criteria of 19.15.17.10.A(5)(a) NMAC for groundwater depth.

3.0 SURFACE WATER - 19.15.17.10.A(5)(b) NMAC

The nearest flowing watercourse is the Pecos River, which is approximately 50 miles from the site. There are no permanent streams in southern Lea County, only ephemeral swales and storm run-off (Lansford, 1982). Therefore, the site is more than 300 ft from the nearest continuously flowing watercourse. The nearest lakebed is the manmade Jal Lake in the City of Jal, approximately 10 miles south of the site. Therefore, the site is more than 200 ft from the nearest lakebed. No sinkholes or playas have been mapped or observed within 200 ft. of the site. Both topographic maps and recent aerial photos were examined to determine the possible locations of these features. This satisfies the siting criteria of 19.15.17.10.A(5)(b) NMAC for distance from surface water bodies.

4.0 NEAREST STRUCTURES – 19.15.17.10.A(5)(c) NMAC

Other than the active and abandoned structures on the facility itself, the nearest structures are more than 1000 ft from the site. The nearest occupied residence is located approximately 2 miles from the site. The nearest school is located in Jal, which is approximately 10 miles from the site. The nearest hospital is in Kermit Texas, approximately 20 miles from the site. The nearest institution or church is located in Jal, approximately 10 miles from the site. Therefore, this satisfies the siting criteria pf 19.15.17.10.A(5)(c) NMAC for distance of more than 1000 ft from the nearest structure.



5.0

Figure 3-1 – TOPOGRAPHIC MAP

WELLS AND SPRINGS – 19.15.17.10.A(5)(d) NMAC

USGS Topographic maps and well data from the New Mexico Office of the State Engineer website, show no domestic wells or fresh water springs within 500 ft of the site, nor are there any fresh water well or springs at all within 1000 ft of the proposed pond. Ground water contamination beneath the site has resulted from previous site use, and is being remediated by Kinder-Morgan. In addition to the program monitoring wells, groundwater samples are also collected from three nearby water supply wells. One is in located in the SE, SE of Section 31, T23S, R37E, the second well is in the center of Section 5, T24S, R37E, and the third well is the Doom Production Well, which supplies water to a residence, and is located in the approximate center of the NW 1/4 of Section 8, T24S, R37E (SAIC, 2012). None of these three wells has been impacted from that contamination. Therefore, the site satisfies the requirements of 19.15.17.A(5)(d) NMAC.

6.0 Municipal Boundaries – 19.15.17.10.A(5)(e) NMAC

The closest incorporated municipalities are the Cities of Jal to the south and Eunice to the north. Jal is approximately 10 miles south of the site, while Eunice is approximately 13 miles to the north. The Eunice municipal fresh water well field is north of Eunice and west of Hobbs. The Jal municipal fresh water field is in Sections 18 and 19 of T26S, R36E (Nicholson and Clebsch, 1961). The proposed brine pond is not in any municipal boundaries or above a municipal fresh water field. Therefore, the site meets the requirements of 19.15.17.10.A(5)(e) NMAC

7.0 Wetlands – 19.15.17.10.A(5)(f) NMAC

No wetlands are shown within 500 feet of the site on the USGS Rattlesnake Canyon Quadrangle map and none are visible in recent aerial photographs of the site. No wetlands have been observed in site reconnaissance. Therefore, the site meets the requirements of 19.15.17.10.A(5)(f)

8.0 Subsurface Mines – 19.15.17.10.A(5)(g) NMAC

The proposed brine pond location is outside of the potash mining area (Figure 3-2) (Barker and Gundiler, 2008). There is a caliche pit (surface, not underground) about a half mile to the northeast of the site. No other mining exists in the area.

9.0 Stability – 19.15.17.10.A(5)(h) NMAC

No instability has been exhibited in the area. The caverns for storage are slender with a maximum circumference of 130 ft. and are overlain by 1300 ft. of competent rock. The salt at the casing shoe is protected from dissolution by LPG (Western Refining, 2012). Regular subsidence monitoring of surveyed monuments conducted at the site confirms that there has been no subsidence at the site. There are no unstable areas that would impact the integrity of the proposed pond.

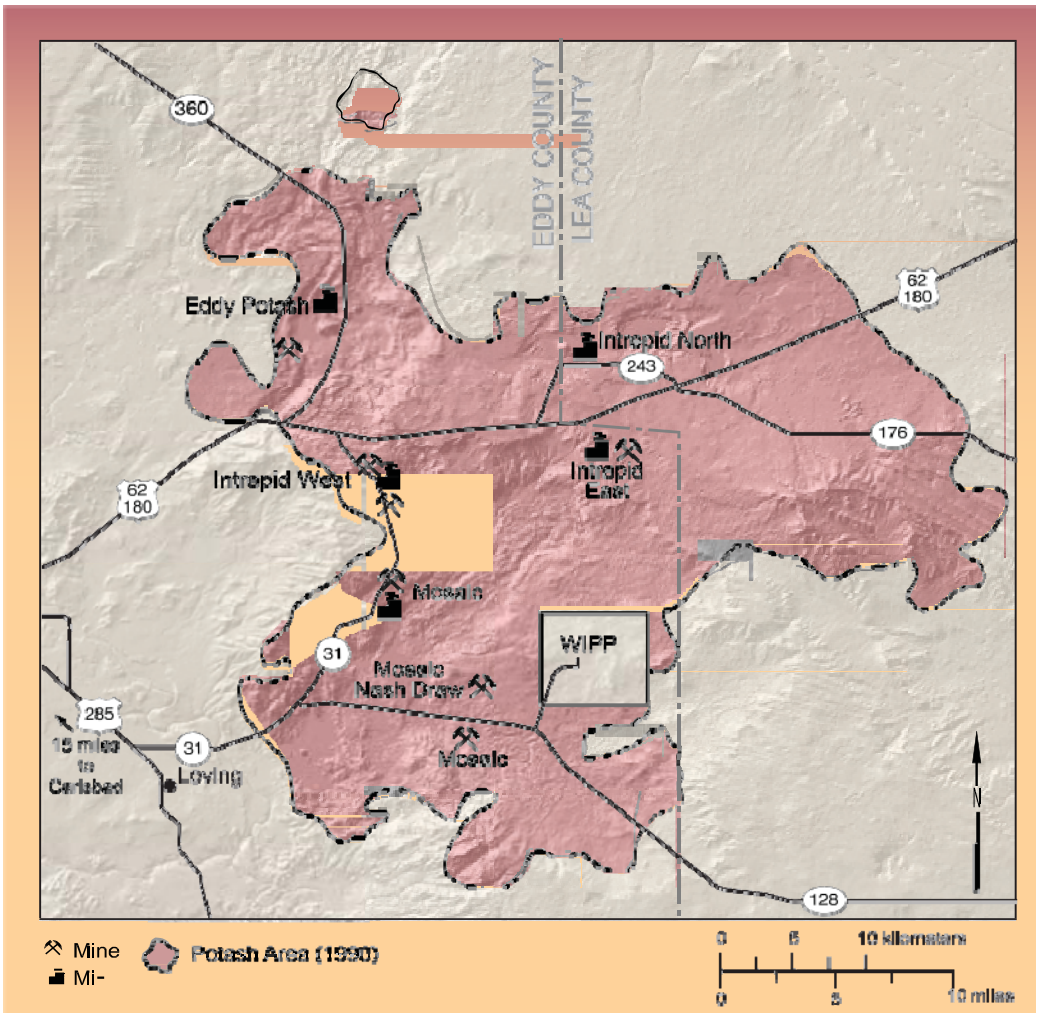


Figure 3-2 – POTASH MINING AREA

10.0 Floodplains – 19.15.17.A(5)(i) NMAC

There are no FEMA panels for this area, and no channels or tributaries that would be delineated as having a floodplain. This indicates that it is outside a 100 year floodplain. Therefore, the site meets the criteria of 19.15.17.A(5)(i).

11.0 Summary

Based on the information presented in the previous sections, the site meets the siting criteria for a permanent pit.

12.0 References

Barker, James and Ibrahim Gundiler, 2008, New Mexico Potash—Past, Present and Future, NM Earth Matters: NM Bureau of Geology and Mineral Resources. p. 1-3.

Jal LPG Storage Facility Permit (GW-007) NMOCD Discharge Plan Renewal, August 27, 2007.

Lansford, R. R., et. al., 1982, High Plains-Ogallala Aquifer Study Lea County, New Mexico, Partial Technical Completion Report, Project No WRRI 1423697 and 1345681: New Mexico Water Resources Research Institute, 8 p.

Nicholson, A. Jr., and A. Clebsch, Jr., 1961, Geology and Ground-Water Conditions in Southern Lea County, New Mexico: State Bureau of Mines and Mineral Resources, Ground-water Report 6, 120 p.

SAIC Energy, Environment & Infrastructure, LLC, 2012, Annual Groundwater Remediation Report Jal No. 4 Plant, Lea County, New Mexico: NMOCD Case AP-101, Prepared for El Paso Natural Gas Company, 132 p.

Pettigrew & Associates, P. A., 2011, Subsidence Monument Monitoring.

Western Refining Company, L. P., 2012, Draft Application For Authorization To Inject.

U. S. Geological Survey, 2013, Rattlesnake Canyon Quadrangle Map, 1:24,000

U. S. Geological Survey, 2013, Jal NW Quadrangle Map, 1:24,000

Section

4

1.0 CLIMATE

The site sits in the semi-arid Pecos River Drainage on the edge of the Southern High Plains. The area generally has clear days, low humidity and moderately low rainfall (Lansford, 1982). The average high temperature is 79.5 degrees Fahrenheit and the average low is 48.3 degrees Fahrenheit. The average total precipitation from 1919 to 2005 is 12.49 inches, with annual precipitation typically ranging from 10 to 15 inches. This data is collected at the weather station in Jal. The 100-year, 24-hour storm event is 6.19 in. (U. S Department. of Commerce, 2014).

Wind is a major factor in this area. It has affected soil formation in both the deposition of sand originally and the shifting of those sands currently. The dry climate and relative moderate winter temperatures contribute to very active evaporation processes. This limits the leaching of lime and other materials from the soil.

2.0 REFERENCES

U. S. Department of Commerce, NOAA, Data Jal Climate Summaries, 2013,

Lansford, R. R., et. al., 1982, High Plains-Ogallala Aquifer Study Lea County, New Mexico, Partial Technical Completion Report, Project No WRRI 1423697 and 1345681: New Mexico Water Resources Research Institute, 8 p.

Section

5

1.0 CERTIFIED ENGINEERING DESIGN

Construction plans and specifications for the proposed new pond were prepared by West Company and certified by Macon McDonald, New Mexico Professional Engineer #11121. In compliance with the requirements of 19.15.17.9.B.1(a) NMAC, Sheet C-2 (and others) include specifications for materials and construction. The geotechnical specifications include site preparation (Note 4.2.1), compaction (Note 4.2.3), liner placement (Note 4.3), and materials testing (Note 4.4). Other specifications are also provided for concrete, reinforcing steel, grout, pipe, seams, welds, and other construction.

Quality Assurance is addressed in the construction contract documents, which provide for construction inspections, testing, reporting, and certifications. The Contractor will be held to these requirements to ensure compliance with the engineer's design and allow for rejection and replacement of any substandard materials or construction. The Civil Construction Plans will serve as the construction and installation plan in compliance with 19.15.17.9.B(1) (a) NMAC.

2.0 DIKE PROTECTION AND STRUCTURAL INTEGRITY

Sheet C-2 of the enclosed drawings provides the recommendations of the geotechnical engineer for dike protection and structural integrity. These recommendations include compaction to 95% Maximum Dry Density at ±2% optimum moisture. The conclusion of the geotechnical engineer, as stated in Note 4.4, is that slopes not greater than 3:1 (H:V) will be stable with a safety factor of at least 2.0. As can be seen from Sheet C-7, the side slopes are designed to be 3:1 (H:V) in compliance with 19.15.17.11.G(1) NMAC and the stability recommendation of the geotechnical engineer.

The foundation of the pond is to be scarified to a depth of at least 6 inches and recompacted to 95% of Maximum Proctor Density. The berms incorporate an anchor trench for the liner and underliner (see Sheets C-7 and C-9). The top of the levee is to be 12 ft wide to allow for inspection and maintenance. The foundation is designed to comply with the foundation requirements of 19.15.17.11.G(1) NMAC.

The leak detection system is shown on Sheets C-4 and C-9. The underliner will be constructed of 60-mil HDPE GSEHD Geo Membrane. Over the underliner will be a ¾ inch gravel layer for leak monitoring and collection. Monitoring and collection pipes will be constructed of 4-inch Sch. 40 PVC in a geotextile and gravel filled leak trench, as shown in the detail on Sheet C-9. The collection pipes will be perforated as shown in the detail on Sheet C-9. The grade of these collection pipes varies, as shown on Sheet C-4, but the minimum grade of 2% complies with the requirements of 19.15.17.11.G.(7). These pipes will be connected to a monitoring and collection well as shown in the detail on Sheet C-12, with the penetration through the berm sealed. The monitor well detail is shown on Sheet C-9. This system will provide for adequate fluid collection and removal, and meets the requirements of 19.15.17.11.G.(2), (3) and (7) NMAC.

3.0 LINER SEAMS

The liner seam details are shown on Sheet C-12 of the enclosed drawings. The field seams will be thermally seamed (hot weld) with double track and air pocket, in compliance with 19.15.17.11.G(5) NMAC.

4.0 LINER SPECIFICATION AND COMPATIBILITY

The proposed liner material is HDPE, which is compatible with the brine water being placed in the pond. It is also resistant to any petroleum hydrocarbons that might be associated with the brine water. HDPE is the material that was recommended by the geotechnical engineering firm on the basis of compatibility with both the brine water and the underlying soil conditions. Therefore the liner appears to meet the requirements of 19.15.17.11(G)(3) NMAC.

5.0 INLET LINES

The design plans show the intake connection details on Sheet C-8. Although the lines will penetrate the liner, the penetrations and liner seals are shown on the details. This complies with the requirements of 19.15.17.11(G)(6) NMAC.

6.0 NOTIFICATION

The construction contract specifications include the 72-hour notification requirement of 19.15.17.11(G)(8) NMAC. The Contractor will be required to provide notice to Western Refining Company upon completion of the leak detection system prior to further construction so the NM OCD may inspect the system before the leak detection system is covered. The Contractor will be required to show this on their construction schedule, and the Contractor will not be allowed to cover the system until it has been inspected and accepted by the OCD, if so desired.

7.0 OPERATING AND MAINTENANCE PLAN

The O&M Plan for the proposed new pond is in section 6 of this permit application package. It will be amended, if necessary, upon completion of construction to incorporate any manufacturer's recommendations.

8.0 FREEBOARD AND OVERTOPPING PREVENTION

The pond was designed with 3 ft of freeboard, in compliance with 19.15.17.11(G)(9). Because the pond will be a bermed, surface impoundment there are only two ways of overtopping: 1) direct precipitation; and 2) overfilling of brine water into the pond. As discussed in the climatological report, the 100-year 24-hour rainfall is 6.19 inches, so 3 ft of freeboard is more than adequate to prevent overtopping in the event of a 100-year precipitation event. As discussed in the O&M Plan, overfilling is prevented by routing overflow to the adjacent pond or trucking to a Class II Salt Water Disposal Well, as the brine is RCRA-exempt waste. The berm is more than adequate to prevent run-on, based on the site drainage. Therefore, the requirements of 19.17.15.11(G)(11) will be met.

19.5.17.11.G.(10) NMAC limits permanent pits to 10 ac-ft (including freeboard). Because the size of this brine pond is dictated by the facility's operations and product throughput, the necessary capacity exceeds this 10 ac-ft limit. As shown on Sheet C-5, the total storage volume including freeboard is 2,133,413.97 cu ft, which is 49 ac-ft. The volume at the maximum brine elevation is 1,714,603 cu ft, or 39 ac-ft. Although the pond has been designed by a New Mexico Professional Engineer to meet or exceed the fresh water, public health, and environmental protection requirements, and the design

meets or exceeds the OCD requirements in all other aspects, the pond exceeds the 10 ac-ft limit for permanent pits, and a variance is being requested along with this construction permit application. Because 19.5.17.11.G(10) NMAC is not one of the items that specifically calls for an exception under the Rules, an application is being made for a variance rather than an exception.

9.0 NUISANCE AND HAZARDOUS ODORS

There is no H_2S associated with the operations at this site. This is confirmed by analytical data and has been previously recognized by the OCD (Appendix B).

10.0 EMERGENCY RESPONSE PLAN

The Emergency Response Plan is found in section 8 of this permit application package.

11.0 WASTE STREAM CHARACTERIZATION

There is no waste stream, as the ponds contain only brine with no or minimum hydrocarbons, as documented in Appendix C. Excess brine is disposed of in Class II Salt Water Disposal Well, as the brine is RCRA-exempt waste.

11.0 MONITORING AND INSPECTION PLAN

The leak detection system shall be inspected monthly to determine if the primary containment is leaking. All channels and culverts will be periodically inspected, at least twice annually and after any major precipitation event. Any sediment deposits and debris will be removed from the channels and culverts as necessary, and any erosion damage, if present, will be repaired or controlled. The inspection will also note any dead migratory birds or other wildlife and report on such within 30 days of the observation.

12.0 EROSION CONTROL

Temporary erosion control will be implemented as necessary during construction of the new pond. This will include NPDES permitting if required by the area of disturbance, dust control, protection of stockpiled soil, and revegetation. Upon completion of the pond construction and once the revegetation has taken hold, no additional erosion control measures are anticipated, given the flat topography of the site and absence of any existing areas of erosion.

13.0 CLOSURE PLAN

The Closure Plan is found in section 12 of this permit application package.

Section 6

1.0 GENERAL OPERATIONS

The facility is permitted to store LPG in underground storage caverns. It is manned whenever loading and unloading operations are in progress. The facility operations involve the underground LPG storage caverns, truck and rail car loading/unloading operations, maintenance of two existing double-lined brine storage ponds, LPG aboveground storage tanks, and the associated pumps, valves, and piping. LPG is transported to and from the facility by means of tanker trucks, rail cars, and pipeline. The facility operations also include a permitted off-site disposal well. The proposed new brine pond will operate in the same manner as the two existing ponds.

Underground storage facilities allow for storage of surplus LPG during periods of low demand and provide availability of these products during periods of high demand. The storage of pressurized LPG products underground is much more economical than the surface storage in high pressure containers, and many hazards of above ground storage are eliminated.

Salt Caverns are essentially impermeable meaning no fluid or gas can escape through the surrounding rock salt. This fact makes a salt cavern ideal for storing hydrocarbon products. The cavern is always filled with liquid, either brine or LPG. Once the cavern is ready to store LPG, injection operations are initiated. Because LPG is lighter than brine, it will float on the top of the brine within the cavern. To inject, LPG is pumped down the annulus and the brine is displaced through tubing to the surface. The displaced brine is stored in a brine pond. While in the annulus and cavern, the LPG remains in liquid state due to the hydrostatic pressure created by the heavier brine within the tubing. To recover LPG, the reverse operation is initiated by pumping brine into the cavern through the tubing causing the product to be displaced through the annulus to the surface.

Since the injected LPG volume and the displaced brine volume stored in the pond is a 1:1 ratio, the LPG inventory records and planning are used to ensure that the pond is not overfilled. Additionally, the pond is visually inspected daily to ensure a 3-foot freeboard. At the maximum injection rate, over-topping of the freeboard is unlikely because it would take approximately 35 hours.

2.0 WASTE GENERATION

Both exempt and non-exempt wastes are generated at the facility. Exempt wastes include domestic waste and trash, certain absorbents, and oil field brine water. The brine water typically contains no hazardous components, and when it does it is at *de minimis* concentrations. Non-exempt wastes include used oil filters and brine/oil mixtures. Only oil field brine water will be placed in the proposed pond.

3.0 INSPECTIONS

The facility is manned on a business-day basis, at least 5 days per week. The pit (pond) will be inspected daily. The inspection consists of the following:

- Visual check of pond level (maintain a 3 foot freeboard),
- Visual check of the leak detection system,

- Visual check of the berms and liner for damage, and
- Visual check of the operating liquid transfer equipment.

4.0 MAINTENANCE

Maintenance is performed as a result of a visual inspection.

Section

7

1.0 TYPES OF EMERGENCIES

Two types of emergencies may occur at the proposed pond, overtopping and leakage. Overtopping is prevented by ensuring that a 3-foot freeboard and inventory control are maintained. Potential leakage is monitored with the leak detection system. Should brine liquids be detected in the leak detection system, the lower liner will prevent further leakage while the leak is being repaired.

2.0 NOTIFICATIONS

When a release is discovered, immediate steps will be taken to contain the release and prevent further discharge. Then, as soon as possible, notification will be made to the following contacts, in the order presented.

1) Jal LPG Storage Facility: 575-395-2632 (office)

   1.a) 915-471-1607 (cell Ken Parker)

   1.b) 888-656-8006 (Bloomfield 24 Hr.)

2) The contact number for the Hobbs' OCD is 575-393-6161 (a 24 hr. line is given if needed)

The notification should include the following information:

- The time and date of the release
- Estimate of the volume released
- Nature and cause of the release
- Steps that were taken to contain the release and their effectiveness

3.0 PROCEDURES

In the unlikely event of a failure of the overflow protection devices, the operator in attendance will immediately cease the discharge into the impacted pond and divert flow, if necessary, into one of the other ponds. The release from overtopping will be contained with temporary soil berms or absorbent berms to prevent offsite discharge. The spilled brine water will be recovered and the soil tested to determine the need for soil remediation. Should remediation be required, a remediation plan will have to be approved by the OCD before remedial measures are undertaken.

In the unlikely event of a liner leak, the operator will make the notifications listed in Section 2.0, and cease all further discharge to the pond. The brine water will be pumped out and placed in the north or south pond, or if those ponds lack sufficient capacity, the brine will be disposed of in a Class II Salt Water Disposal Well, as the brine is RCRA-exempt waste. The liner will then be tested to locate the source of the leak. Repair will then be made in accordance with the recommendations of the liner manufacturer or engineer. Once the repairs have been made, the repair will be tested to ensure the repaired liner integrity has been restored before additional brine water is placed into the pond. The OCD may require additional measures, depending on the size and nature of the leak.

Section 8

1.0 WASTE STREAM CHARACTERIZATION

There is no waste stream, as the ponds contain only brine with no or minimum hydrocarbons, as documented in Appendix C. Excess brine is disposed of in Class II Salt Water Disposal Well, as the brine is RCRA-exempt waste.

Section 9

1.0 MONITORING

Records of LPG delivery and storage are maintained as part of the normal site operations. Since the injected LPG volume and the displaced brine volume stored in the pond is a 1:1 ratio, the LPG inventory records are monitored to ensure that the pond is not overfilled. At the maximum injection rate, over-topping of the freeboard is unlikely because it would take approximately 35 hours. Very little maintenance is required for the ponds beyond normal housekeeping type activities and maintenance of the pumps and valves. Maintenance to the ponds is performed when inspections indicate work is necessary.

2.0 INSPECTIONS

The facility is manned on a business-day basis, at least 5 days per week. The pond and liquid transfer equipment are inspected daily. The inspection consists of the following:

- Visual check of pond level (to maintain a 3 foot freeboard);
- Visual check of the leak detection system;
- Visual check of the berms and liner for damage; and
- Visual check of the operating liquid transfer equipment.

Required maintenance is performed as a result of findings of the visual inspection. More information can be found in the Operations and Maintenance Section (Section 6).

Section 10

1.0 SITE LOCATION AND DESCRIPTION

This closure plan has been developed for the proposed pond at the Western Refining, Inc. (WNR) Liquified Petroleum Gas (LPG) storage facility located approximately 10 miles north of Jal, New Mexico, just west of New Mexico Highway 18 (Figure 1). The facility, formerly owned and operated by El Paso Natural Gas Company, contains two existing brine ponds which WNR wishes to permit under the OCD Pit Rule, 19.15.17 NMAC. This Closure Plan addresses the proposed new brine storage pond at the facility, which is located in the SW1/4, SW1/4 Section 32, T23S, R37E, Lea County, New Mexico (Figure 2). The pond is used for the storage of brine displaced from the underground storage caverns by LPG. The pit is 334 ft wide and 470 ft long. The depth from the top of the berm is 25 ft with the bottom elevation approximately 3297 ft above mean sea level (MSL). The top of the berm is approximately 6 feet above the surrounding ground elevation.

The pond will be constructed with a double liner and leak detection system. The liners will consist of 60 mil High Density Polyethylene (HDPE). Between the two liners will be a layer of clean gravel and 4" PVC perforated pipe, which serves to detect and allow removal of any fluids that may leak through the upper liner. Closure of the pond will involve evaporation of the remaining fluids in the pond, removal of the liner system components, along with any residual solids in the pond bottom, removal of the berms, and regrading and restoration of the site.

2.0 POST CLOSURE LAND USE

Facility closure is not anticipated at this time, but this closure plan has been prepared to meet the requirements for a pit rule permit for the proposed pond. The post-closure land use is, therefore, unknown, but is expected to revert back to the open rangeland that existed prior to facility construction and be compatible with current surrounding land use.

3.0 CLOSURE PLAN COMPONENTS

This section describes the various components that will be involved in closing the pond. These will include removal of the pond contents and associated structures, determination of the need for soil remediation, final grading, and revegetation. WNR shall notify OCD at least 60 days in advance of the proposed closure of the pond.

3.1 Potential for Site Remediation

After the contents of the pond have been removed, the soil beneath the pond will be sampled and analyzed in accordance with the provisions of 19.15.17.13 NMAC. Five soil samples will be collected and composited in the field to provide a single composite sample for chemical analysis. One sample will be collected from near each of the four corners of the pond, and one sample will be taken from near the center of the pond. The samples will be collected from the soil beneath the bottom liner of the pond. The samples will be analyzed for the parameters listed in Table 1.

Table 1 - Closure Criteria for North Pond Soils		
Constituent	**Analytical Method[1]**	**Limit[2]**
Chloride	EPA 300.0	20,000 mg/kg
Total Petroleum Hydrocarbons	EPA SW-8946 Method 418.1	2,500 mg/kg
GRO + DRO	EPA SW-846 Method 8015M	1,000 mg/kg
BTEX Compounds	EPA SW-846 Method 8021B or 8260B	50 mg/kg
Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

[1] Or other test method approved by the OCD

[2] Numerical limits or natural background levels, whichever is greater

If any of the constituents in the soil sample exceed the limits shown in Table 1, WNR shall report the results to the OCD and await ODC approval before proceeding with the site closure. OCD may require additional testing or remediation to implement full site closure.

If all of the constituents in the sample are below the limits shown in Table 1, WNR may proceed with final pond filling, grading, and other site closure activities, per this closure plan.

3.2 Water Evaporation

As part of the pond closure operations, brine water will cease to be discharged into the pond. The water remaining in the pond will then be allowed to evaporate. WNR may elect to enhance the evaporation with the use of spray evaporators, or may simply allow the water to evaporate naturally. Once the water has evaporated, the residual solids will be removed along with the liner materials to prevent their being discharged onto the site.

3.3 Geomembrane Liner Removal and Disposal

The geomembrane liner will be folded up over the pond residuals and removed for disposal at an approved disposal facility, or covered with clean soil and closed in place.

3.4 Site Grading and Drainage

After the water has been evaporated and the liner removed or covered for closure in place, the pond site will be regraded to approximately the original contours prior to construction, and consistent with the surrounding grade. No drainage structures will be required at closure. The final grade will provide a general slope of about 0.5 to 1.0 percent, consistent with the natural contours and drainage pattern of the area. Post-closure drainage will be by natural sheet flow to the eastern boundary of the property, following the natural drainage pattern. Because of the very low grade and the revegetation at closure, no erosion protection other than site vegetation is necessary or planned.

3.5 Revegetation

The area impacted by grading and other disturbances during closure operations will be revegetated. The revegetation is intended to reduce impacts to surface water by establishing a self-sustaining native plant community which will provide protection against soil erosion and enhance the natural aesthetics

of the closed site. The need for soil amendments will be determined based on site-specific evaluations at the time of closure. Inorganic fertilizer may be added to increase nitrogen, phosphate, and potassium available to plants, if required by the analytical results of the soil. Mulch may be applied after seeding to conserve soil moisture and protect against soil erosion until the plants have taken root. Planting will be performed between April and October. Amended areas will be seeded with a mixture of native grasses and forbs that will not depend on external application of water or fertilizer. The plant species native to the area, as listed in the NRCS *Soil Survey of Lea County, New Mexico*, are shown on Table 2. Specific species, composition percentages, and seeding rates, will be determine during a vegetation survey conducted as part of the closure operations.

Table 2 – Native Plant Species				
Black grama	Side-oats grama	Bluestem	Bush muhly	Plains bristlegrass
Sand bluestem	Blue grama	Hairy grama	Shin oak	Yucca
Dropseed	Three-awn	Sand Paspalum	Sand sagebrush	Broom snakeweed

3.6 Regulatory Compliance

A storm water discharge permit (NPDES) will be required for construction activities during site closure, and must be obtained prior to implementing closure operations. Temporary erosion controls, such as silt fence, compost socks, or hay bales, will be placed around the construction zone during construction, but will be removed upon completion of the site closure. Dust will be controlled periodically during earthwork operations by watering haul roads and other dust generating areas, as necessary.

3.7 Closure Operations and Schedule

Although a specific schedule of operations will be prepared by the construction contractor selected to perform the closure, a general schedule follows.

Week 1:

- Notify OCD that closure operations will commence (advance notice will have been given 60 days prior)
- Stop brine water delivery into the pond
- Prepare Storm Water Pollution Prevention Plan (SWPPP)

Weeks 1-4:

- Evaporate water from pond
- Mobilize construction equipment
- Install sediment controls

Weeks 5-8:

- Remove liners and residuals, or complete closure in place
- Sample and analyze underlying soil
- Perform vegetation survey and soil analysis for amendments and seed mix
- Regrade pond area to final contours

Week 9:

- Revegetate site

APPENDIX B

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, September 27, 2011 8:27 AM
To: 'Weaver, Ron'
Cc: Parker, Ken; Schmaltz, Randy; Gonzales, Elidio L, EMNRD
Subject: RE: GW-007 H2S Contingency Plan Requirements
Attachments: Jal typical GC 9-27-2011.pdf

Ron, et al.:

The New Mexico Oil Conservation Division (OCD) is in receipt of your analytical data confirming that an H2S Contingency Plan is **not** required under the OCD Regulations (§ 19.15.11 NMAC- Hydrogen Sulfide Gas).

Please retain this message for your records.

Please notify the OCD if conditions change.

Thank you.

File: OCD Online "GW-007 H2S Contingency Plan"

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/
"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Weaver, Ron [mailto:Ron.Weaver@wnr.com]
Sent: Tuesday, September 27, 2011 8:16 AM
To: Chavez, Carl J, EMNRD
Cc: Parker, Ken; Schmaltz, Randy
Subject: RE: GW-007 H2S Contingency Plan Requirements

Helps if you actually attach the file, doesn't it? Sorry about that.

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Tuesday, September 27, 2011 7:26 AM
To: Weaver, Ron
Cc: Parker, Ken; Schmaltz, Randy
Subject: RE: GW-007 H2S Contingency Plan Requirements

Ron:
Good morning. The attachment was not received. Could you resend it? Thank you.
Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau

WESTERN REFINING - EL PASO, TX
Sample Report

Sample Number: 64143
Product: TKFLDLPG2
Tank No.: 0158
Batch ID:
Comment:
Date Sampled: 9/26/2011 04:48:27

Analysis ID	Component Name	Result	Units	Pass/Fail
GCVOL/1	Hexanes_Plus_(C6+)	0.00	%vol	Pass
GCVOL/1	Methane_(C1)	0.19	%vol	Pass
GCVOL/1	Ethane_(C2)	0.03	%vol	Pass
GCVOL/1	Ethylene_(C2=)	0.00	%vol	Pass
GCVOL/1	Propane_(C3)	2.01	%vol	Pass
GCVOL/1	Propylene_(C3=)	0.00	%vol	Pass
GCVOL/1	Isobutane_(IC4)	22.40	%vol	Pass
GCVOL/1	N-Butane_(NC4)	75.09	%vol	Pass
GCVOL/1	T-2-Butene_(TC4=2)	0.00	%vol	Pass
GCVOL/1	1-Butene_(C4=1)	0.05	%vol	Pass
GCVOL/1	Isobutylene_(IC4=1)	0.06	%vol	Pass
GCVOL/1	C-2-Butene_(CC4=2)	0.18	%vol	Pass
GCVOL/1	Isopentane_(IC5)	0.02	%vol	Pass
GCVOL/1	N-Pentane_(NC5)	0.00	%vol	Pass
GCVOL/1	1,3-Butadiene	0.00	%vol	Pass
GCVOL/1	3MEC4=1	0.00	%vol	Pass
GCVOL/1	TC5=2	0.00	%vol	Pass
GCVOL/1	2ME=1	0.00	%vol	Pass
GCVOL/1	CC5=2	0.00	%vol	Pass
GCVOL/1	2ME=2	0.00	%vol	Pass
GCVOL/1	C5=1	0.00	%vol	Pass
GCVOL/1	Total_Volume_Percent	100.0	%vol	Pass
GCVOL/1	Specific_Gravity	0.5775		Pass
GCVOL/1	Total_Olefins	0.3	%vol	Pass
OXY_LOWOX/1	Total_Oxygenates_ppm	20.1	ppm	Pass
SULF_4045/1	Sulfur_ppm	2.17	ppm	Pass

WESTERN REFINING - EL PASO, TX
Sample Report

Sample Number: 64153
Product: TKFLDLPG2
Tank No.: 0158
Batch ID:
Comment: Special
Date Sampled: 9/26/2011 07:57:00

Analysis ID	Component Name	Result	Units	Pass/Fail
H2S/1	H2S_ppm	0.25	ppm	Pass

APPENDIX C

Analytical Report 500412

for

Western Refining

Project Manager: Ken Parker

South Brine Pond

29-JAN-15

Collected By: Client

12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-14-18), Arizona (AZ0765), Florida (E871002), Louisiana (03054)
New Jersey (TX007), North Carolina(681), Oklahoma (9218), Pennsylvania (68-03610)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD (L10-135)
Texas (T104704477), Louisiana (04176), USDA (P330-07-00105)

Xenco-Lakeland: Florida (E84098)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

29-JAN-15

Project Manager: **Ken Parker**
Western Refining
P.O. Box 1345
Jal, NM 88252

Reference: XENCO Report No(s): **500412**
South Brine Pond
Project Address:

Ken Parker:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 500412. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 500412 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Kelsey Brooks
Project Manager

Sample Cross Reference 500412

Western Refining, Jal, NM

South Brine Pond

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
South Pond	W	01-14-15 10:00		500412-001

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:
Batch: LBA-959868 Mercury, Total by EPA 245.1
Sample diluted due to reactivity. AS 1/20/15

Batch: LBA-960021 TDS by SM2540C
SM2540C
Batch 960021,
Total dissolved solids recovered below QC limits in the laboratory control sample. Samples affected are: 500412-001.

Certificate of Analysis Summary 500412

Western Refining, Jal, NM

Project Name: South Brine Pond

Project Id:
Contact: Ken Parker
Project Location:

Date Received in Lab: Wed Jan-14-15 01:30 pm
Report Date: 29-JAN-15
Project Manager: Kelsey Brooks

Analysis Requested							
	Lab Id:	500412-001					
	Field Id:	South Pond					
	Depth:						
	Matrix:	WATER					
	Sampled:	Jan-14-15 10:00					
Alkalinity by SM2320B SUB: TX104704215	***Extracted:***						
	Analyzed:	Jan-16-15 10:05					
	Units/RL:	mg/L	RL				
Alkalinity, Total (as CaCO3)		120	4.00				
BTEX by EPA 8021B	***Extracted:***	Jan-14-15 15:00					
	Analyzed:	Jan-14-15 19:45					
	Units/RL:	mg/L	RL				
Benzene		0.00185	0.00100				
Toluene		ND	0.00200				
Ethylbenzene		ND	0.00100				
m_p-Xylenes		ND	0.00200				
o-Xylene		ND	0.00100				
Total Xylenes		ND	0.00100				
Total BTEX		0.00185	0.00100				
Inorganic Anions by EPA 300/300.1	***Extracted:***	Jan-20-15 18:33					
	Analyzed:	Jan-20-15 18:33					
	Units/RL:	mg/L	RL				
Chloride		198000	5000				
Mercury, Total by EPA 245.1 SUB: TX104704215	***Extracted:***	Jan-20-15 11:20					
	Analyzed:	Jan-20-15 14:41					
	Units/RL:	mg/L	RL				
Mercury		ND	0.00200				

Kelsey Brooks
Project Manager

Certificate of Analysis Summary 500412

Western Refining, Jal, NM

Project Name: South Brine Pond

Project Id:
Contact: Ken Parker
Project Location:

Date Received in Lab: Wed Jan-14-15 01:30 pm
Report Date: 29-JAN-15
Project Manager: Kelsey Brooks

Analysis Requested							
	Lab Id:	500412-001					
	Field Id:	South Pond					
	Depth:						
	Matrix:	WATER					
	Sampled:	Jan-14-15 10:00					
Metals by EPA 200.8 SUB: TX104704215	***Extracted:***	Jan-16-15 11:10					
	Analyzed:	Jan-20-15 21:20					
	Units/RL:	mg/L	RL				
Arsenic		ND	0.0800				
Barium		ND	0.320				
Cadmium		ND	0.160				
Chromium		ND	0.160				
Lead		ND	0.160				
Selenium		ND	0.0800				
Silver		ND	0.160				
Metals per ICP by EPA 200.7 SUB: TX104704295	***Extracted:***	Jan-29-15 06:15					
	Analyzed:	Jan-29-15 12:25					
	Units/RL:	mg/L	RL				
Calcium		518	50.0				
Magnesium		1550	5.00				
Potassium		4490	250				
Sodium		105000	250				
TDS by SM2540C	***Extracted:***						
	Analyzed:	Jan-20-15 11:00					
	Units/RL:	mg/L	RL				
Total dissolved solids		283000	5.00				
pH by SM4500-H	***Extracted:***						
	Analyzed:	Jan-16-15 10:00					
	Units/RL:	Deg C	RL				
Temperature		21.4					

Kelsey Brooks
Project Manager

Certificate of Analysis Summary 500412

Western Refining, Jal, NM

Project Name: South Brine Pond

Project Id:
Contact: Ken Parker
Project Location:

Date Received in Lab: Wed Jan-14-15 01:30 pm
Report Date: 29-JAN-15
Project Manager: Kelsey Brooks

Analysis Requested							
	Lab Id:	500412-001					
	Field Id:	South Pond					
	Depth:						
	Matrix:	WATER					
	Sampled:	Jan-14-15 10:00					
pH by SM4500-H	***Extracted:***						
	Analyzed:	Jan-16-15 10:00					
	Units/RL:	SU RL					
pH		7.37					

Kelsey Brooks
Project Manager

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

Form 2 - Surrogate Recoveries

Project Name: South Brine Pond

Work Orders : 500412,

Project ID:

Lab Batch #: 959553 **Sample:** 500412-001 / SMP **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 01/14/15 19:45

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0295	0.0300	98	80-120	
4-Bromofluorobenzene	0.0310	0.0300	103	80-120	

Lab Batch #: 959553 **Sample:** 667097-1-BLK / BLK **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 01/14/15 18:06

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0294	0.0300	98	80-120	
4-Bromofluorobenzene	0.0269	0.0300	90	80-120	

Lab Batch #: 959553 **Sample:** 667097-1-BKS / BKS **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 01/14/15 18:23

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0311	0.0300	104	80-120	
4-Bromofluorobenzene	0.0252	0.0300	84	80-120	

Lab Batch #: 959553 **Sample:** 667097-1-BSD / BSD **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 01/14/15 18:39

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0313	0.0300	104	80-120	
4-Bromofluorobenzene	0.0261	0.0300	87	80-120	

Lab Batch #: 959553 **Sample:** 500339-001 S / MS **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 01/14/15 18:55

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0311	0.0300	104	80-120	
4-Bromofluorobenzene	0.0257	0.0300	86	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B

All results are based on MDL and validated for QC purposes.

Form 2 - Surrogate Recoveries

Project Name: South Brine Pond

Work Orders : 500412, **Project ID:**

Lab Batch #: 959553 **Sample:** 500339-001 SD / MSD **Batch:** 1 **Matrix:** Water

Units: mg/L **Date Analyzed:** 01/14/15 19:12

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0314	0.0300	105	80-120	
4-Bromofluorobenzene	0.0265	0.0300	88	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B

All results are based on MDL and validated for QC purposes.

Blank Spike Recovery

Project Name: South Brine Pond

Work Order #: 500412 **Project ID:**

Lab Batch #: 960021 **Sample:** 960021-1-BKS **Matrix:** Water

Date Analyzed: 01/20/2015 **Date Prepared:** 01/20/2015 **Analyst:** MHS

Reporting Units: mg/L **Batch #:** 1 **BLANK /BLANK SPIKE RECOVERY STUDY**

TDS by SM2540C Analytes	Blank Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Control Limits %R	Flags
Total dissolved solids	<5.00	1000	1160	116	80-120	

Blank Spike Recovery [D] = 100*[C]/[B]
All results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit

BS / BSD Recoveries

Project Name: South Brine Pond

Work Order #: 500412 **Project ID:**

Analyst: ARM **Date Prepared:** 01/14/2015 **Date Analyzed:** 01/14/2015

Lab Batch ID: 959553 **Sample:** 667097-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00100	0.100	0.0959	96	0.100	0.0983	98	2	70-125	25	
Toluene	<0.00200	0.100	0.111	111	0.100	0.114	114	3	70-125	25	
Ethylbenzene	<0.00100	0.100	0.122	122	0.100	0.126	126	3	71-129	25	
m_p-Xylenes	<0.00200	0.200	0.232	116	0.200	0.240	120	3	70-131	25	
o-Xylene	<0.00100	0.100	0.110	110	0.100	0.114	114	4	71-133	25	

Analyst: JUM **Date Prepared:** 01/20/2015 **Date Analyzed:** 01/20/2015

Lab Batch ID: 959952 **Sample:** 667316-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<1.00	25.0	23.0	92	25.0	22.8	91	1	90-110	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

BS / BSD Recoveries

Project Name: South Brine Pond

Work Order #: 500412 **Project ID:**

Analyst: ANS **Date Prepared:** 01/20/2015 **Date Analyzed:** 01/20/2015

Lab Batch ID: 959868 **Sample:** 667301-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Mercury, Total by EPA 245.1 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Mercury	<0.000200	0.00200	0.00219	110	0.00200	0.00217	109	1	85-115	20	

Analyst: DAB **Date Prepared:** 01/16/2015 **Date Analyzed:** 01/16/2015

Lab Batch ID: 959695 **Sample:** 667164-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Metals by EPA 200.8 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Arsenic	<0.00200	0.100	0.102	102	0.100	0.102	102	0	85-115	20	
Barium	<0.00400	0.100	0.0985	99	0.100	0.106	106	7	85-115	20	
Chromium	<0.00400	0.100	0.0958	96	0.100	0.0999	100	4	85-115	20	
Lead	<0.00200	0.100	0.102	102	0.100	0.110	110	8	85-115	20	
Selenium	<0.00200	0.100	0.106	106	0.100	0.103	103	3	85-115	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

BS / BSD Recoveries

Project Name: South Brine Pond

Work Order #: 500412 **Project ID:**

Analyst: DAB **Date Prepared:** 01/20/2015 **Date Analyzed:** 01/20/2015

Lab Batch ID: 959910 **Sample:** 667305-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Metals by EPA 200.8 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Cadmium	<0.00200	0.100	0.105	105	0.100	0.108	108	3	85-115	20	
Silver	<0.00200	0.0500	0.0527	105	0.0500	0.0535	107	2	85-115	20	

Analyst: DAT **Date Prepared:** 01/29/2015 **Date Analyzed:** 01/29/2015

Lab Batch ID: 960563 **Sample:** 667689-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Metals per ICP by EPA 200.7 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Calcium	<0.100	1.00	1.01	101	1.00	1.01	101	0	85-115	20	
Magnesium	<0.0100	1.00	0.893	89	1.00	0.919	92	3	85-115	20	
Potassium	<0.500	10.0	9.32	93	10.0	9.38	94	1	85-115	20	
Sodium	<0.500	11.0	10.7	97	11.0	10.7	97	0	85-115	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

BS / BSD Recoveries

Project Name: South Brine Pond

Work Order #: 500412 **Project ID:**

Analyst: DHE **Date Prepared:** 01/16/2015 **Date Analyzed:** 01/16/2015

Lab Batch ID: 959648 **Sample:** 959648-1-BKS **Batch #:** 6 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Alkalinity by SM2320B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Alkalinity, Total (as CaCO3)	<4.00	250	256	102	250	257	103	0	80-120	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

Form 3 - MS Recoveries

Project Name: South Brine Pond

Work Order #: 500412

Lab Batch #: 959952 **Project ID:**

Date Analyzed: 01/20/2015 **Date Prepared:** 01/20/2015 **Analyst:** JUM

QC- Sample ID: 500694-001 S **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

Inorganic Anions by EPA 300	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Chloride	222	500	661	88	80-120	

Lab Batch #: 959695

Date Analyzed: 01/16/2015 **Date Prepared:** 01/16/2015 **Analyst:** DAB

QC- Sample ID: 500382-001 S **Batch #:** 1 **Matrix:** Ground Water

Reporting Units: mg/L

Metals by EPA 200.8	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Arsenic	0.00428	0.100	0.107	103	70-130	
Barium	0.0801	0.100	0.195	115	70-130	
Chromium	0.0140	0.100	0.107	93	70-130	
Lead	<0.00200	0.100	0.114	114	70-130	
Selenium	0.00560	0.100	0.104	98	70-130	
Silver	<0.00200	0.0500	0.0524	105	70-130	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

Form 3 - MS / MSD Recoveries

Project Name: South Brine Pond

Work Order # : 500412 **Project ID:**

Lab Batch ID: 959553 **QC- Sample ID:** 500339-001 S **Batch #:** 1 **Matrix:** Water

Date Analyzed: 01/14/2015 **Date Prepared:** 01/14/2015 **Analyst:** ARM

Reporting Units: mg/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00100	0.100	0.0973	97	0.100	0.0986	99	1	70-125	25	
Toluene	<0.00200	0.100	0.113	113	0.100	0.116	116	3	70-125	25	
Ethylbenzene	<0.00100	0.100	0.125	125	0.100	0.102	102	20	71-129	25	
m_p-Xylenes	<0.00200	0.200	0.238	119	0.200	0.248	124	4	70-131	25	
o-Xylene	<0.00100	0.100	0.113	113	0.100	0.117	117	3	71-133	25	

Lab Batch ID: 959868 **QC- Sample ID:** 500160-001 S **Batch #:** 1 **Matrix:** Waste Water

Date Analyzed: 01/20/2015 **Date Prepared:** 01/20/2015 **Analyst:** ANS

Reporting Units: mg/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Mercury, Total by EPA 245.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Mercury	<0.000200	0.00200	0.00248	124	0.00200	0.00249	125	0	70-130	20	

Lab Batch ID: 959868 **QC- Sample ID:** 500308-001 S **Batch #:** 1 **Matrix:** Drinking Water

Date Analyzed: 01/20/2015 **Date Prepared:** 01/20/2015 **Analyst:** ANS

Reporting Units: mg/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Mercury, Total by EPA 245.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Mercury	<0.000200	0.00200	0.00190	95	0.00200	0.00193	97	2	70-130	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

Form 3 - MS / MSD Recoveries

Project Name: South Brine Pond

Work Order # : 500412 **Project ID:**

Lab Batch ID: 959695 **QC- Sample ID:** 500370-001 S **Batch #:** 1 **Matrix:** Ground Water

Date Analyzed: 01/16/2015 **Date Prepared:** 01/16/2015 **Analyst:** DAB

Reporting Units: mg/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Metals by EPA 200.8 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Arsenic	0.0266	0.100	0.125	98	0.100	0.124	97	1	70-130	20	
Barium	0.175	0.100	0.286	111	0.100	0.283	108	1	70-130	20	
Cadmium <01/20/2015 20:04>	<0.00200	0.100	0.106	106	0.100	0.104	104		70-130	20	
Chromium	0.0298	0.100	0.119	89	0.100	0.118	88	1	70-130	20	
Lead	0.00275	0.100	0.113	110	0.100	0.111	108	2	70-130	20	
Selenium	<0.00200	0.100	0.0979	98	0.100	0.0969	97	1	70-130	20	
Silver <01/20/2015 20:04>	<0.00200	0.0500	0.0512	102	0.0500	0.0507	101		70-130	20	

Lab Batch ID: 960563 **QC- Sample ID:** 501096-001 S **Batch #:** 1 **Matrix:** Water

Date Analyzed: 01/29/2015 **Date Prepared:** 01/29/2015 **Analyst:** DAT

Reporting Units: mg/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Metals per ICP by EPA 200.7 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Calcium	30.4	1.00	31.1	70	1.00	31.1	70	0	75-125	20	X
Magnesium	2.63	1.00	3.44	81	1.00	3.41	78	1	75-125	20	
Potassium	15.8	10.0	25.2	94	10.0	25.2	94	0	75-125	20	
Sodium	32.3	11.0	43.2	99	11.0	43.4	101	0	75-125	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

Sample Duplicate Recovery

Project Name: South Brine Pond

Work Order #: 500412

Lab Batch #: 959648 **Project ID:**
Date Analyzed: 01/16/2015 10:05 **Date Prepared:** 01/16/2015 **Analyst:** DHE
QC- Sample ID: 500257-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

SAMPLE / SAMPLE DUPLICATE RECOVERY

Alkalinity by SM2320B Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Alkalinity, Total (as CaCO3)	196	198	1	20	

Lab Batch #: 960021
Date Analyzed: 01/20/2015 11:00 **Date Prepared:** 01/20/2015 **Analyst:** MHS
QC- Sample ID: 500523-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: mg/L

SAMPLE / SAMPLE DUPLICATE RECOVERY

TDS by SM2540C Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	1300	1250	4	10	

Lab Batch #: 959621
Date Analyzed: 01/16/2015 10:00 **Date Prepared:** 01/16/2015 **Analyst:** WRU
QC- Sample ID: 500348-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: Deg C

SAMPLE / SAMPLE DUPLICATE RECOVERY

pH by SM4500-H Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Temperature	21.7	21.7	0	20	U

Lab Batch #: 959621
Date Analyzed: 01/16/2015 10:00 **Date Prepared:** 01/16/2015 **Analyst:** WRU
QC- Sample ID: 500348-001 D **Batch #:** 1 **Matrix:** Water
Reporting Units: SU

SAMPLE / SAMPLE DUPLICATE RECOVERY

pH by SM4500-H Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
pH	7.72	7.72	0	20	U

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.
BRL - Below Reporting Limit

CHAIN OF CUSTODY

Page 1 Of 1

XENCO LABORATORIES

Setting the Standard since 1990

Stafford,Texas (281-240-4200)

Dallas, Texas (214-902-0300)

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Norcross, Georgia (770-449-8800)

Lakeland, Florida (863-646-8526)

Tampa, Florida (813-620-2000)

Xenco Quote #

Xenco Job # 500412

Client / Reporting Information

Company Name / Branch: Western Refining

Company Address: PO Box 1345 JAL, NM

Email: Ken.Parker@wnr.com Phone No: 575-631-7933

Project Contact: Ken Parker

Samplers's Name: Ken Parker

Project Information

Project Name/Number:

Project Location: South Brine Pond

Invoice To: Western Refining PO Box 1345 JAL, NM 88252

PO Number:

Analytical Information

No.	Field ID / Point of Collection	Collection: Sample Depth	Collection: Date	Collection: Time	Matrix	# of bottles	Number of preserved bottles: HCl	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	MEOH	NONE	Btex	Metals RCRA-8	Cations (Ca, Mg, Na, K)	Cl, Alkalinity	TDS	PH
1	South Pond		1-14-15	10:00A	W	5									✓	✓	✓	✓	✓	✓
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Matrix Codes

A= Air
S = Soil/Sed/Solid
GW =Ground Water
DW = Drinking Water
P = Product
SW = Surface water
SL = Sludge
WW= Waste Water
W = Wipe
O = Oil

WW= Waste Water

Field Comments

Turnaround Time (Business days)

- ☐ Same Day TAT
- ☒ 5 Day TAT
- ☐ Next Day EMERGENCY
- ☐ 7 Day TAT
- ☐ 2 Day EMERGENCY
- ☐ Contract TAT
- ☐ 3 Day EMERGENCY

TAT Starts Day received by Lab, if received by 3:00 pm

Data Deliverable Information

- ☐ Level II Std QC
- ☐ Level IV (Full Data Pkg /raw data)
- ☐ Level III Std QC+ Forms
- ☐ TRRP Level IV
- ☐ Level 3 (CLP Forms)
- ☐ UST / RG -411
- ☐ TRRP Checklist

Notes:

FED-EX / UPS: Tracking #

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Ken Parker	1-14-15 1:30PM	1	2	1/14/15 1550	2
3	Relinquished by:	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
5	Relinquished by:	Date Time:	Received By: 5	Custody Seal #	Preserved where applicable ☐	On Ice ☒ Cooler Temp. Thermo. Corr. Factor 5.0

Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to XENCO Laboratories and its affiliates, subcontractors and assigns XENCO's standard terms and conditions of service unless previously negiotiated under a fully executed client contract.

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: Western Refining

Date/ Time Received: 01/14/2015 01:30:00 PM

Work Order #: 500412

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used :

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	5
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seals intact on shipping container/ cooler?	**N/A**
#5 Custody Seals intact on sample bottles?	**N/A**
#6 *Custody Seals Signed and dated?	**N/A**
#7 *Chain of Custody present?	**Yes**
#8 Sample instructions complete on Chain of Custody?	**Yes**
#9 Any missing/extra samples?	**No**
#10 Chain of Custody signed when relinquished/ received?	**Yes**
#11 Chain of Custody agrees with sample label(s)?	**Yes**
#12 Container label(s) legible and intact?	**Yes**
#13 Sample matrix/ properties agree with Chain of Custody?	**Yes**
#14 Samples in proper container/ bottle?	**Yes**
#15 Samples properly preserved?	**Yes**
#16 Sample container(s) intact?	**Yes**
#17 Sufficient sample amount for indicated test(s)?	**Yes**
#18 All samples received within hold time?	**Yes**
#19 Subcontract of sample(s)?	**Yes**
#20 VOC samples have zero headspace (less than 1/4 inch bubble)?	**Yes**
#21 <2 for all samples preserved with HNO3,HCL, H2SO4? Except for samples for the analysis of HEM or HEM-SGT which are verified by the analysts.	**Yes**
#22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst:

PH Device/Lot#:

Checklist completed by: Kelsey Brooks Date: 01/14/2015

Checklist reviewed by: Kelsey Brooks Date: 01/14/2015

APPENDIX

A

JAL BRINE PIT

JAL, NEW MEXICO

CIVIL CONSTRUCTION PLANS

ENGINEER'S NOTES

1. THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES, THEY ARE RELEASED FOR PRICING ONLY.

2. A THOROUGH ATTEMPT HAS BEEN MADE TO SHOW THE LOCATIONS OF ALL UNDERGROUND OBSTRUCTIONS AND UTILITY LINES IN THE WORK AREA. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO OBSTRUCTIONS AND UTILITY LINES ENCOUNTERED DURING CONSTRUCTION AND SHALL DETERMINE THE EXACT LOCATION OF UTILITIES IN THE AREA.

3. THE ENGINEER MAKES NO REPRESENTATION OR GUARANTEE REGARDING EARTHWORK QUANTITIES OR THAT THE EARTHWORK FOR THIS PROJECT WILL BALANCE DUE TO THE VARYING FIELD CONDITIONS, CHANGING SOIL TYPES, ALLOWABLE CONSTRUCTION TOLERANCES, AND CONSTRUCTION METHODS THAT ARE BEYOND THE CONTROL OF THE ENGINEER.

4. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL THOROUGHLY SATISFY HIMSELF AS TO THE ACTUAL CONDITIONS AND EARTHWORK QUANTITIES, IF ANY. NO CLAIM SHALL BE MADE AGAINST THE OWNER/DEVELOPER OR ENGINEER FOR ANY EXCESS OR DEFICIENCY THEREIN ACTUAL OR RELATIVE.

5. THE ENGINEER WILL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OR FOR SAFETY PRECAUTIONS OR PROGRAMS UTILIZED IN CONNECTION WITH THE WORK, AND HE WILL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. ALL EARTHWORK CONSTRUCTION SHALL CONFORM TO THE LATEST AGENCY SPECIFICATIONS INCLUDING ANY SUPPLEMENTS THERETO AND

7. OWNER/CONTRACTOR IS RESPONSIBLE FOR SURVEY VERIFICATION OF EXISTING HORIZONTAL AND VERTICAL CONDITIONS PRIOR TO START OF CONSTRUCTION. A DEVIATION IN EXISTING CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF WEST COMPANY BEFORE CONSTRUCTION STARTS. WEST COMPANY WILL NOT BE RESPONSIBLE FOR REMOVAL, REPLACEMENT, OR OTHER MODIFICATIONS THAT MAY BE REQUIRED AS A RESULT OF EXISTING CONDITIONS NOT PROPERLY VERIFIED AND CONFIRMED. SHOULD AN ERROR BE FOUND IN THE HORIZONTAL & VERTICAL CONDITIONS, WEST COMPANY WILL BE NOTIFIED AND CONSTRUCTION WILL NOT PROCEED UNTIL REVISIONS AND/OR MODIFICATIONS HAVE BEEN PREPARED AND SUBMITTED BY WEST COMPANY.

VICINITY MAP
N.T.S.

OWNER

Western Refining

WESTERN REFINING, INC.
FACILITY LOCATION:
WESTERN'S JAL LPG FACILITY
INTERSECTION OF MEXICO
HIGHWAY 18 & DEEP WELLS ROAD
LEA, COUNTY NEW MEXICO
(APPROXIMATELY 9 MILES NORTH
OF JAL ON HIGHWAY 18)

ENGINEER

MACON McDONALD, P.E.
WEST COMPANY OF MIDLAND, L.L.C.
110. W LOUISIANA AVE., STE. 110
MIDLAND, TEXAS 79701
TELEPHONE: (432) 687-0865

INDEX OF SHEETS

TITLE SHEET AND INDEX OF DRAWINGS

811 Know what's below. Call before you dig.

THESE PLANS ARE SUBJECT TO REVIEW & APPROVAL BY JURISDICTIONAL ENTITIES

BENCHMARK
COORDINATES, BEARINGS, DISTANCES AND AREAS SHOWN HEREON ARE LAMBERT GRID AND CONFORM TO THE "TEXAS COORDINATE SYSTEM", TEXAS CENTRAL ZONE, NORTH AMERICAN DATUM 1983.

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
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MACON McDONALD NEW MEXICO 11121 REGISTERED PROFESSIONAL ENGINEER
10/19/2015

No.	Date	Revision Notes
	02/28/14	ISSUED FOR PRELIMINARY PRICING
	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

Project Title
JAL BRINE PIT
JAL NEW MEXICO

Western Refining

WESTERN REFINING, INC.

Sheet Title
COVER SHEET

N

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-1 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	

GEOTECHNICAL ENGINEERING REPORT SUMMARY

NOTE: THIS GEOTECHNICAL SUMMARY IS PROVIDED FOR THE CONTRACTORS INFORMATION AND SPECIFICATION GUILDELINES TO BE USED FOR CONSTRUCTION. WESTERN REFINING WILL PROVIDE ALL TESTING REQUIRED FOR THE PROJECT.

GEOTECHNICAL ENGINEERING REPORT NEW BRINE PIT
LEA COUNTY, NEW MEXICO
TERRACON PROJECT NO. A4135085 NOVEMBER 21, 2013

1.1 INTRODUCTION

WESTERN REFINING IS PROPOSING TO CONSTRUCT A NEW BRINE PIT WITHIN THE EXISTING WESTERN REFINING FACILITY LOCATED NEAR THE INTERSECTION OF NEW MEXICO HIGHWAY 18 AND DEEP WELLS ROAD IN LEA COUNTY, NEW MEXICO. OUR SCOPE OF SERVICES INCLUDED DRILLING AND SAMPLING SIX (6) BORINGS TO DEPTHS OF APPROXIMATELY 35 FEET BELOW EXISTING GRADES, FIELD AND LABORATORY TESTING AND ENGINEERING ANALYSES. THE PURPOSE OF THESE SERVICES IS TO PROVIDE INFORMATION AND GEOTECHNICAL ENGINEERING RECOMMENDATIONS RELATIVE TO:

SUBSURFACE SOIL CONDITIONS
GROUNDWATER CONDITIONS
EARTHWORK
BRINE PIT DESIGN AND CONSTRUCTION

2.0 PROJECT INFORMATION

2.1 PROJECT DESCRIPTION

ITEM DESCRIPTION:

PROPOSED CONSTRUCTION A NEW BRINE PIT WILL BE CONSTRUCTED WITHIN THE EXISTING WESTERN REFINING FACILITY LOCATED IN LEA COUNTY, NEW MEXICO THE PIT WILL HAVE AN EARTHEN BERM AROUND THE PERIMETER. THE PIT COULD BE AS MUCH AS 30 FEET DEEP. BASED ON THE PLANNED INCLINATION OF THE PIT BANKS, THE PIT SLOPES APPEAR TO BE 3 (HORIZONTAL) TO 1 (VERTICAL).

GRADING WE ANTICIPATE THAT THE BASE OF THE PIT WILL BE APPROXIMATELY 20 FEET BELOW EXISTING GRADES AND THAT THE TOP OF THE PERIMETER BERM WILL BE APPROXIMATELY 10 FEET ABOVE EXISTING GRADES.CUT AND FILL SLOPES ASSUMED TO BE NO STEEPER THAN 3H:1V (HORIZONTAL TO VERTICAL)FREE-STANDING RETAINING WALLS NONE BELOW GRADE AREAS THE PIT IS PROPOSED TO BE BUILT INTO THE EXISTING TOPOGRAPHY AND IS ANTICIPATED TO BE APPROXIMATELY 30 FEET DEEP.

2.2 SITE LOCATION AND DESCRIPTION

ITEM DESCRIPTION:

LOCATION, THE PROPOSED PROJECT SITE IS LOCATED ON THE NORTHWEST SIDE OF THE INTERSECTION OF NEW MEXICO HIGHWAY 18 AND DEEP WELLS ROAD IN LEA COUNTY, NEW MEXICO. EXISTING IMPROVEMENTS, THE AREA OF THE PROPOSED BRINE PIT APPEARS TO HAVE UNDERGONE PRIOR EXCAVATION AND/OR FILLING. CURRENT GROUND COVER EXPOSED SOIL WITH NATIVE SHRUBS AND GRASSES. EXISTING TOPOGRAPHY SHOWS MODERATE TO STEEP GRADE CHANGES DUE TO PREVIOUS EXCAVATION. SHOULD ANY OF THE ABOVE INFORMATION OR ASSUMPTIONS BE INCONSISTENT WITH THE PLANNED CONSTRUCTION, PLEASE LET US KNOW SO THAT WE MAY MAKE ANY NECESSARY MODIFICATIONS TO THIS REPORT.

3.0 SUBSURFACE CONDITIONS

3.1 TYPICAL PROFILE

CONDITIONS ENCOUNTERED AT THE BORING LOCATIONS ARE INDICATED ON THE BORING LOGS. STRATIFICATION BOUNDARIES ON THE BORING LOGS REPRESENT THE APPROXIMATE LOCATIONS OF CHANGES IN SOIL TYPES; IN-SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL. DETAILS FOR THE BORING LOCATIONS CAN BE FOUND ON THE BORING LOGS IN APPENDIX A OF THIS REPORT. BASED ON THE RESULTS OF THE BORINGS, SUBSURFACE CONDITIONS IN THE AREA OF THE PROPOSED BASIN CAN BE GENERALIZED AS FOLLOWS:

DESCRIPTION, APPROXIMATE DEPTH TO BOTTOM OF STRATUM (FEET) MATERIAL ENCOUNTERED CONSISTENCY/DENSITYSTRATUM I4 TO 5SILTY SAND1, LIGHT BROWN MEDIUM DENSE STRATUM II352CLAYEY SAND1, BROWN MEDIUM DENSE TO VERY DENSE 1 THE NATIVE SILTY SAND (SM) AND CLAYEY SAND (SC) MATERIALS ENCOUNTERED ARE NOT EXPECTED TO EXPERIENCE SUBSTANTIAL VOLUMETRIC CHANGES (SHRINK/SWELL) WITH FLUCTUATIONS IN MOISTURE CONTENT.2BORINGS TERMINATED WITHIN THIS STRATUM AT THE PLANNED DEPTHS OF APPROXIMATELY 35 FEET.

3.2 GROUNDWATER

THE BORINGS WERE ADVANCED IN THE DRY USING CONTINUOUS AUGER DRILLING AND AIR ROTARY TECHNIQUES THAT ALLOW SHORT-TERM GROUNDWATER OBSERVATIONS TO BE MADE WHILE DRILLING. GROUNDWATER SEEPAGE WAS NOT OBSERVED DURING OR AT THE COMPLETION OF DRILLING.

THESE GROUNDWATER OBSERVATIONS PROVIDE AN INDICATION OF THE GROUNDWATER CONDITIONS PRESENT AT THE TIME THE BORING WAS DRILLED. GROUNDWATER CONDITIONS MAY BE DIFFERENT AT THE TIME OF CONSTRUCTION. GROUNDWATER CONDITIONS MAY CHANGE BECAUSE OF SEASONAL VARIATIONS IN RAINFALL, RUNOFF AND LANDSCAPE IRRIGATION.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 GEOTECHNICAL CONSIDERATIONS

GEOTECHNICAL RECOMMENDATIONS FOR THE PROPOSED BRINE PIT INCLUDING EARTHWORK, CONSTRUCTION, AND LINER MATERIAL CONSIDERATIONS ARE PRESENTED IN THE FOLLOWING REPORT SECTIONS.

4.2 EARTHWORK

4.2.1 SITE PREPARATION

IT IS RECOMMENDED THAT EARTHWORK BEGIN WITH STRIPPING OF EXISTING FILL PILES, SCRAP METAL, DISCARDED CONCRETE, OTHER FOREIGN/DELETERIOUS MATERIALS, ROOT ZONE SOILS, VEGETATION, AND SOFT OR OTHERWISE UNSUITABLE MATERIALS FROM THE SURFACE OF THE PROPOSED CONSTRUCTION AREAS. EXCAVATION OF THE NEAR SURFACE MATERIALS CAN GENERALLY BE HANDLED USING CONVENTIONAL EARTHMOVING EQUIPMENT.

AREAS REQUIRING FILL SHOULD BE PROOF ROLLED PRIOR TO FILL PLACEMENT. THE PROOF-ROLLING SHOULD BE PERFORMED WITH A FULLY LOADED, TANDEM-AXLE DUMP TRUCK OR OTHER EQUIPMENT PROVIDING AN EQUIVALENT SUBGRADE LOADING. A MINIMUM GROSS WEIGHT OF 20 TONS IS RECOMMENDED FOR THE PROOF-ROLLING EQUIPMENT. THE PROOF ROLLING SHOULD CONSIST OF SEVERAL OVERLAPPING PASSES IN MUTUALLY PERPENDICULAR DIRECTIONS OVER A GIVEN AREA. ANY SOFT OR PUMPING AREAS SHOULD BE EXCAVATED TO FIRM GROUND. EXCAVATED AREAS SHOULD BE BACKFILLED WITH PROPERLY PLACED AND COMPACTED FILL AS DISCUSSED IN SECTION 4.2.3 COMPACTION REQUIREMENTS.
4.2.2 SUITABLE GENERAL FILL

THE ON-SITE SOILS, FREE OF DELETERIOUS MATERIALS INCLUDING BUT NOT LIMITED TO VEGETATION, DEBRIS, AND ROCKS GREATER THAN 4 INCHES IN MAXIMUM DIMENSION, ARE GENERALLY SUITABLE FOR POND EMBANKMENT FILL. IMPORTED FILL MATERIAL SHOULD BE CLEAN SOIL WITH A LIQUID LIMIT (LL) OF LESS THAN 35 PERCENT AND A PLASTICITY INDEX (PI) LESS THAN 15.

4.2.3 COMPACTION REQUIREMENTS

ENGINEERED FILL WILL BE TESTED FOR MOISTURE CONTENT AND COMPACTION DURING PLACEMENT. SHOULD THE RESULTS OF THE IN-PLACE DENSITY TESTS INDICATE THE SPECIFIED MOISTURE OR COMPACTION LIMITS HAVE NOT BEEN MET, THE AREA REPRESENTED BY THE TEST SHOULD BE REWORKED AND RETESTED AS REQUIRED UNTIL THE SPECIFIED MOISTURE AND COMPACTION REQUIREMENTS ARE ACHIEVED.

ITEM DESCRIPTION:

SUBGRADE PREPARATION TO RECEIVE FILL SURFACE SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES, MOISTURE CONDITIONED AND COMPACTED. LIFT THICKNESS 9-INCHES OR LESS LOOSE LIFT THICKNESS GENERAL FILL AND SUBGRADE COMPACTION AT LEAST 95% MAXIMUM STANDARD PROCTOR DRY DENSITY (ASTM D 698) IN THE RANGE OF ±2 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE FOR ON-SITE SOILS AND IMPORTED FILL.

4.3 POND LINER

WE ESTIMATE THAT THE NEAR SURFACE SOILS HAVE RELATIVELY HIGH HYDRAULIC CONDUCTIVITY RATES DUE TO THEIR GRANULAR NATURE. SINCE THE BRINE PIT IS DESIGNED TO RETAIN WATER, THE USE OF ONSITE MATERIAL AS A NATURAL LINER IS NOT RECOMMENDED. HIGH DENSITY POLYETHYLENE (HDPE) LINER IS RECOMMENDED FOR THIS SITE. THE HIGH DENSITY POLYETHYLENE LINER SHOULD BE PLACED ON COMPACTED ON-SITE MATERIAL USED AS SUBGRADE. THE ON-SITE SUB-LINER MATERIAL SHOULD NOT CONTAIN ANY ROCK GREATER THAN 1 INCH IN DIAMETER. THERE ARE MANY COMPANIES THAT MANUFACTURE THESE PLASTIC LINERS, AND THE CONTRACTOR SHOULD STRICTLY FOLLOW THE DESIGN AND CONSTRUCTION STANDARDS AND PROCEDURES RECOMMENDED BY THE MANUFACTURER, WITH PARTICULAR ATTENTION PAID TO ORIENTATION/PLACEMENT OF SHEETING, OVERLAPPING, SEALING, SEAM TESTING, AND TOP ANCHORAGE.

4.4 SLOPE STABILITY

IN GENERAL THE EXISTING SOILS AND RE-COMPACTED FILL SHOULD BE STABLE AT A 3H TO 1V SLOPE WITH A GLOBAL SLOPE STABILITY FACTOR OF SAFETY OF AT LEAST 2. WE UNDERSTAND MATERIALS EXCAVATED FROM AREAS OF DEEP CUTS WILL BE USED TO FILL IN LOWER LYING AREAS AROUND THE PROPOSED BRINE PIT. ONCE THE INTENDED FILL MATERIALS ARE DETERMINED AND AVAILABLE FOR TESTING, ADDITIONAL TESTING AND ANALYSES WILL LIKELY BE REQUIRED TO VERIFY ADHERENCE TO THE RECOMMENDATIONS.

GENERAL NOTES

SITE CLEARING:

1. ALL ITEMS IN PROJECT AREA ARE TO BE REMOVED. ITEMS MAY REQUIRE TEMPORARY SUPPORT DURING EXCAVATION.
2. ALL UNIDENTIFIED UNDERGROUND OBSTUCTIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S ENGINEER FOR IDENTIFICATION AND INSTRUCTIONS REGARDING THEIR DISPOSITION.
3. EXCAVATION SHALL INCLUDE THE REMOVAL OF ALL DEBRIS, CONCRETE, PIPING AND VEGETATION AND/ OR ANY OTHER ITEMS LOCATED WITHIN THE PROJECT AREA COMPLETELY FROM THE SITE.
4. POSITIVE DRAINAGE SHALL BE ESTABLISHED TO PREVENT SURFACE DRAINAGE INTO AN EXCAVATION AND WATER FROM PONDING WITHIN THE EXCAVATION. IN ADDITION, LOW POINT SUMPS SHALL BE LOCATED WITHIN THE EXCAVATION.
5. CONTRACTOR TO VERIFY LOCATION OF ALL UNDERGROUND LINES THAT MAY LAY WITHIN THE EXCAVATION LIMITS PRIOR TO BEGINNING ANY EXCAVATION.

CONCRETE, REINFORCING STEEL AND GROUT:

1. CONCRETE CONSTRUCTION SHALL BE PER ACI 318-11.
2. ALL FOUNDATION LOCATIONS AND ELEVATIONS SHALL BE VERIFIED BY FIELD SURVEYORS PRIOR TO THE PLACEMENT OF CONCRETE.
3. CONCRETE SHALL BE CEMENT TYPE 1, 4,000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS, 3" TO 5" SLUMP MAXIMUM AND 1 1/2" NOMINAL COARSE AGGREGATE SIZE UNLESS NOTED OTHERWISE.
4. STEEL BAR REINFORCEMENT FOR CONCRETE SHALL CONFORM TO ASTM A615 GR 60.
5. EPOXY-COATED BARS SHALL CONFORM TO ASTM A775.
6. REINFORCING STEEL BARS SHALL HAVE 60,000 PSI YIELD STRENGTH.
7. GROUT SHALL BE A CEMENTITIOUS MIXTURE MEETING THE FOLLOWING REQUIREMENTS:
   a. CEMENT SHALL BE PORTLAND CEMENT TYPE 1 PER ASTM C150.
   b. SAND SHALL MEET ALL THE REQUIREMENTS OF FINE AGGREGATE PER ASTM C33.
   c. WATER-TO-CEMENT RATIO SHALL NOT BE MORE THAN 0.45 BY WEIGHT.
   d. INSTALLED GROUT MIX SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF NO LESS THAN 4000 PSI AT 28 DAYS AS DETERMINED BY TESTS PER ASTM C109.
   e. GROUT SHALL BE NON-SHRINK.
10. NEW CONCRETE SHALL BE BONDED TO EXISTING CONCRETE USING THE FOLLOWING PROCEDURE:
    a. CONCRETE SURFACE SHALL BE CHIPPED TO APPROXIMATELY ½" DEPTH WITH A LIGHT, HAND CHIPPING TOOL TO PROVIDE A ROUGH SURFACE FOR BONDING.
    b. THE SURFACES SHALL BE DRY AND ALL LOOSE MATERIAL. OIL OR OTHER CONTAMINATES SHALL BE REMOVED FROM THE SURFACE OF THE EXISTING CONCRETE.
    c. COAT THE ENTIRE CONTACT SURFACE OF THE EXISTING CONCRETE WITH LARSEN'S WELD-CRETE OR APPROVED EQUAL IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
    d. LARSEN'S WELD-CRETE SHALL NOT BE PLACED MORE THAN SEVEN (7) DAYS PRIOR TO THE PLACEMENT OF THE NEW CONCRETE.
11. CONCRETE COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:
    a. CONCRETE DEPOSITED DIRECTLY AGAINST THE EARTH OR SEAL SLAB: 3" CLEAR REQUIRED.
    b. CONCRETE EXPOSED TO EARTH OR WEATHER AFTER REMOVAL OF FORMS: 2" CLEAR REQUIRED.
    c. CONCRETE COVER IS TO BE MEASURED FROM OUTERMOST SURFACE OF OUTERMOST SURFACE OF REINFORCING STEEL TO CONCRETE SURFACE.
12. STEEL ASSOCIATED WITH CONCRETE SHALL BE HOT DIP GALVANIZED UNLESS NOTED OTHERWISE. GALVANIZING SHALL BE PER ASTEM A123 AND ALL APPLICABLE PROVISIONS.
13. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE A ¾" CHAMFER UNLESS NOTED OTHERWISE.

ABBREVIATIONS:

CL	CENTER LINE
EA.	EACH
ELEV.	ELEVATION
EXIST.	EXISTING
FF	FINISHED FLOOR
FDN.	FOUND
FL	FLOW LINE
F.S.	FAR SIDE
H.R.	HANDRAIL
MAX.	MAXIMUM
M.E.G.	MATCH EXISTING GRADE
N.F.	NEAR SIDE
O.C.	ON CENTER
PL	PLATE
PROJ.	PROJECTION
R	RADIUS
REQ'D.	REQUIRED
SPA.	SPACE OR SPACING
T.O.C.	TOP OF CONCRETE
T.O.G.	TOP OF GROUT
T.O.S.	TOP OF STEEL
TYP.	TYPICAL
U.O.N	UNLESS OTHERWISE NOTED
W.P.	WORK POINT

STAINLESS STEEL

a. STRUCTURAL SHAPES: CONDITION A, FINISH CLASS A, TYPE 316 (UNS S31600). ASTM A276
b. STRUCTURAL PLATE: TYPE 316 (UNS S31600), ASTM A666
c. THREADED STUDS: ALLOY GROUP 2, ASTM F593
d. BOLTS: ALLOY GROUP 2, ASTM F593
e. NUTS: ALLOY GROUP 2, ASTM F594
f. SS ANCHORS: HILTI KB-TZ SS 316
g. WELDING: PER REQUIREMENTS OF AWS D1.5

PLASTICS:

1. HDPE LINER SYSTEM: SEE SPECIFICATIONS PROVIDED BY MANUFACTURER.
2. PVC PIPE: ASTM D1785 "Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40 AND 80

GOVERNMENT AND INDUSTRY CODES AND STANDARDS:

1. STRUCTURAL ENGINEERING INSTITUTE/AMERICAN SOCIETY OF CIVIL ENGINEERS "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES." SEI/ASCE 7-10.
2. AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE," ACI 318-11.
3. AMERICAN SOCIETY FOR TESTING AND MATERIALS, VARIOUS ASTM STANDARDS AS SPECIFIED IN CONSTRUCTION DOCUMENTS.
4. APPLICABLE FEDERAL, STATE AND LOCAL CONSTRUCTION SAFETY STANDARDS AND REGULATIONS.

SECTION 5 PERMIT NOTES

1.0 CERTIFIED ENGINEERING DESIGN

Construction plans and specifications for the proposed new pond were prepared by West Company and certified by Macon McDonald, New Mexico Professional Engineer #11121. In compliance with the requirements of 19.15.17.9.B.1(a) NMAC, Sheet C-2 (and others) include specifications for materials and construction. The geotechnical specifications include site preparation (Note 4.2.1), compaction (Note 4.2.3), liner placement (Note 4.3), and materials testing (Note 4.4). Other specifications are also provided for concrete, reinforcing steel, grout, pipe, seams, welds, and other construction.

Quality Assurance is addressed in the construction contract documents, which provide for construction inspections, testing, reporting, and certifications. The Contractor will be held to these requirements to ensure compliance with the engineer's design and allow for rejection and replacement of any substandard materials or construction. The Civil Construction Plans will serve as the construction and installation plan in compliance with 19.15.17.9.B(1) (a) NMAC.

2.0 DIKE PROTECTION AND STRUCTURAL INTEGRITY

Sheet C-2 of the enclosed drawings provides the recommendations of the geotechnical engineer for dike protection and structural integrity. These recommendations included compaction to 95% Maximum Dry Density at ±2% optimum moisture. The conclusion of the geotechnical engineer, as stated in Note 4.4, is that slopes not greater than 3:1 (H:V) will be stable with a safety factor of at least 2.0. As can be seen from Sheet C-7, the side slopes are designed to be 3:1 (H:V) in compliance with 19.15.17.11.G(1) NMAC and the stability recommendation of the geotechnical engineer.

The foundation of the pond is to be scarified to a depth of at least 6 inches and recompacted to 95% of Maximum Proctor Density. The berms incorporate an anchor trench for the liner and underliner (see Sheets C-7 and C-9). The top of the levee is to be 12 ft wide to allow for inspection and maintenance. The foundation is designed to comply with the foundation requirements of 19.15.17.11.G(1) NMAC.

The leak detection system is shown on Sheets C-4 and C-9. The underliner will be constructed of 40-mil HDPE GSEHD Geo Membrane. Over the underliner will be a 200-mil HDPE drainage net for leak monitoring and collection. Monitoring and collection pipes will be constructed of 4-inch Sch. 40 PVC in a gravel filled leak trench, as shown in the detail on Sheet C-9. The collection pipes will be perforated as shown in the detail on Sheet C-9. The grade of these collection pipes varies, as shown on Sheet C-4, but the minimum grade of 2% complies with the requirements of 19.15.17.11.G.(7). These pipes will be connected to a monitoring and collection well as shown in the detail on Sheet C-12, with the penetration through the berm sealed. The monitor well detail is shown on Sheet C-9. This system will provide for adequate fluid collection and removal, and meets the requirements of 19.15.17.11.G.(2), (3) and (7) NMAC.

3.0 LINER SEAMS

The liner seam details are shown on Sheet C-12 of the enclosed drawings. The field seams will be thermally seamed (hot weld) with double track and air pocket, in compliance with 19.15.17.11.G(5) NMAC.

4.0 LINER SPECIFICATION AND COMPATIBILITY

The proposed liner material is HDPE, which is compatible with the brine water being placed in the pond. It is also resistant to any petroleum hydrocarbons that might be associated with the brine water. HDPE is the material that was recommended by the geotechnical engineering firm on the basis of compatibility with both the brine water and the underlying soil conditions. Therefore the liner appears to meet the requirements of 19.15.17.11(G)(3) NMAC.

5.0 INLET LINES

The design plans show the intake connection details on Sheet C-8. Although the lines will penetrate the liner, the penetrations and liner seals are shown on the details. This complies with the requirements of 19.15.17.11(G)(6) NMAC.

6.0 NOTIFICATION

The construction contract specifications include the 72-hour notification requirement of 19.15.17.11(G)(8) NMAC. The Contractor will be required to provide notice to Western Refining Company upon completion of the leak detection system prior to further construction so the NM OCD may inspect the system before the leak detection system is covered. The Contractor will be required to show this on their construction schedule, and the Contractor will not be allowed to cover the system until it has been inspected and accepted by the OCD, if so desired.

7.0 OPERATING AND MAINTENANCE PLAN

The O&M Plan for the proposed new pond is in section 6 of this permit application package. It will be amended, if necessary, upon completion of construction to incorporate any manufacturer's recommendations.

8.0 FREEBOARD AND OVERTOPPING PREVENTION

The pond was designed with 3 ft of freeboard, in compliance with 19.15.17.11(G)(9). Because the pond will be a bermed, surface impoundment there are only two ways of overtopping: 1) direct precipitation; and 2) overfilling of brine water into the pond. As discussed in the climatological report, the 100-year 24-hour rainfall is 6.19 inches, so 3 ft of freeboard is more than adequate to prevent overtopping in the event of a 100-year precipitation event. As discussed in the O&M Plan, overfilling is prevented by routing overflow to the adjacent pond or trucking to a Class II Salt Water Disposal Well, as the brine is RCRA-exempt waste. The berm is more than adequate to prevent run-on, based on the site drainage.
Therefore, the requirements of 19.17.15.11(G)(11) will be met.

19.5.17.11.G.(10) NMAC limits permanent pits to 10 ac-ft (including freeboard). Because the size of this brine pond is dictated by the facility's operations and product throughput, the necessary capacity exceeds this 10 ac-ft limit. As shown on Sheet C-5, the total storage volume including freeboard is 2,133,413.97 cu ft, which is 49 ac-ft. The volume at the maximum brine elevation is 1,714,603 cu ft, or 39 ac-ft. Although the pond has been designed by a New Mexico Professional Engineer to meet or exceed the fresh water, public health, and environmental protection requirements, and the design

meets or exceeds the OCD requirements in all other aspects, the pond exceeds the 10 ac-ft limit for permanent pits, and a variance is being requested along with this construction permit application. Because 19.5.17.11.G(10) NMAC is not one of the items that specifically calls for an exception under the Rules, an application is being made for a variance rather than an exception.

9.0 NUISANCE AND HAZARDOUS ODORS

There is no H_2S associated with the operations at this site. This is confirmed by analytical data and has been previously recognized by the OCD (Appendix C).

10.0 EMERGENCY RESPONSE PLAN

The Emergency Response Plan is found in section 8 of the permit application package.

11.0 WASTE STREAM CHARACTERIZATION

There is no waste stream, as the ponds contain only brine with no or minimum hydrocarbons, as documented in Appendix D. Excess brine is disposed of in Class II Salt Water Disposal Well, as the brine is RCRA-exempt waste.

12.0 MONITORING AND INSPECTION PLAN

The leak detection system shall be inspected monthly to determine if the primary containment is leaking. All channels and culverts will be periodically inspected, at least twice annually and after any major precipitation event. Any sediment deposits and debris will be removed from the channels and culverts as necessary, and any erosion damage, if present, will be repaired or controlled. The inspection will also note any dead migratory birds or other wildlife and report on such within 30 days of the observation.

13.0 EROSION CONTROL

Temporary erosion control will be implemented as necessary during construction of the new pond. This will include NPDES permitting if required by the area of disturbance, dust control, protection of stockpiled soil, and revegetation. Upon completion of the pond construction and once the revegetation has taken hold, no additional erosion control measures are anticipated, given the flat topography of the site and absence of any existing areas of erosion.

14.0 CLOSURE PLAN

The Closure Plan is found in section 12 of the permit application package.

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MACON MCDONALD
NEW MEXICO
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10/19/2015

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Western Refining

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Sheet Title
GEOTECHNICAL REPORT SUMMARY / GENERAL NOTES

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-2 of 12
Date: 02.28.14	
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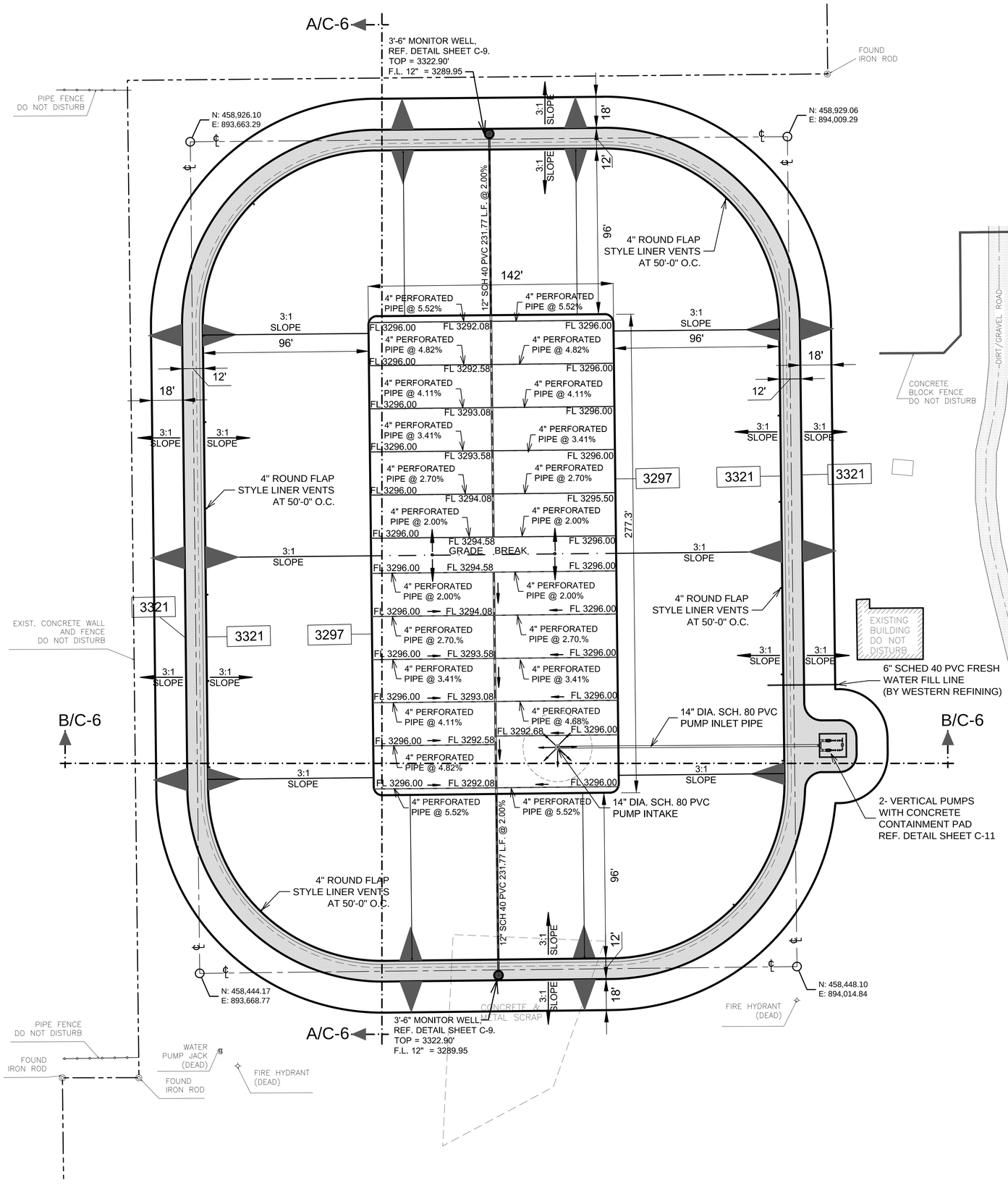
Sheet Title
DEMOLITION PLAN

N

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-3 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	



BRINE POND WORKING CAPACITY

TOP BERM ELEV. = 3321
MAX. BRINE ELEV. = 3318
VOLUME AT MAX. BRINE ELEV. OF 3318 = 1,714,603 CU./FT.
X 0.178107607 CU./FT. TO BBL CONVERSION

= 305,383.84 BBL

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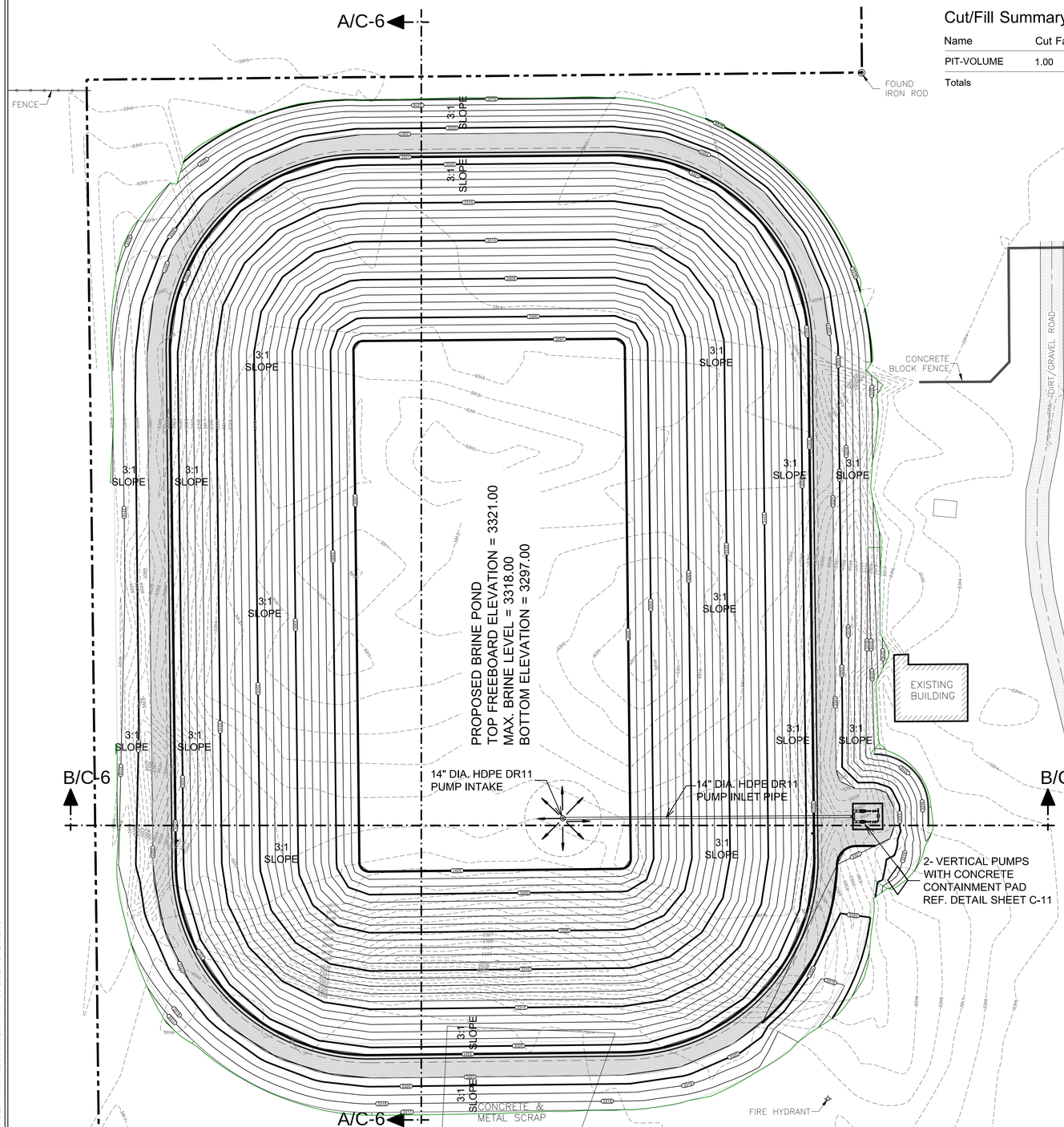
Sheet Title
SITE PLAN LAYOUT

N

0' 30' 60' 90'
SCALE 1" = 30'

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: SCALE: 1" = 30'
Reviewed By: LHW	Sheet No.: C-4 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	



Cut/Fill Summary (Cut & fill summary is approximate, contractor is responsible for all final quantities)

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
PIT-VOLUME	1.00	1.15	168210.48 Sq. Ft.	48452.66 Cu. Yd.	5195.32 Cu. Yd.	43257.34 Cu. Yd.<Cut>
Totals			168210.48 Sq. Ft.	48452.66 Cu. Yd.	5195.32 Cu. Yd.	43257.34 Cu. Yd.<Cut>

BRINE POND WORKING CAPACITY

TOP BERM ELEV. = 3321
MAX. BRINE ELEV. = 3318
VOLUME AT MAX. BRINE ELEV. OF 3318 = 1,714,603 CU./FT.
X 0.178107607 CU./FT. TO BBL CONVERSION

= 305,383.84 BBL

JAL BRINE PIT STORAGE VOLUME

ELEV	AREA (sq. ft.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
3,297.00	39,383.56	N/A	N/A	0.00	N/A	0.00
3,298.00	42,755.44	1.00	41069.50	41069.50	41057.96	41057.96
3,299.00	46,227.85	1.00	44491.65	85561.15	44480.35	85538.31
3,300.00	49,800.80	1.00	48014.33	133575.47	48003.24	133541.55
3,301.00	53,474.27	1.00	51637.53	185213.01	51626.64	185168.20
3,302.00	57,248.28	1.00	55361.27	240574.28	55350.55	240518.75
3,303.00	61,122.81	1.00	59185.55	299759.83	59174.97	299693.72
3,304.00	65,097.88	1.00	63110.35	362870.18	63099.91	362793.64
3,305.00	69,173.48	1.00	67135.68	430005.86	67125.37	429919.01
3,306.00	73,349.61	1.00	71261.55	501267.40	71251.35	501170.35
3,307.00	77,626.27	1.00	75487.94	576755.34	75477.84	576648.20
3,308.00	82,003.46	1.00	79814.87	656570.21	79804.86	656453.06
3,309.00	86,481.18	1.00	84242.32	740812.53	84232.40	740685.46
3,310.00	91,059.44	1.00	88770.31	829582.84	88760.47	829445.93
3,311.00	95,738.22	1.00	93398.83	922981.67	93389.06	922835.00
3,312.00	100,517.54	1.00	98127.88	1021109.55	98118.18	1020953.17
3,313.00	105,397.38	1.00	102957.46	1124067.01	102947.82	1123901.00
3,314.00	110,377.76	1.00	107887.57	1231954.58	107877.99	1231778.99
3,315.00	115,458.67	1.00	112918.21	1344872.80	112908.69	1344687.68
3,316.00	120,640.11	1.00	118049.39	1462922.19	118039.91	1462727.59
3,317.00	125,922.08	1.00	123281.09	1586203.28	123271.66	1585999.25
3,318.00	131,304.58	1.00	128613.33	1714816.61	128603.94	1714603.19
3,319.00	136,787.61	1.00	134046.10	1848862.70	134036.75	1848639.94
3,320.00	142,371.17	1.00	139579.39	1988442.10	139570.09	1988210.02
3,321.00	148,055.27	1.00	145213.22	2133655.32	145203.95	2133413.97

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
110 W. LOUISIANA AVE., SUITE 110,
MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

RANDON McDONALD NEW MEXICO 11121 REGISTERED PROFESSIONAL ENGINEER
10/19/2015

No.	Date	Revision Notes
	02/28/14	ISSUED FOR PRELIMINARY PRICING
	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

Project Title
JAL BRINE PIT
JAL NEW MEXICO

Western Refining

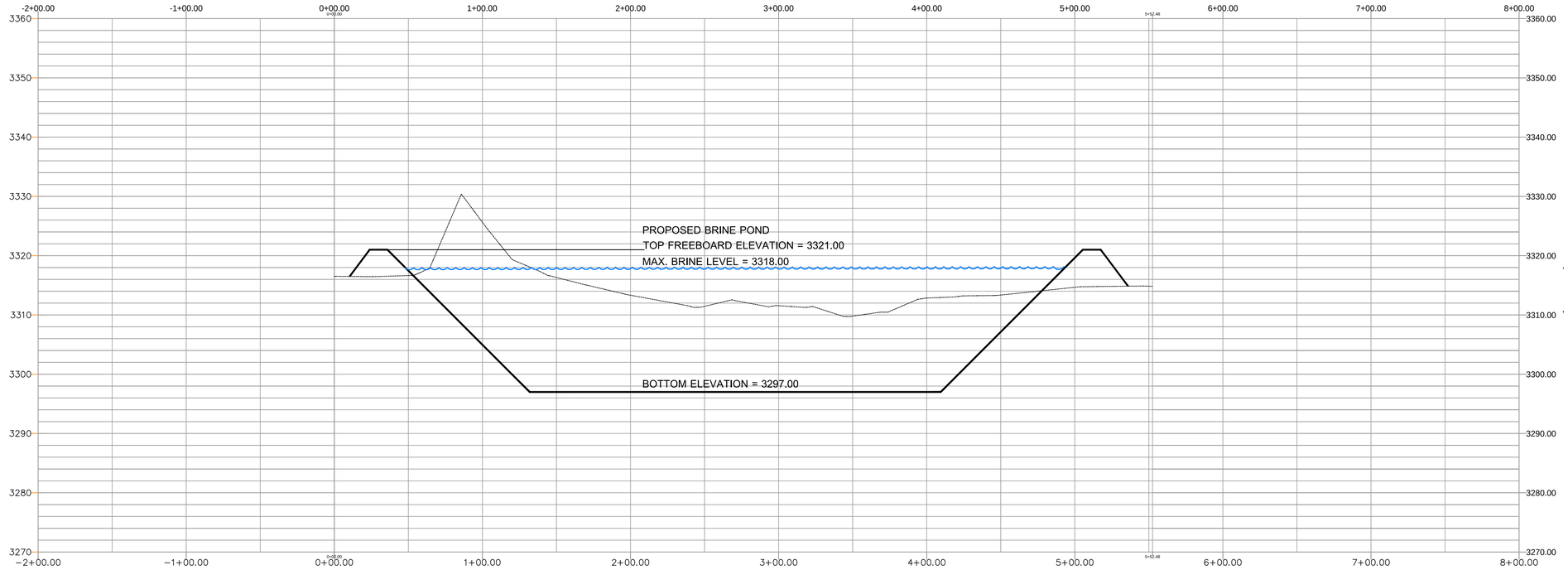
WESTERN REFINING, INC.

Sheet Title
GRADING PLAN LAYOUT

N

0' 30' 60' 90'
SCALE 1" = 30'

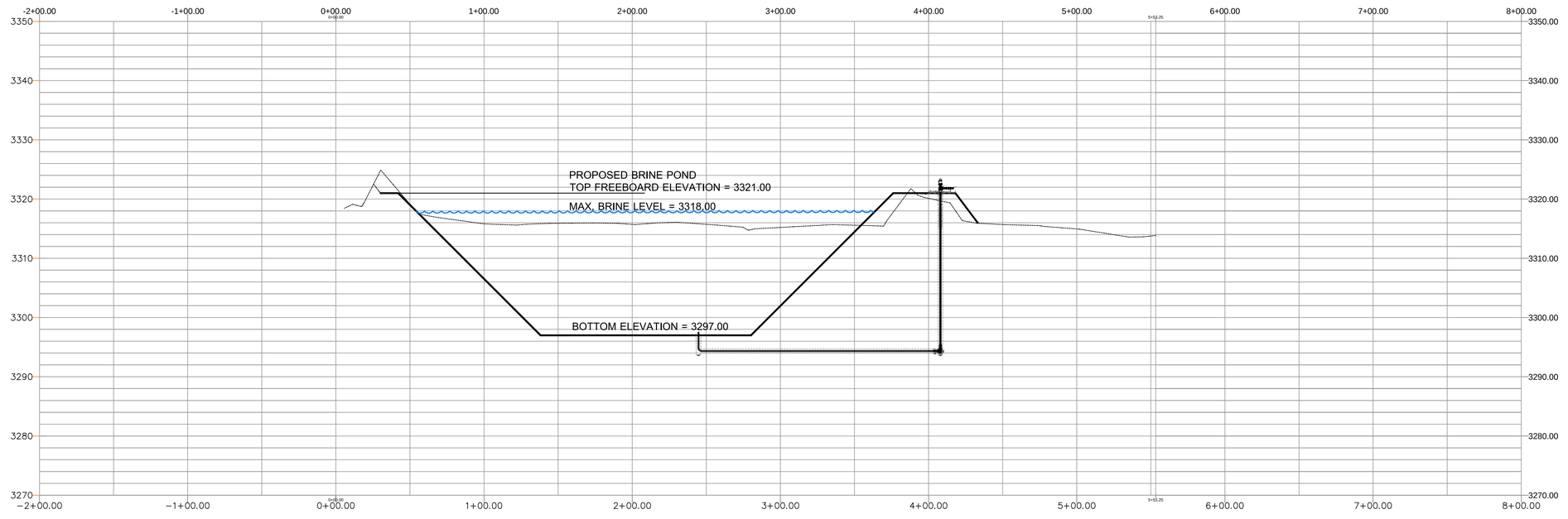
Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: SCALE: 1" = 30'
Reviewed By: LHW	Sheet No.: C-5 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	



POND SECTION A - A

NO SCALE - TYPICAL FOR ALL SLOPES

Station



POND SECTION B - B

NO SCALE - TYPICAL FOR ALL SLOPES

Station

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
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(432) 687-0865 - FAX (432)687-0868

MACON McDONALD
NEW MEXICO
11121
REGISTERED PROFESSIONAL ENGINEER

10/19/2015

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	02/28/14	ISSUED FOR PRELIMINARY PRICING
	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

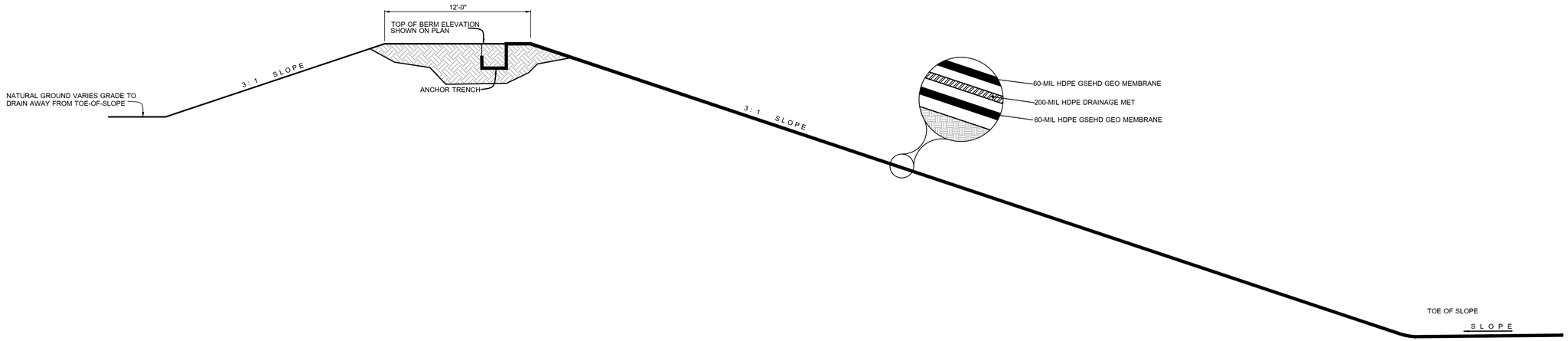
Project Title
JAL BRINE PIT
JAL NEW MEXICO

Western Refining

WESTERN REFINING, INC.

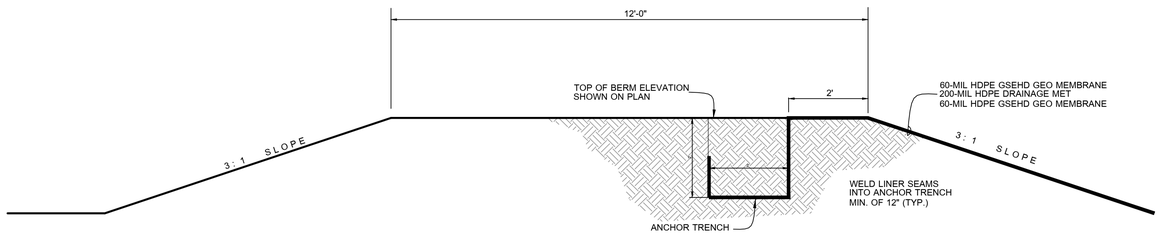
Sheet Title
BRINE PIT POND SECTIONS

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-6
Date: 02.28.14	of 12
CAD File Name: 2013-1466	



POND SECTION

NO SCALE - TYPICAL FOR ALL SLOPES



ANCHOR TRENCH DETAIL

NO SCALE - TYPICAL UNLESS NOTED OTHERWISE

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
110 W. LOUISIANA AVE., SUITE 110,
MIDLAND, TEXAS 79701
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	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

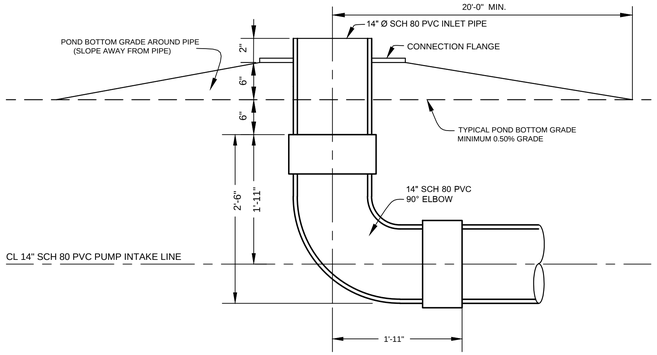
Project Title
JAL BRINE PIT
JAL NEW MEXICO

WESTERN REFINING, INC.

Sheet Title
BRINE PIT DETAILS & SECTIONS

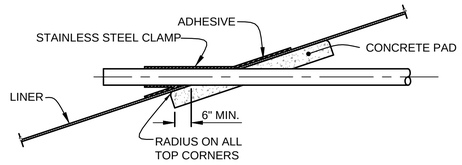
N

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-7 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	



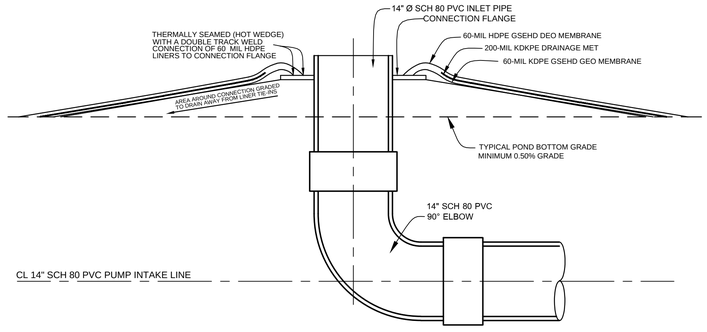
ELEVATION
14" SCH 80 PVC PUMP INTAKE CONNECTION DETAIL

NO SCALE



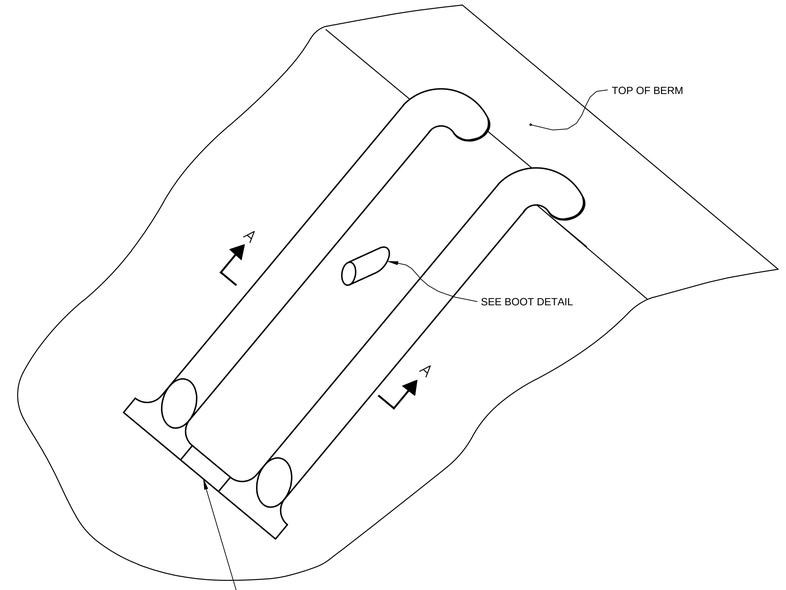
FRESH WATER INLET PIPE TOP LINER BOOT DETAIL

NO SCALE



ELEVATION
14" SCH 80 PVC PUMP INTAKE CONNECTION LINER DETAIL

NO SCALE



SECTION A - A

FRESH WATER INLET PIPE DETAIL

NO SCALE

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
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MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

MACON McDONALD
NEW MEXICO
11121
REGISTERED PROFESSIONAL ENGINEER

10/19/2015

No.	Date	Revision Notes
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	10/19/15	PERMIT REVIEW REVISIONS

Project Title

JAL BRINE PIT
JAL NEW MEXICO

Western Refining

WESTERN REFINING, INC.

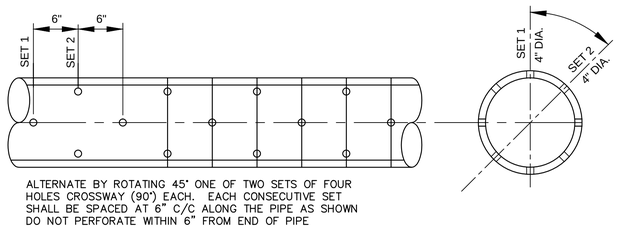
Sheet Title

BRINE PIT DETAILS

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-8 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	

NOTES:

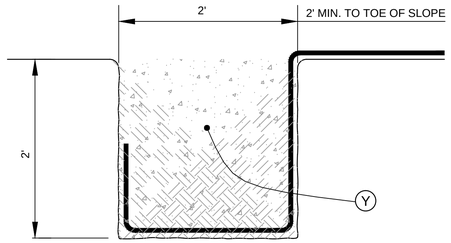
1. SUMP PUMP, ELECTRICAL, AND RETURN LINE ARE TO BE SUPPLIED BY WESTERN REFINING, INC.



ALTERNATE BY ROTATING 45° ONE OF TWO SETS OF FOUR HOLES CROSSWAY (90°) EACH. EACH CONSECUTIVE SET SHALL BE SPACED AT 6" C/C ALONG THE PIPE AS SHOWN DO NOT PERFORATE WITHIN 6" FROM END OF PIPE

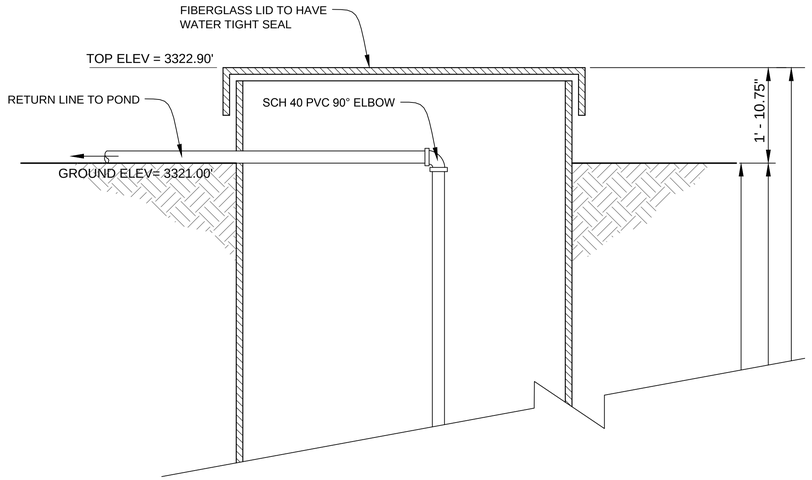
2 PERFORATED 4" SCH 40 PVC PIPE DETAIL

NO SCALE

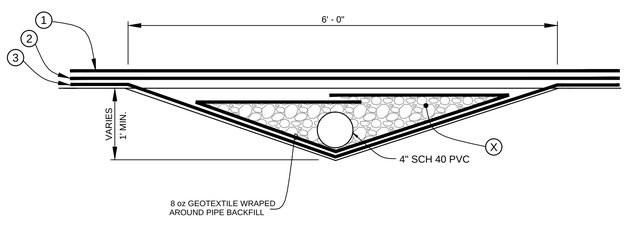


ANCHOR LINING TRENCH DETAIL

NO SCALE

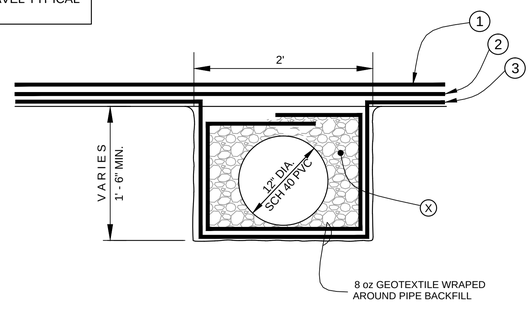


1. 60 MIL HDPE PRIMARY LINER
2. 200 MIL DRAINAGE NET
3. 60 MIL SECONDARY LINER
X. FILL WITH 3/4" TO 1/2" GRAVEL TYPICAL



LEAK TRENCH SECTION

NO SCALE

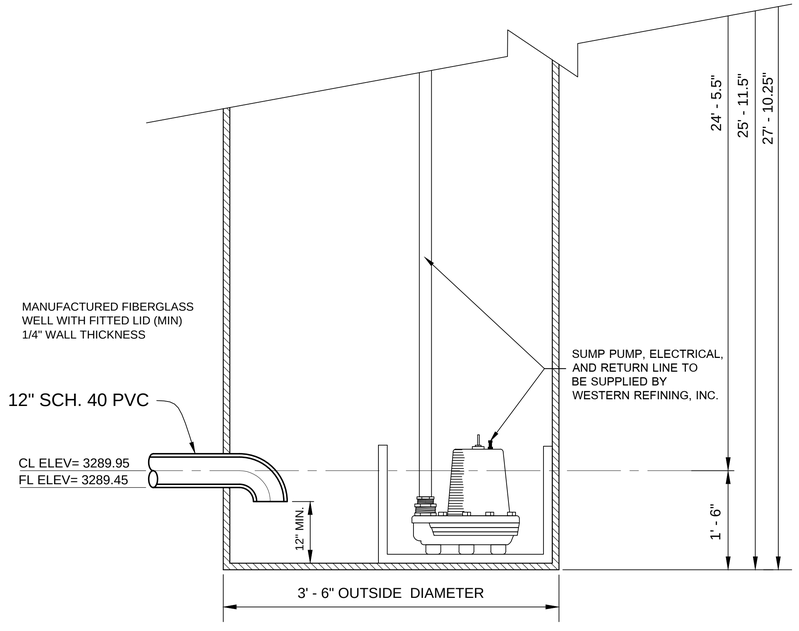


12" SCH 40 PVC TO MONITORING WELL

NO SCALE

LEAK DETECTION PIPE DETAILS

NO SCALE



(TYP.) MONITORING WELL DETAIL

NO SCALE

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
110 W. LOUISIANA AVE., SUITE 110,
MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

MACON McDONALD
NEW MEXICO
11121
REGISTERED PROFESSIONAL ENGINEER
10/19/2015

No.	Date	Revision Notes
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	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

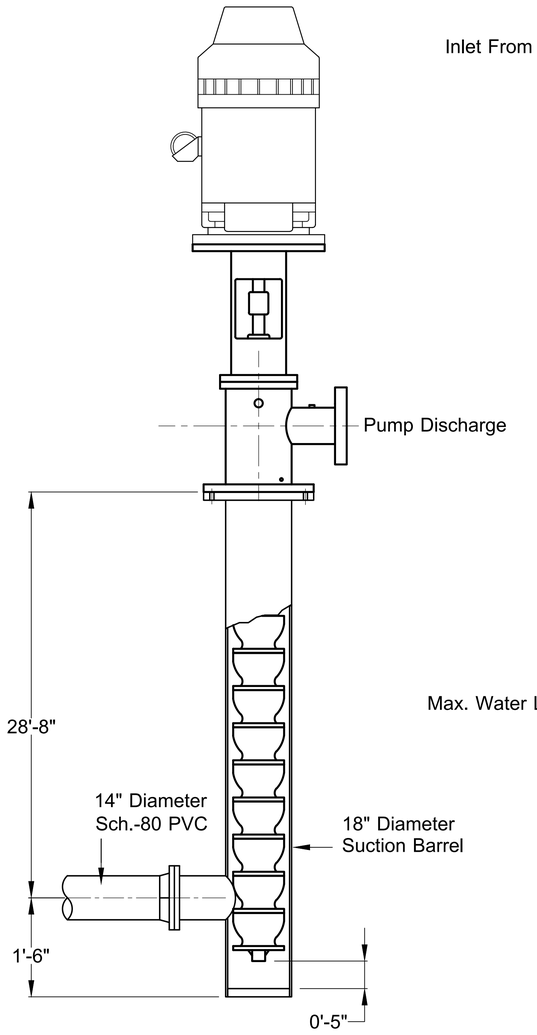
Project Title
JAL BRINE PIT
JAL NEW MEXICO

Western Refining

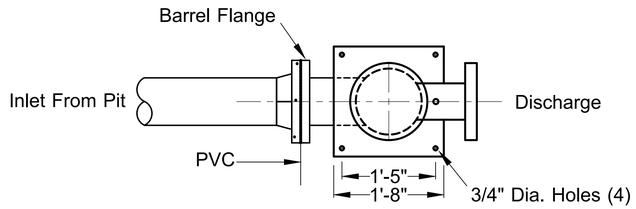
WESTERN REFINING, INC.

Sheet Title
BRINE PIT DETAILS
LEAK DETECTION SYSTEM

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-9 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	



Vertical Pump (Typical 2)



TOP VIEW

ELEV. VIEWS

Suction Line to operate
with both pumps

ANCHOR BOLT DETAIL

(Not to Scale)

JAL BRINE POND VERTICAL PUMP DETAIL

NO SCALE - TYPICAL UNLESS NOTED OTHERWISE

General Pump Notes:

Pumps to be provided by Western refining and installed by contractor
Vertical Industrial Can-Type Pump (Goulds Model VIC or equal)
250 gpm @ 100 psi discharge pressure
Approx. 30 ft. lift.
Brine Water Service (Sp. Gr. 1.2)

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
110 W. LOUISIANA AVE., SUITE 110,
MIDLAND, TEXAS 79701
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MACON McDONALD
NEW MEXICO
11121
REGISTERED PROFESSIONAL ENGINEER
10/19/2015

No.	Date	Revision Notes
	02/28/14	ISSUED FOR PRELIMINARY PRICING
	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

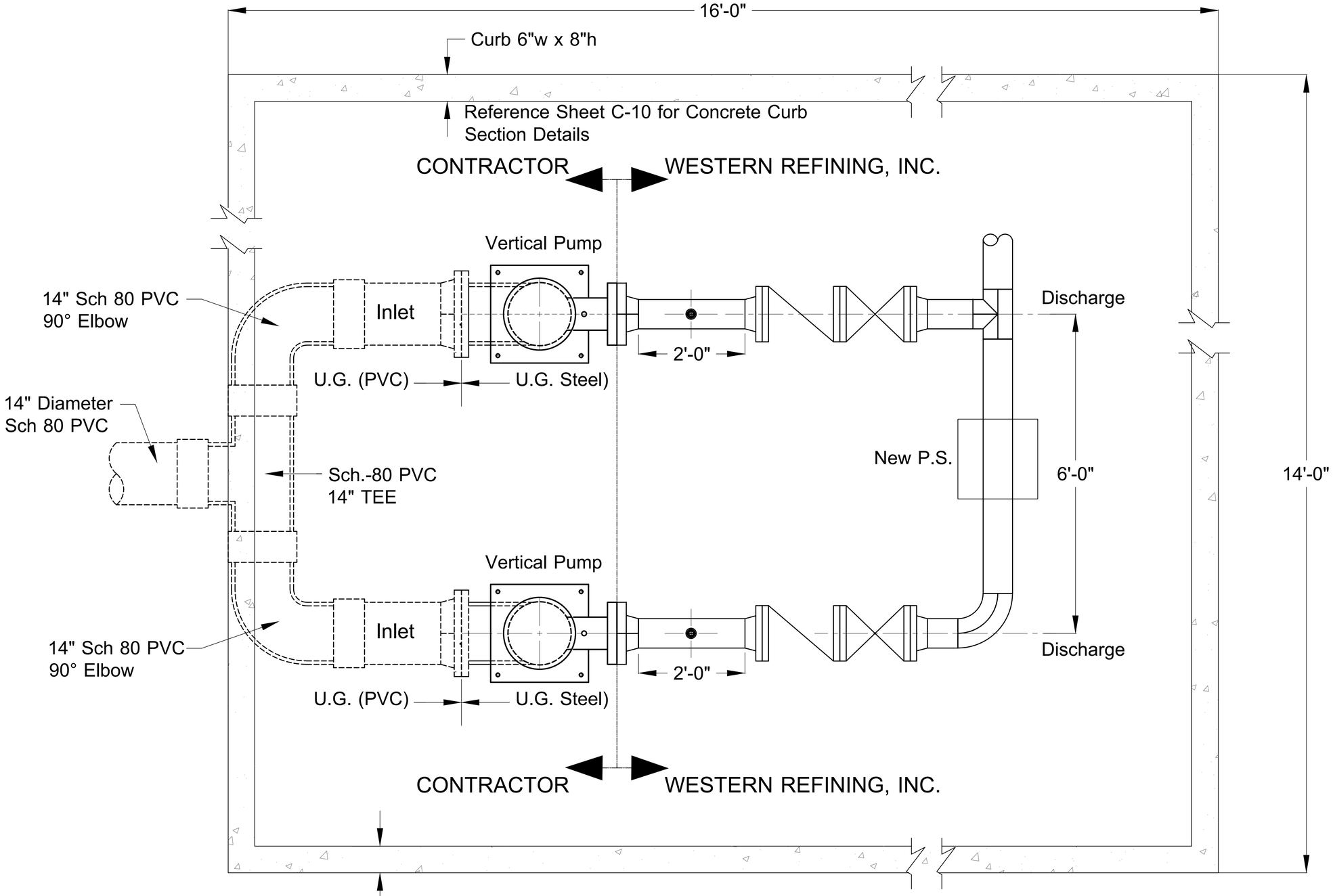
Project Title
JAL BRINE PIT
JAL NEW MEXICO

Western Refining

WESTERN REFINING, INC.

Sheet Title
JAL BRINE POND VERTICAL PUMP DETAILS

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-10 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	



PLAN VIEW

JAL BRINE POND VERTICAL PUMP DETAIL

NO SCALE - TYPICAL UNLESS NOTED OTHERWISE

General Pump Notes:

Pumps to be provided by Western refining and installed by contractor
Vertical Industrial Can-Type Pump (Goulds Model VIC or equal)
250 gpm @ 100 psi discharge pressure
Approx. 30 ft. lift.
Brine Water Service (Sp. Gr. 1.2)

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
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MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

RYAN MACON McDONALD NEW MEXICO 11121 REGISTERED PROFESSIONAL ENGINEER
10/19/2015

No.	Date	Revision Notes
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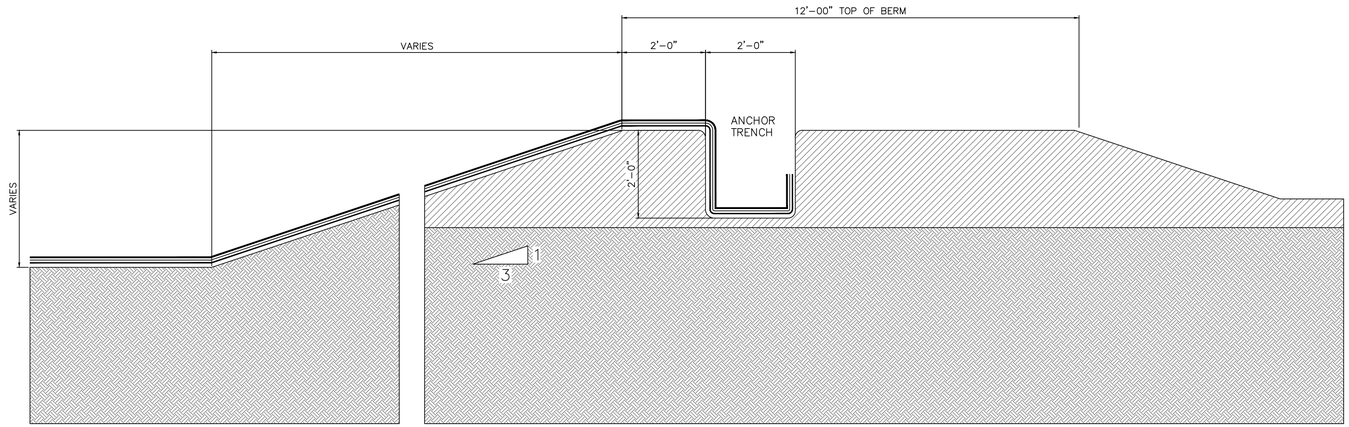
	10/19/15	PERMIT REVIEW REVISIONS

Project Title
JAL BRINE PIT
JAL NEW MEXICO

WESTERN REFINING, INC.

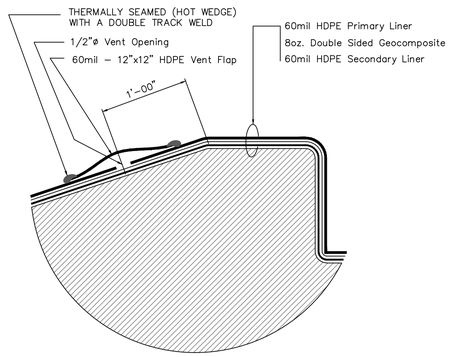
Sheet Title
JAL BRINE POND VERTICAL PUMP DETAILS

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-11
Date: 02.28.14	of 12
CAD File Name: 2013-1466	



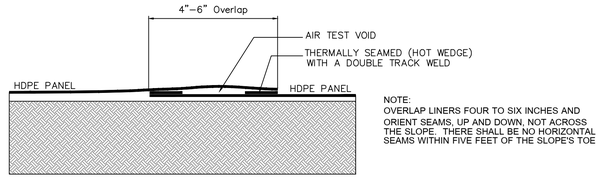
TYPICAL BERM SECTION

NOT TO SCALE



AIR VENT DETAIL

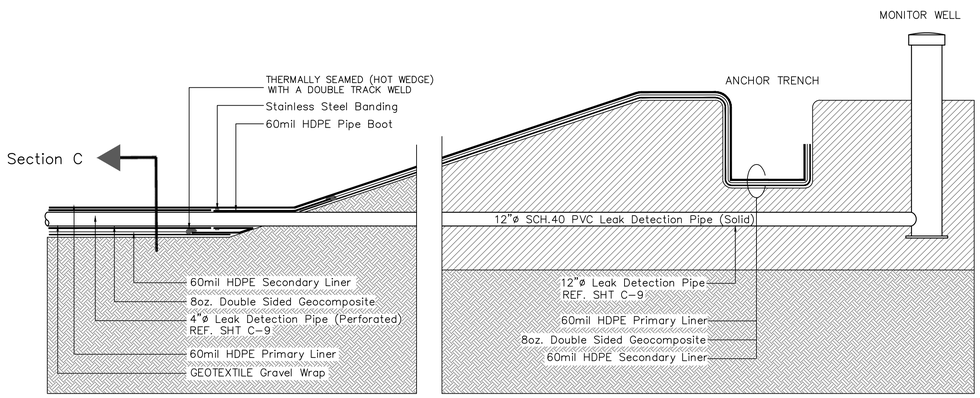
NOT TO SCALE



NOTE:
OVERLAP LINERS FOUR TO SIX INCHES AND ORIENT SEAMS, UP AND DOWN, NOT ACROSS THE SLOPE. THERE SHALL BE NO HORIZONTAL SEAMS WITHIN FIVE FEET OF THE SLOPE'S TOE

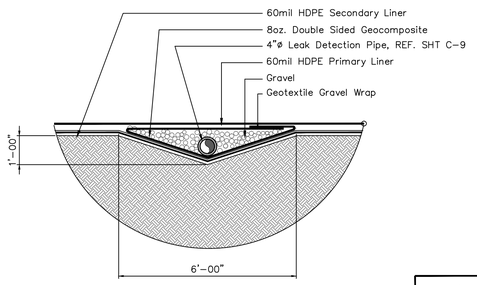
WEDGE WELD DETAIL

NOT TO SCALE



LEAK DETECTION THRU BERM

NOT TO SCALE



DETAIL SECTION C

NOT TO SCALE

DOUBLE LINED POND DETAILS

FALCON ENVIRONMENTAL LINING

Drawn By : JASMIN	Material :	Sheet No.
Date : 01/14/14	60 mil HD GEOTEXTILE	1 / 1
Checked By :		
Scale : Not to Scale		

WEST COMPANY
SURVEYORS - ENGINEERS - PLANNERS
REGISTRATION: FIRM 2184
SURVEYOR REGISTRATION: FIRM 100682-00
110 W. LOUISIANA AVE., SUITE 110,
MIDLAND, TEXAS 79701
(432) 687-0865 - FAX (432)687-0868

MACON McDONALD
NEW MEXICO
11121
REGISTERED PROFESSIONAL ENGINEER
10/19/2015

No.	Date	Revision Notes
	02/28/14	ISSUED FOR PRELIMINARY PRICING
	03/01/14	GRADING REVISION OUTSIDE BERM AREA
	10/19/15	PERMIT REVIEW REVISIONS

Project Title
JAL BRINE PIT
JAL NEW MEXICO

Western Refining

WESTERN REFINING, INC.

Sheet Title
DOUBLE LINED POND DETAILS [FALCON ENVIRONMENTAL LINING SYSTEMS, INC.]

Project Manager: LHW	Project ID: 2013-1466
Drawn By: BLW	Scale: N.T.S.
Reviewed By: LHW	Sheet No.: C-12 of 12
Date: 02.28.14	
CAD File Name: 2013-1466	

Technical Report
In Support of Variance Request

Three Brine Ponds
Jal LPG Storage Facility
Lea County, New Mexico

Prepared for and submitted by:

Western Refining, LLP

6501 Trowbridge Drive
El Paso, Texas
(915)775-3206

December 2015

Prepared by:

JCB Engineering, Inc.

89 Camino Alto
Sandia Park, New Mexico
(505)281-6694

BACKGROUND AND PURPOSE

This technical report has been prepared by JCB Engineering, Inc. (JCB) for Western Refining Company to support a requested waiver from the 10 ac-ft volume limit of Rule 19.15.17.11.G(10) NMAC. JCB was asked to consider the safety of the existing and proposed brine ponds, as described in the design plans prepared for construction. JCB has considered the potential impacts of a catastrophic failure of the existing and proposed berms, based on typical dam safety criteria. However, because the structures are non-jurisdictional and appear to meet the criteria for a low hazard dam, a complete breach analysis and safety evaluation was not performed. This report summarizes JCB's findings relative to a theoretical catastrophic breach of one of the structures.

JURISDICTIONAL CONSIDERATIONS

The New Mexico Office of the State Engineer (OSE) Dam Safety Bureau has jurisdiction over dams and other surface water impoundments in New Mexico that present a threat to public safety and the environment, or are considered unsafe. The OSE's *Dam Safety Design and Operation Criteria* published in 2003 set the limits for this jurisdiction at dams that impounded more than 10 acre-feet of water or had a height greater than 10 feet (p. 2). However, these criteria were changed in 2010 to eliminate from the OSE's jurisdiction dams that could be considered safe even though they fell under OSE's jurisdiction by the 2003 criteria. The new criteria (Figure 1) were based on a combination of dam height and impounded volume to better identify dams and impoundments that could be considered unsafe. As can be seen from that figure, the impoundments at the Jal facility (dam heights = 4 to 6 ft, maximum storage capacity = 40 ac-ft including freeboard) are non-jurisdictional, which would indicate the OSE's opinion that such dams can be operated safely.

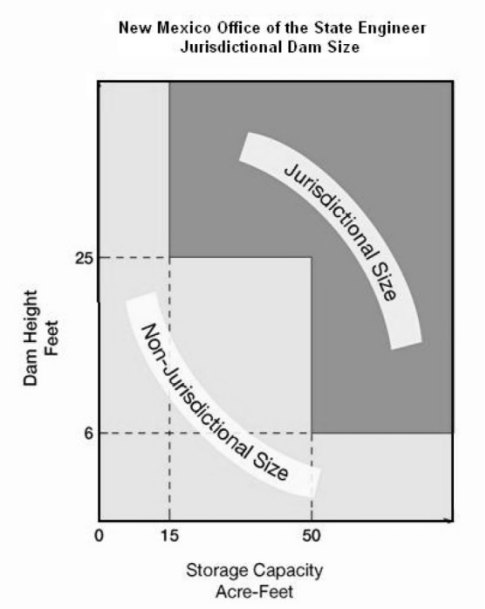


Figure 1 – JURISDICTIONAL SIZE CRITERIA

This opinion is further supported by Section 75-5-11 and 75-5-12 NMSA 1978, which assign to the OSE authority and jurisdiction over "unsafe" dams. Although this does not address engineering design questions, the fact that the impoundment is considered non-jurisdiction under this authority would imply it is not an "unsafe" dam.

HAZARD CLASSIFICATION

The NM Dam Safety Bureau has three hazard classifications for dams:

High	Dams where failure or mis-operation will probably cause loss of human life.
Significant	Dams where failure or mis-operation will probably not result in loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but may be located in populated areas with significant infrastructure.
Low	Dams where failure or mis-operation results in no probable loss of life but may result in low economic or environmental losses. Losses would be principally limited to the dam owner's property

The Bureau of Reclamation (BoR) has developed a Technical Memorandum (U.S. Department of the Interior, 1988) to determine the hazard classification of dams. It is based on the downstream hazard to life and property due to a failure of the dam, and is not associated with the condition or anticipated performance of the dam. Only the direct effects on downstream persons, property, or natural resources (officially designated parks, recreation areas, or preserves) are considered. This hazard classification is used as a tool for determining which dams should undergo a full safety evaluation. Dams with a low hazard classification are excluded from the safety evaluation.

JCB used the Downstream Hazard Classification Procedure Chart in the BoR Technical Memorandum and the National Weather Service Simplified Dam-Break Model (SMPDBK) to determine the appropriate hazard classification. Because the structures are not damming a watercourse and the only inflow is from the actual facility operations, the evaluation was based on a "Sunny Day" failure and not the Probable Maximum Flood (PMF), because piping caused by an undetected leak through the liner, although extremely unlikely, would be more likely than overtopping. The results of this model were then compared to the downstream land use conditions to evaluate the hazard classification. The SMPDBK input variables were based on the proposed pond design drawings, and the SMPDBK model is included as Appendix A.

The SMPDBK results predict a peak flow of 201 cfs in the event of a failure of the berm surrounding the proposed new pond, so this was used as the worst case scenario. The predicted peak discharge from the north and south ponds are 77 cfs and 78 cfs, respectively. JCB generated a flow path and cross sections downstream from the proposed brine pond using the USGS DEM for the Rattlesnake Quadrangle in AutoCAD Civil 3D. That geometry was exported to a HEC-RAS geometry file and a steady state analysis was performed using the peak flow rate of 201 cfs. Because the pond is not on a defined channel, the terrain is very flat, and the berms are to surround the pond, an unsteady flow, as typically done for dam breach analysis, could not easily be performed. However the steady flow results show that a peak flow of 201 cfs would quickly spread and dissipate, with the peak flow velocity of 1.36 fps and maximum flow depth of about 1.67 feet. The model also predicts the flow would essentially dissipate within 2,000 feet downstream of the pond (Figure 2). Based on depth vs. velocity curves of the BoR Technical Memorandum (Figures 3 through 7), the predicted flow depth and velocity would not pose a hazard for any category. Although the risk to children falls in the engineering judgement zone, there will be no children at the facility or for 2,000 feet downstream, so there appears to be no risk in this category either. In addition, there are no permanent dwellings, parks, recreational facilities, or other potentially impacted developments within the inundation limits. Therefore, the proposed pond meets the critieria for a low hazard dam, and the damage is predicted to be limited to the actual facility area. Furthermore, the breach analysis was based on the entire volume of the pond being released, although only about 9 ac-ft will actually be stored above ground surface at maximum. The most likely offsite economic damage to result from a catastrophic release from the proposed pond would be possible erosion of the highway or railroad about 1,200 feet downstream of the pond. However, a flow velocity of 1.36 fps is generally insufficient to scour to an appreciable depth. Because the two existing ponds have an even less impact, all three ponds would appear to fall into the low hazard classification.

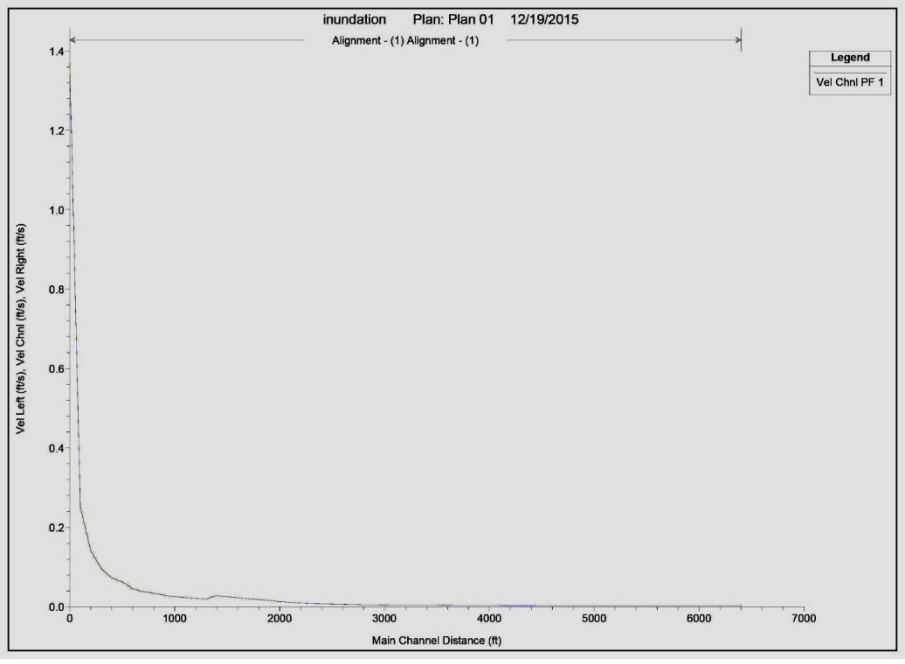


Figure 2 - FLOW VELOCITY-DISTANCE RELATION

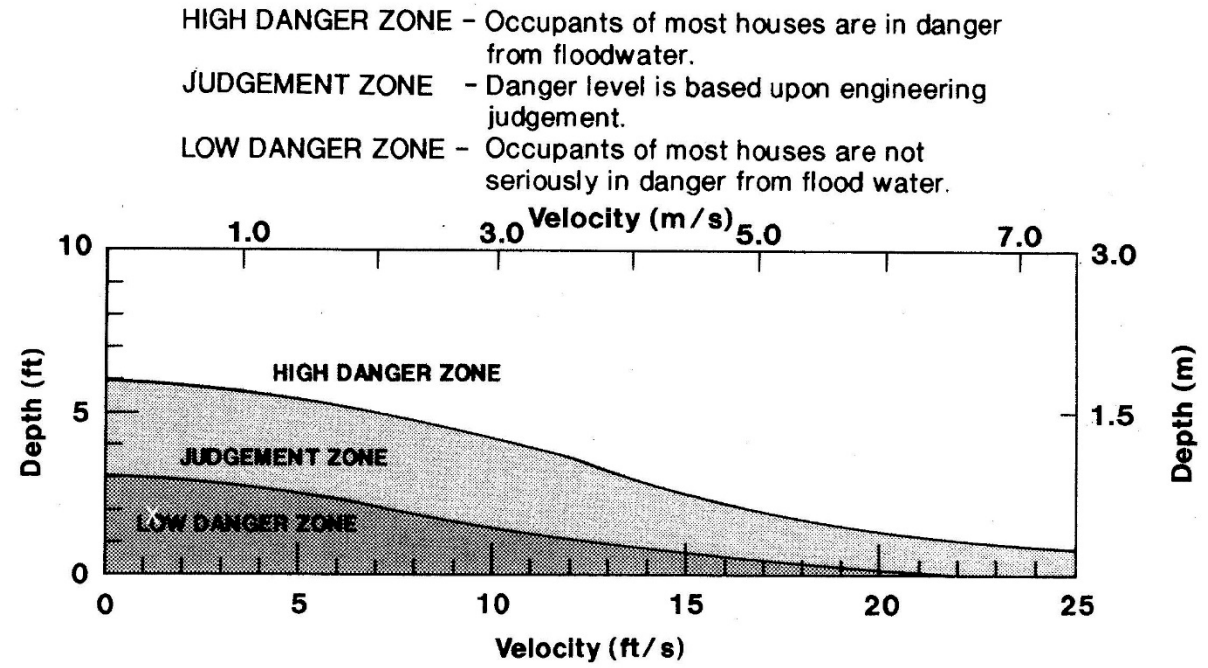


Figure 3 - DEPTH-VELOCITY FLOOD DANGER LEVEL RELATIONSHIP FOR HOUSES BUILT ON FOUNDATIONS

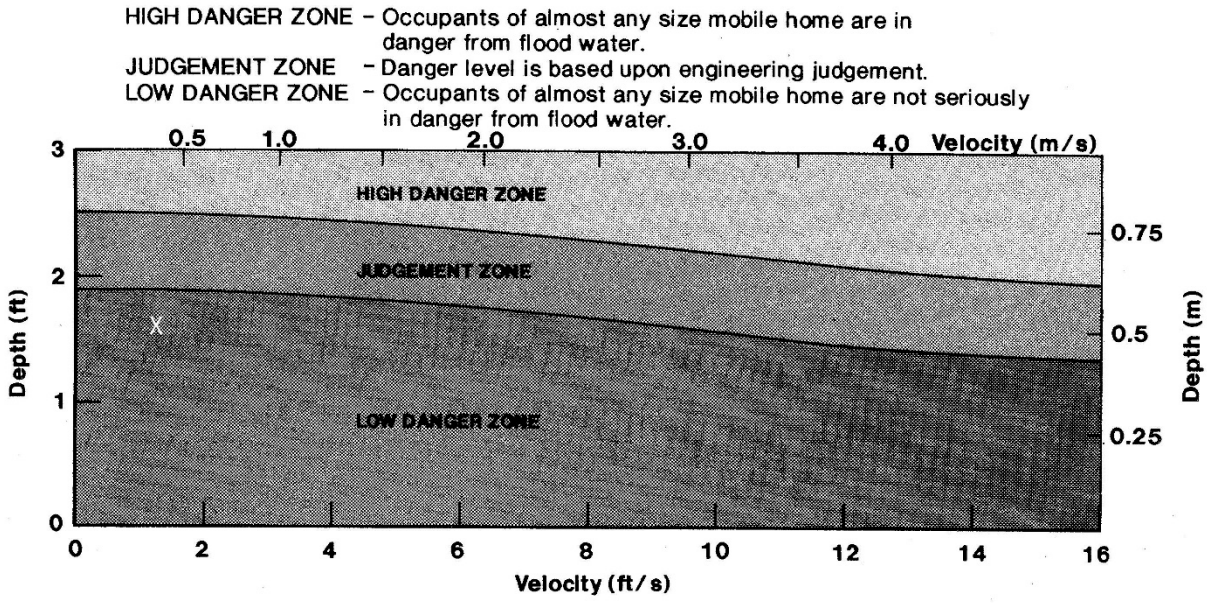


Figure 4 - DEPTH-VELOCITY FLOOD DANGER LEVEL RELATIONSHIP FOR MOBILE HOMES

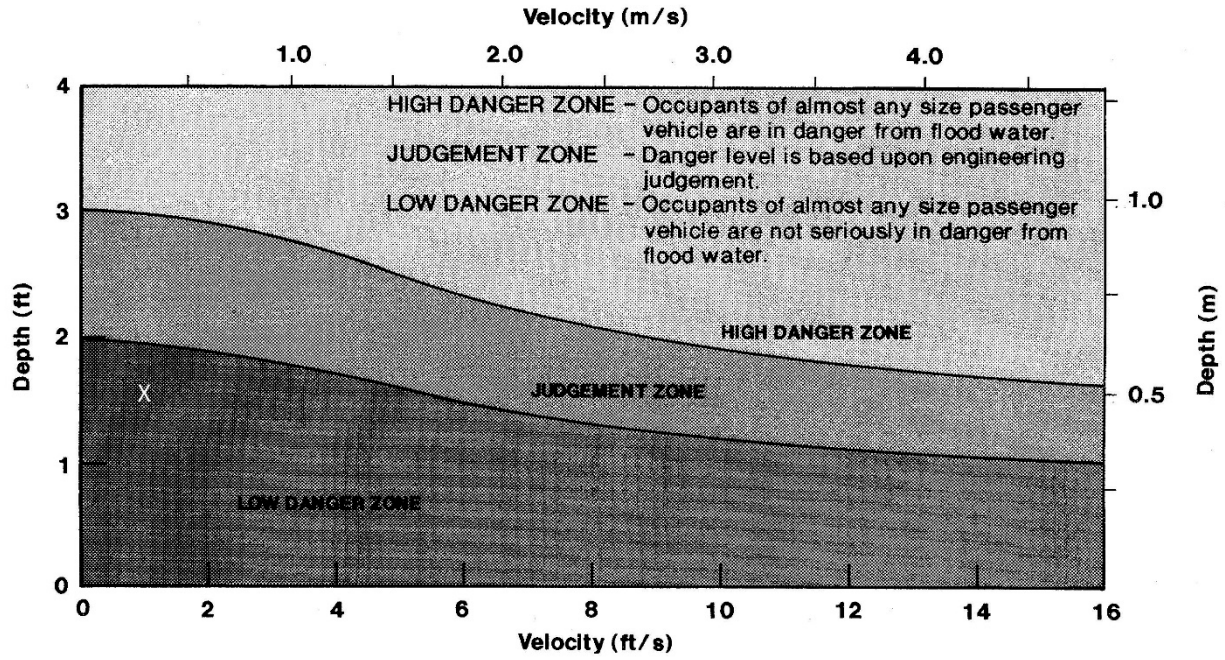


Figure 5 - DEPTH-VELOCITY DANGER RELATIONSHIP FOR PASSENGER VEHICLES

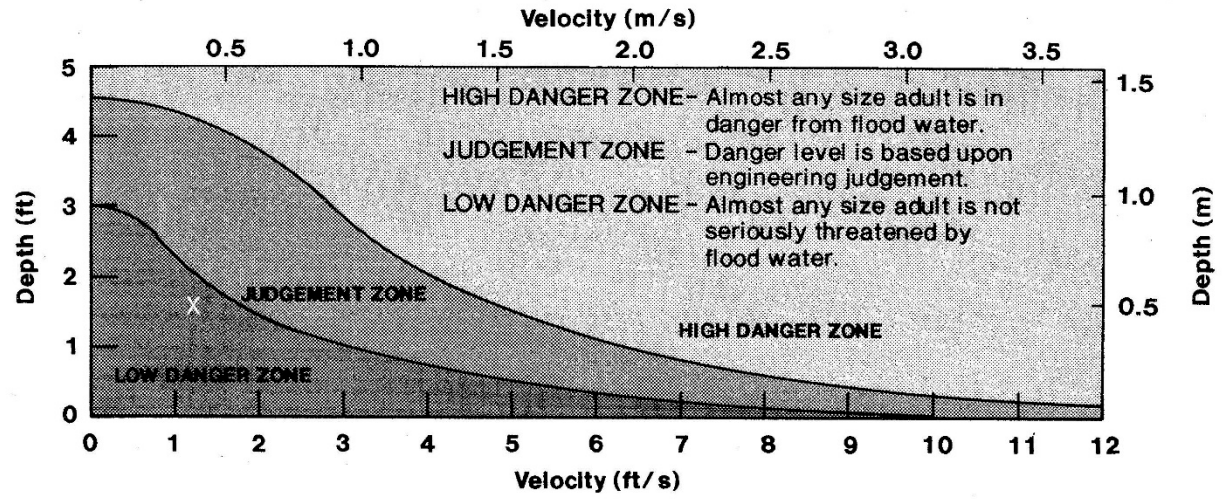


Figure 6 - DEPTH-VELOCITY DANGER LEVEL RELATIONSHIP FOR ADULTS

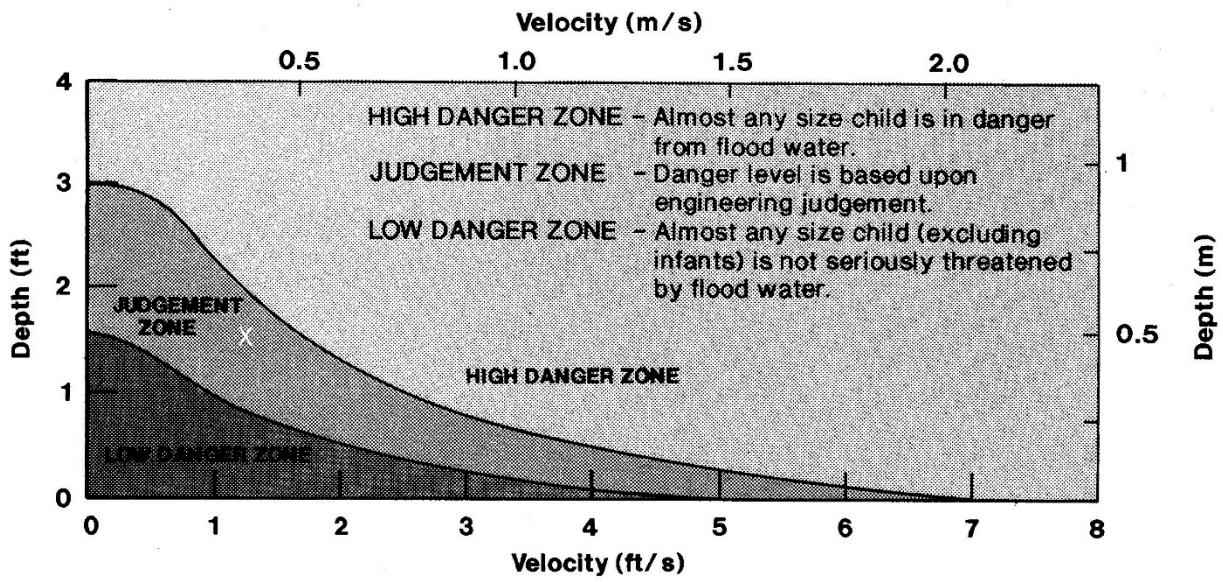


Figure 7 - DEPTH-VELOCITY DANGER LEVEL RELATIONSHIP FOR CHILDREN

FAILURE MECHANISMS

According to the Association of State Dam Safety Officials (ASDSO), the principal causes of dam failures are overtopping (34 %), foundation defects (30 %), and piping (20 %). Other failures are caused by material failures and lack of maintenance.

Overtopping typically occurs in dams that impound flowing channels, which is not the case with the Jal impoundments. Overtopping occurs when the inflow exceeds the outlet capacity of the emergency spillway and water flows over the top of the dam. Because the inflow into the ponds is strictly controlled by the operators, and not by an uncontrolled stream flowing into the ponds, overtopping could only occur due to negligence on the part of the operators, and the O&M and emergency response procedures have been developed to prevent such an event from happening.

Foundation failures are due to settlement and slope instability. The geotechnical study performed for the proposed pond design addressed foundation and slope stability, and those have been incorporated into the design. Therefore, if the pond is constructed as specified in the plans there should be no foundation or settlement problems, according to the geotechnical engineer for the design. The two existing ponds have been in operation for several years with no settlement, which would have occurred long before this were that to be a problem.

Piping failure is a result of internal erosion caused by seepage through the dam. Because the ponds will be lined there should be no seepage, and therefore no piping. In addition, the ponds have been designed with a dual liner and leak detection system, so any seepage should be detected and remediated before the berm could fail.

As a final measure, any potential breach of a berm could be alleviated by pumping the brine water out of the pond and into one of the other ponds, as discussed in the O&M and emergency response plans for the facility. This is consistent with the standard dam safety procedure of lowering the water level behind the impoundment to prevent a catastrophic failure.

CONCLUSION

Based on the results of this study, it appears the existing and proposed brine ponds would be classified as low hazard structures, and a catastrophic failure of a berm would principally result in economic damage to the facility itself and possible minor economic damage to property within 2,000 feet downstream of the proposed pond location.

REFERENCES

New Mexico Office of the State Engineer, 2003, Dam Safety Design and Operation Criteria

New Mexico Office of the State Engineer, 2010, Rules and Regulations Governing Dam Design, Construction and Dam Safety

U. S. Department of the Interior, Bureau of Reclamation, 1977, Design of Small Dams

U. S. Department of the Interior, Bureau of Reclamation, 1988, Downstream Hazard Classification Guidelines: ACER Technical Memorandum No. 11

Wetmore, J. N., and D. L. Fread, 1991, The NWS Simplified Dam-Break Flood Forecasting Model:

APPENDIX A

SIMPLIFIED DAM BREAK ANALYSIS SPREADSHEET

BREACH PREDICTOR EQUATIONS

Recently some statistically derived predictors for average breach width (b) and time of failure (T_f) have been developed by MacDonald and Langridge-Monopolis (1984) and Froelich (1987, 1995). From Froelich's work in which he used the properties of 63 breaches of dams ranging in height from 12 to 285 feet, with 6 dams greater than 100 feet, the following predictor equations were obtained:

$$T_f = 0.59(V_s^{0.47})/(H^{0.91})$$

$$b = 9.5 K_o (V_s H)^{0.25}$$

where,

b = average breach width (ft),
T_f = time of failure (hrs), only includes vertical erosion of dam
K_o = 0.7 for piping and 1.0 for overtopping failure
Vs = storage volume (ac-ft), and
H = height (ft) of water over breach bottom

BREACH WIDTH & TIME OF FAILURE FOR

Your Small Dam

INPUT VARIABLES:			OUTPUT PARAMETERS:	
H =	3.00	ft	b =	21.8 ft
Vs =	38.7	ac-ft	T_f =	1.21 hrs
Ko =	0.7			

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NWS SIMPLE DAM BREAK EQUATION:

Your Small Dam

$$Q_b = Q_o + 3.1 B_r (C/(T_f + C/\sqrt{H}))^3$$

WHERE,

Q_b = BREACH FLOW + NON-BREACH FLOW (cfs)
Qo = NON-BREACH FLOW (cfs)
Br = FINAL AVERAGE BREACH WIDTH (ft, APPROX. 1H TO 5H)
C = 23.4*As/Br
As = RESERVOIR SURFACE AREA (ac) AT MAXIMUM POOL LEVEL
H = SELECTED FAILURE DEPTH (ft) ABOVE FINAL BREACH ELEVATION
T_f = TIME TO FAILURE (hrs, USE H/120 OR A MINIMUM OF 10 MIN)

INPUT VARIABLES:

Qo =	**0**	**cfs**
As =	**2.57**	**ac**
H =	**2.0**	**ft**

Note: Must enter Data on Brwidth Worksheet as well

OUTPUT VARIABLES:

SELECTED BREACH WIDTHS Br, [ft]		TIME OF FAILURE T_f, [hrs]	COMPUTED C VALUE	MAXIMUM BREACH FLOW Q_b, [cfs]	
2.0	[H]	0.17	30.07	**17**	
3.0	[1.5H]	0.17	20.05	**25**	
4.0	[2H]	0.17	15.03	**33**	
5.0	[2.5H]	0.17	12.03	**41**	
6.0	[3H]	0.17	10.02	**49**	
7.0	[3.5H]	0.17	8.59	**56**	
8.0	[4.0H]	0.17	7.52	**64**	
10.0	[5.0H]	0.17	6.01	**78**	**<SELECTED FLOW**
15.4	Froelich Eq	1.10	3.90	**49**	
15.4	Froelich Eq	0.17	----	**158**	= Volume / Failure tim

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BREACH PREDICTOR EQUATIONS

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K_o = 0.7 for piping and 1.0 for overtopping failure
Vs = storage volume (ac-ft), and
H = height (ft) of water over breach bottom

BREACH WIDTH & TIME OF FAILURE FOR

Your Small Dam

INPUT VARIABLES:			OUTPUT PARAMETERS:	
H =	2.00	ft	b =	15.4 ft
Vs =	14.4	ac-ft	T_f =	1.10 hrs
Ko =	0.7			

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NWS SIMPLE DAM BREAK EQUATION:

Your Small Dam

$$Q_b = Q_o + 3.1 B_r (C/(T_f + C/\sqrt{H}))^3$$

WHERE,

Q_b = BREACH FLOW + NON-BREACH FLOW (cfs)
Qo = NON-BREACH FLOW (cfs)
Br = FINAL AVERAGE BREACH WIDTH (ft, APPROX. 1H TO 5H)
C = 23.4*As/Br
As = RESERVOIR SURFACE AREA (ac) AT MAXIMUM POOL LEVEL
H = SELECTED FAILURE DEPTH (ft) ABOVE FINAL BREACH ELEVATION
T_f = TIME TO FAILURE (hrs, USE H/120 OR A MINIMUM OF 10 MIN)

INPUT VARIABLES:

Qo =	0	cfs
As =	2.80	ac
H =	2.0	ft

Note: Must enter Data on Brwidth Worksheet as well

OUTPUT VARIABLES:

SELECTED BREACH WIDTHS Br, [ft]		TIME OF FAILURE T_f, [hrs]	COMPUTED C VALUE	MAXIMUM BREACH FLOW Q_b, [cfs]	
2.0	[H]	0.17	32.76	17	
3.0	[1.5H]	0.17	21.84	25	
4.0	[2H]	0.17	16.38	34	
5.0	[2.5H]	0.17	13.10	42	
6.0	[3H]	0.17	10.92	49	
7.0	[3.5H]	0.17	9.36	57	
8.0	[4.0H]	0.17	8.19	64	
10.0	[5.0H]	0.17	6.55	79	<SELECTED FLOW
15.0	Froelich Eq	1.04	4.37	55	
15.0	Froelich Eq	0.17	----	149	= Volume / Failure tim

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BREACH PREDICTOR EQUATIONS

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$$b = 9.5 K_o (V_s H)^{0.25}$$

where,

b = average breach width (ft),
T_f = time of failure (hrs), only includes vertical erosion of dam
K_o = 0.7 for piping and 1.0 for overtopping failure
Vs = storage volume (ac-ft), and
H = height (ft) of water over breach bottom

BREACH WIDTH & TIME OF FAILURE FOR

Your Small Dam

INPUT VARIABLES:			OUTPUT PARAMETERS:		
H =	2.00	ft	b =	15.0	ft
Vs =	12.9	ac-ft	T_f =	1.04	hrs
Ko =	0.7				

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