Bratcher, Mike, EMNRD

From: Jones, Brad A., EMNRD
Sent: Thursday, June 14, 2012 2:39 PM
To: David_Luna@xtoenergy.com
Cc: Bratcher, Mike, EMNRD; Keith_Hebert@xtoenergy.com; Andrew Parker; r@rthicksconsult.com
Subject: Nash Unit #29 C-144 Application Submittal for Modular Impoundment approval
Attachments: 2012 6-14 XTO Energy Inc. Nash Unit #29 Poseidon Concepts TP permit 2.pdf

David,

Please see the attached… it is a copy of your approval. Thank you and the effort of your consultants for working with OCD in order for the OCD to complete the approval process. OCD appreciates XTO's effort in resolving this matter. If you have any questions, please do not hesitate to contact me.

Brad

Brad A. Jones
Environmental Engineer
Environmental Bureau
NM Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505
E-mail: brad.a.jones@state.nm.us
Office: (505) 476-3487
Fax: (505) 476-3462

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

June 13, 2012

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

Mr. Brad Jones
NMOCD
1220 S. St. Francis Drive
Santa Fe, NM

RE: Nash Draw Unit #29 modular impoundment (Atlantis system) for temporary storage of treated produced water.

Dear Mike and Brad:

For the above-referenced modular impoundment, we are pleased to submit:

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

Please contact me with any questions or comments at 505-266-5004

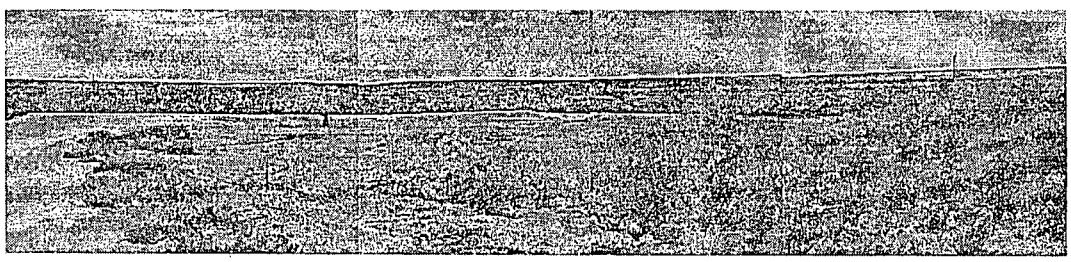
Sincerely,
R.T. Hicks Consultants

Andrew Parker

Copy: David Luna, XTO Energy

June 2012

C-144 Permit Package for Nash Draw Unit #29 - Temporary Storage of Treated Produced Water - Modular Impoundment Section 13 T23S R29E Eddy County NM



Prepared for
XTO Energy
Midland, Texas

Prepared by
R.T. Hicks Consultants, Ltd.
Albuquerque, New Mexico

C-144

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

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

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

Form C-144
Revised August 1, 2011

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

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

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

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

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

1.
Operator: XTO Energy,Inc OGRID #: 5380
Address: 200 N. Loraine, Suite 800 Midland, TX 79701
Facility or well name: Nash Unit #29
API Number: 30-015-29434 OCD Permit Number:
U/L or Qtr/Qtr J Section 13 Township 23S Range 29E County: Eddy
Center of Proposed Design: Latitude N 32.30322 Longitude W 103.93719 NAD: ☐1927 ☒ 1983
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Pit:** Subsection F or G of 19.15.17.11 NMAC
Temporary: ☐ Drilling ☐ Workover
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A X Other: Modular impoundment for temporary storage of treated produced water
☒ Lined ☐ Unlined Liner type: Thickness 30 mil ☒ LLDPE ☐ HDPE ☐ PVC ☒ Other Vertical steel foam-insulated panels that support liner
☐ String-Reinforced
Liner Seams: ☒ Welded ☒ Factory ☐ Other Volume: 41,000 bbl Dimensions: Diameter: 157 ft. Height: 12 ft ~~L x W x D~~

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

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

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

6.

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

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

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

☒ Alternate. Please specify Modular impoundment walls are 12 feet high; no fencing necessary.

7.

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

☐ Screen ☐ Netting ☐ Other_____

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

8.

Signs: Subsection C of 19.15.17.11 NMAC

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

☒ Signed in compliance with 19.15.16.8 NMAC See photos in Appendix SSI-1

9.

Administrative Approvals and Exceptions:

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

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

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

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

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

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

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No SEE FIGURES 1a,1b
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 SEE FIGURE 2
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. *(Applies to temporary, emergency, or cavitation pits and below-grade tanks)* - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☒ No ☐ NA SEE FIGURE 3
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. *(Applies to permanent pits)* - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☐ No ☒ NA
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	☐ Yes ☒ No SEE FIGURE 4
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 SEE FIGURE 5
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No SEE FIGURE 6
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	☐ Yes ☒ No SEE FIGURE 7
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	☒ Yes ☐ No SEE FIGURE 8
Within a 100-year floodplain. - FEMA map	☐ Yes ☒ No SEE FIGURE 9

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

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

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

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

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

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

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

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

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

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

Type: ☐ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Closed-loop System
☒ Alternative Modular impoundment for temporary storage of treated produced water

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

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

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

16.

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

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

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

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

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

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

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

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

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

17.

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

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

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

18.

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

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

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

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

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

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

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

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

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

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

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

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

19.
Operator Application Certification:

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

Name (Print): David Luna Title: Operations Engineer

Signature: David Luna Date: 06/13/2012

e-mail address: David_Luna@xtoenergy.com Telephone: 432-620-6742

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

OCD Representative Signature: Approval Date: 6/14/12

Title: Environmental Engineer OCD Permit Number:

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

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

☐ Closure Completion Date:

22.
Closure Method:

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

☐ If different from approved plan, please explain.

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

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

Disposal Facility Name: Disposal Facility Permit Number:

Disposal Facility Name: Disposal Facility Permit Number:

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

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

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

☐ Site Reclamation (Photo Documentation)

☐ Soil Backfilling and Cover Installation

☐ Re-vegetation Application Rates and Seeding Technique

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

☐ Proof of Closure Notice (surface owner and division)

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

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

☐ Confirmation Sampling Analytical Results (if applicable)

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

☐ Disposal Facility Name and Permit Number

☐ Soil Backfilling and Cover Installation

☐ Re-vegetation Application Rates and Seeding Technique

☐ Site Reclamation (Photo Documentation)

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

25.
Operator Closure Certification:

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

Name (Print): Title:

Signature: Date:

e-mail address: Telephone:

Survey Information

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

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-102
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015-29434	47545	NASH DRAW BRUSHY CANYON OIL POOL

[4] Property Code	[5] Property Name	[6] Well Number
010735	NASH UNIT	29

[7] OGRID No.	[8] Operator Name	[9] Elevation
021712	STRATA PRODUCTION	2991.

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
J	13	23-S	29-E		1980	SOUTH	2310	EAST	EDDY

[11] Bottom Hole Location If Different From Surface

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

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

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

2310'

1980'

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief

Carol J. Garcia
Signature

CAROL J. GARCIA
Printed Name

PRODUCTION RECORDS MANAGER
Title

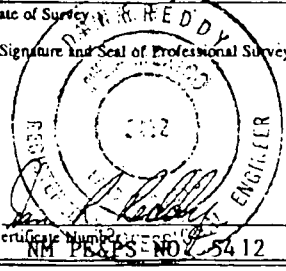
JANUARY 15, 1997
Date

[18] SURVEYOR CERTIFICATION

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

NOVEMBER 26, 1996
Date of Survey

Signature and Seal of Professional Surveyer:

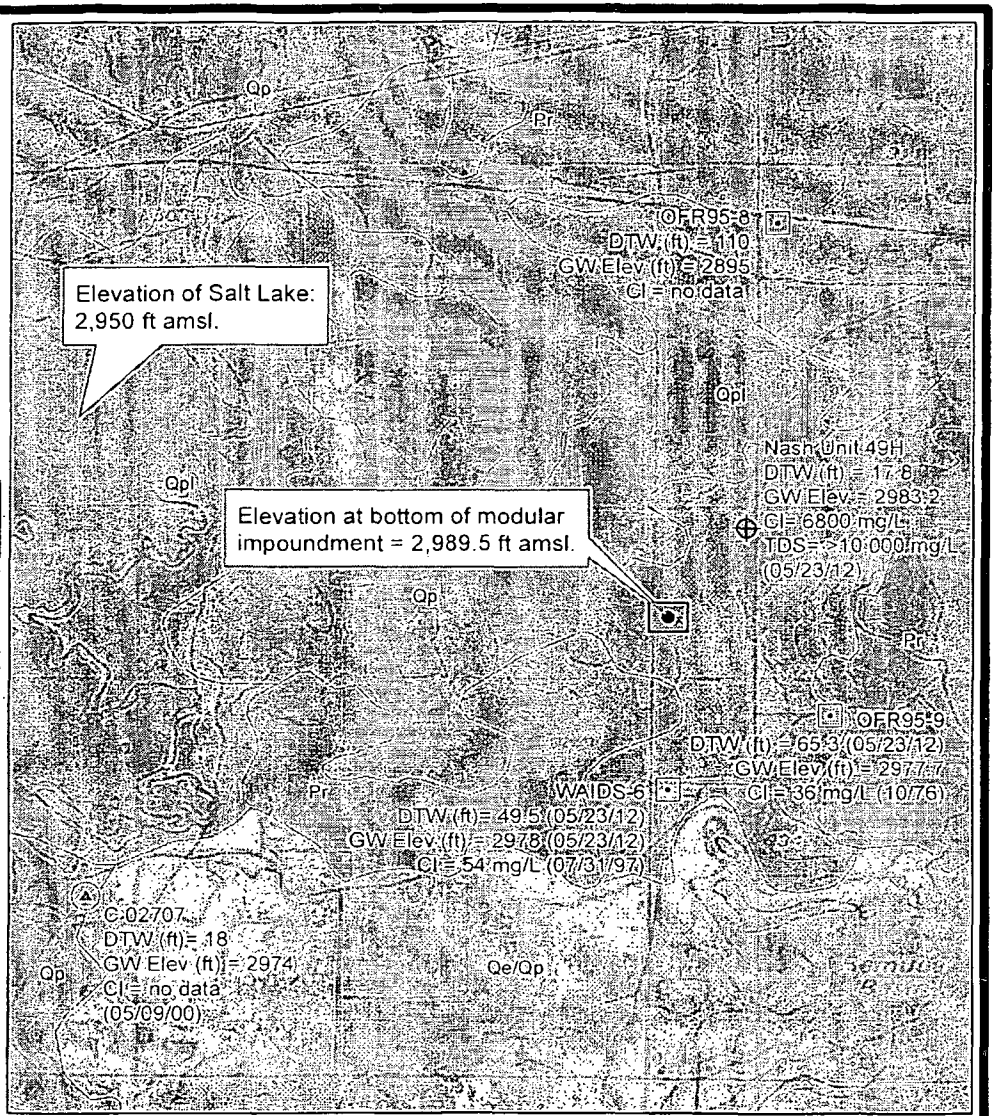


Certificate Number NM PE&PS NO. 5412

Site Specific Information

- Figures 1 - 9
- Siting Compliance Demonstration
- Design and Construction Demonstration
- Operational Compliance
- Closure Requirements

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



Legend

- Location
- Nash Draw 49H Conductor Pipe

Misc. Water Wells

Well Depth (ft)

- No Data
- < 150
- 150 - 350

OSE Water Wells

Well Depth (ft)

- <150

Geology with description

- Pqm, Paleozoic-Quartermaster Formation; red sandstone and siltstone; Upper Permian
- Pqr, Paleozoic-Quartermaster and Rustler Formations; Upper Permian
- Pr, Paleozoic-Ruster Formation; siltstone, gypsum, sandstone, and dolomite; Upper Permian
- Qa, Quaternary Alluvium
- Qe/Qp, Quaternary-Eolian Piedmont Deposits
- Qoa, Quaternary-Older Alluvial Deposits
- Qp, Quaternary-Piedmont Alluvial Deposits
- Qpl, Quaternary-Lacustrine and Playa Deposits

N W E S

0 0.5 1 Miles

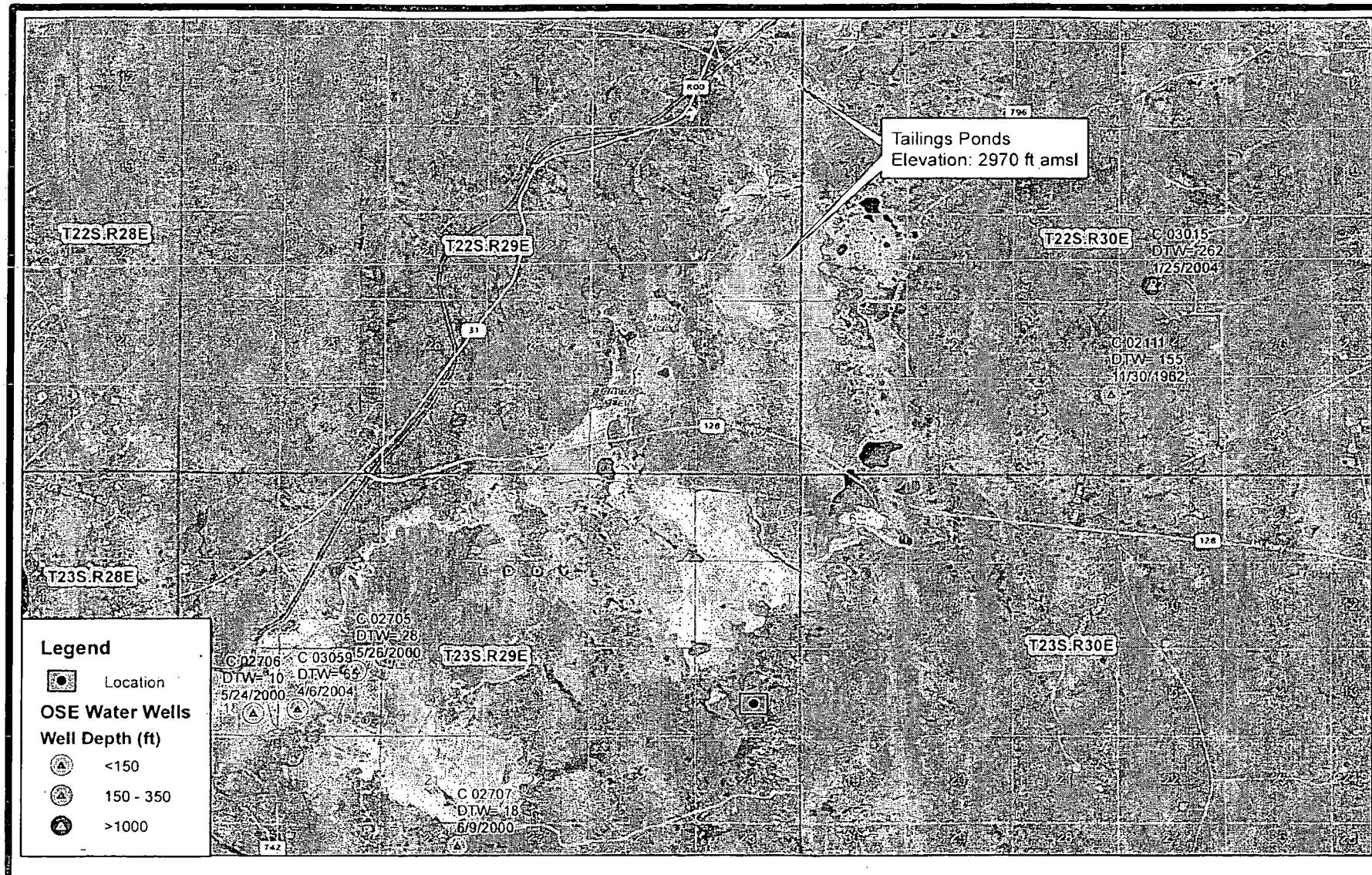
R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Nearyby Water Wells and Geology

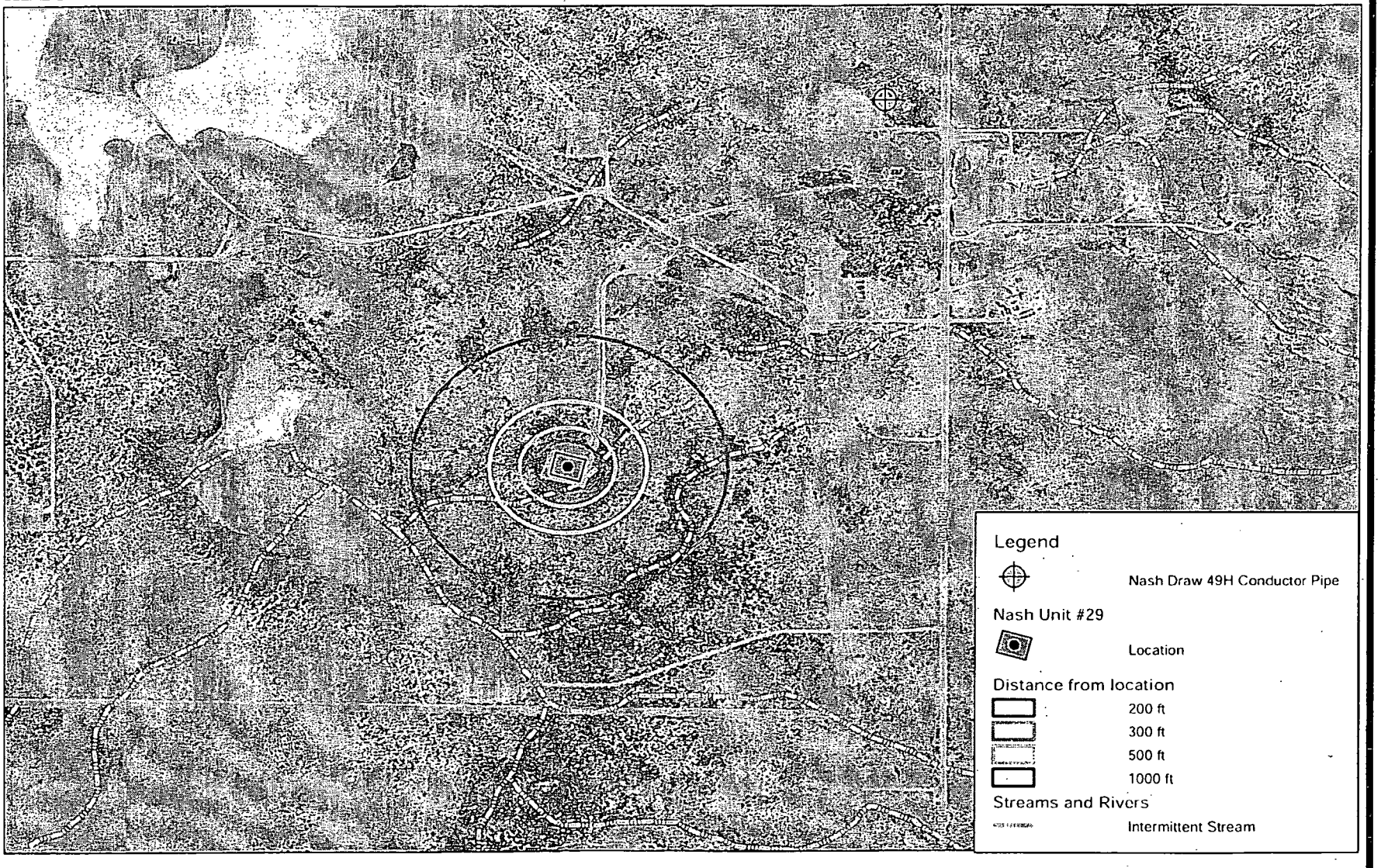
XTO Energy: Nash Unit #29

Figure 1a

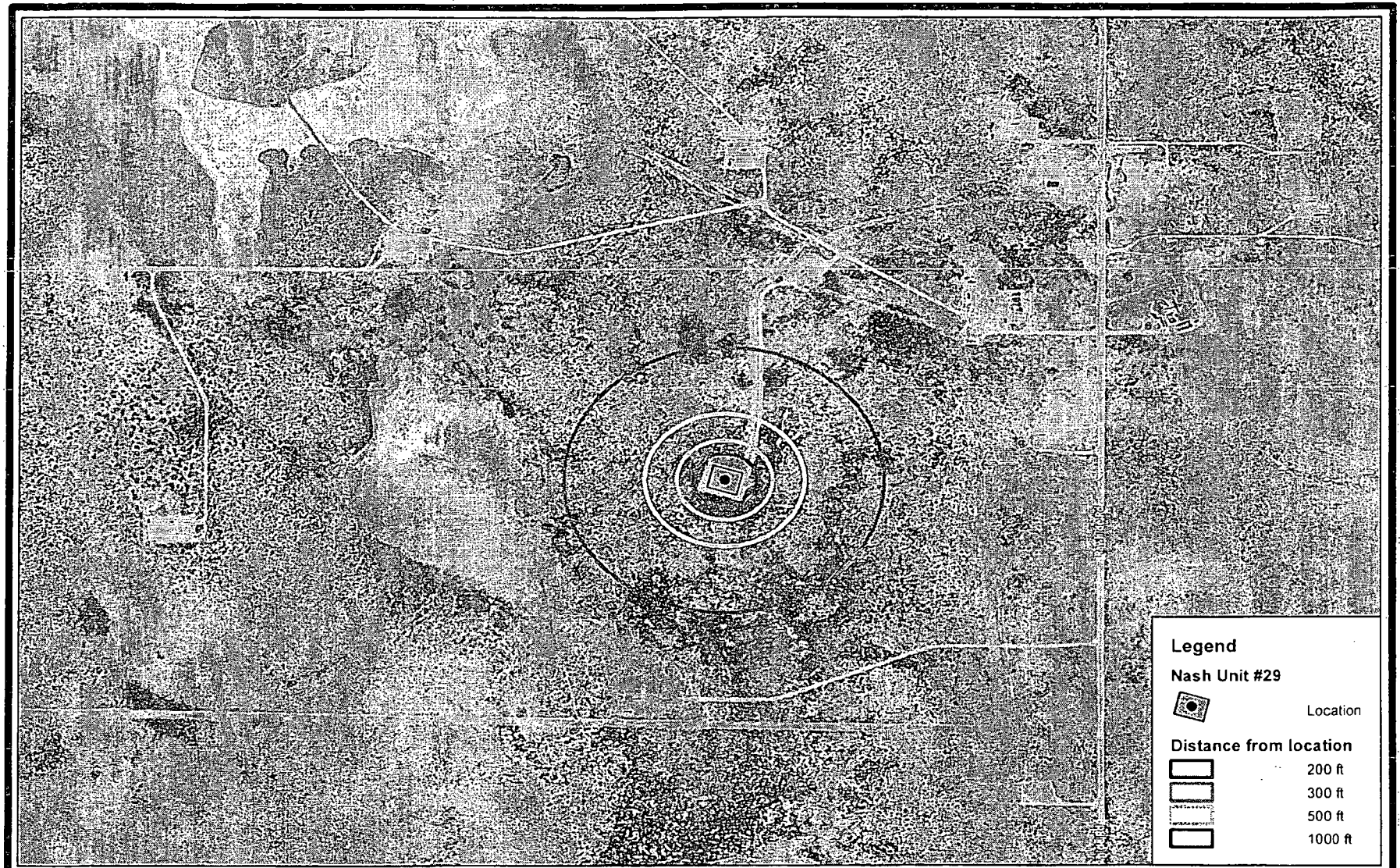
June 2012



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Location of Proposed Pit Relative to Salt Lake/Tailings Pond	Figure 1b
	XTO Energy: Nash Unit #29	June 2012



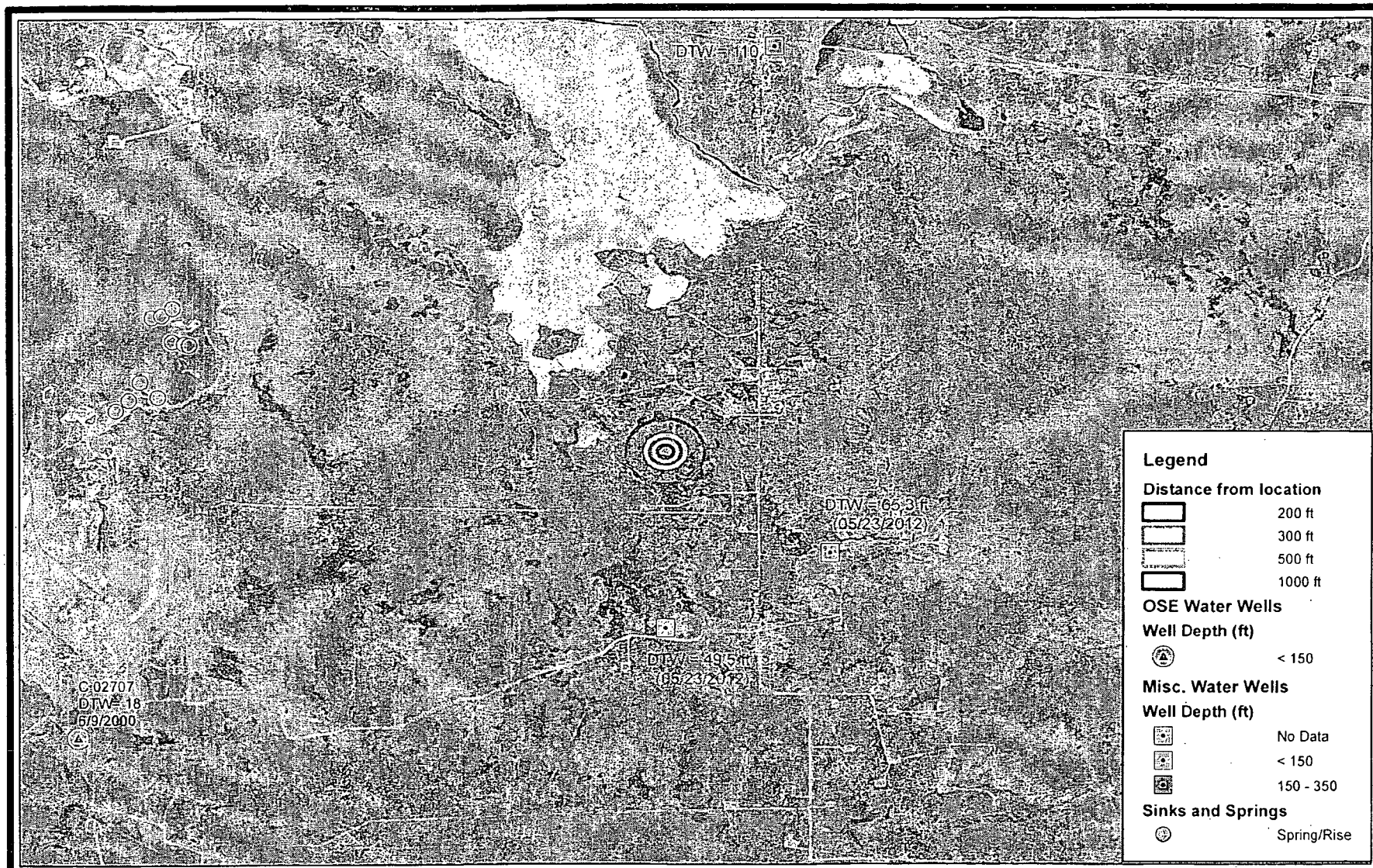
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Continously Flowing Watercourses, Water Bodies, and Springs and Seeps	Figure 2
	XTO Energy: Nash Unit #29	June 2012



N
W E
S

0 500 1,000
Feet

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Structures	Figure 3
	XTO Energy: Nash Unit #29	June 2012



N
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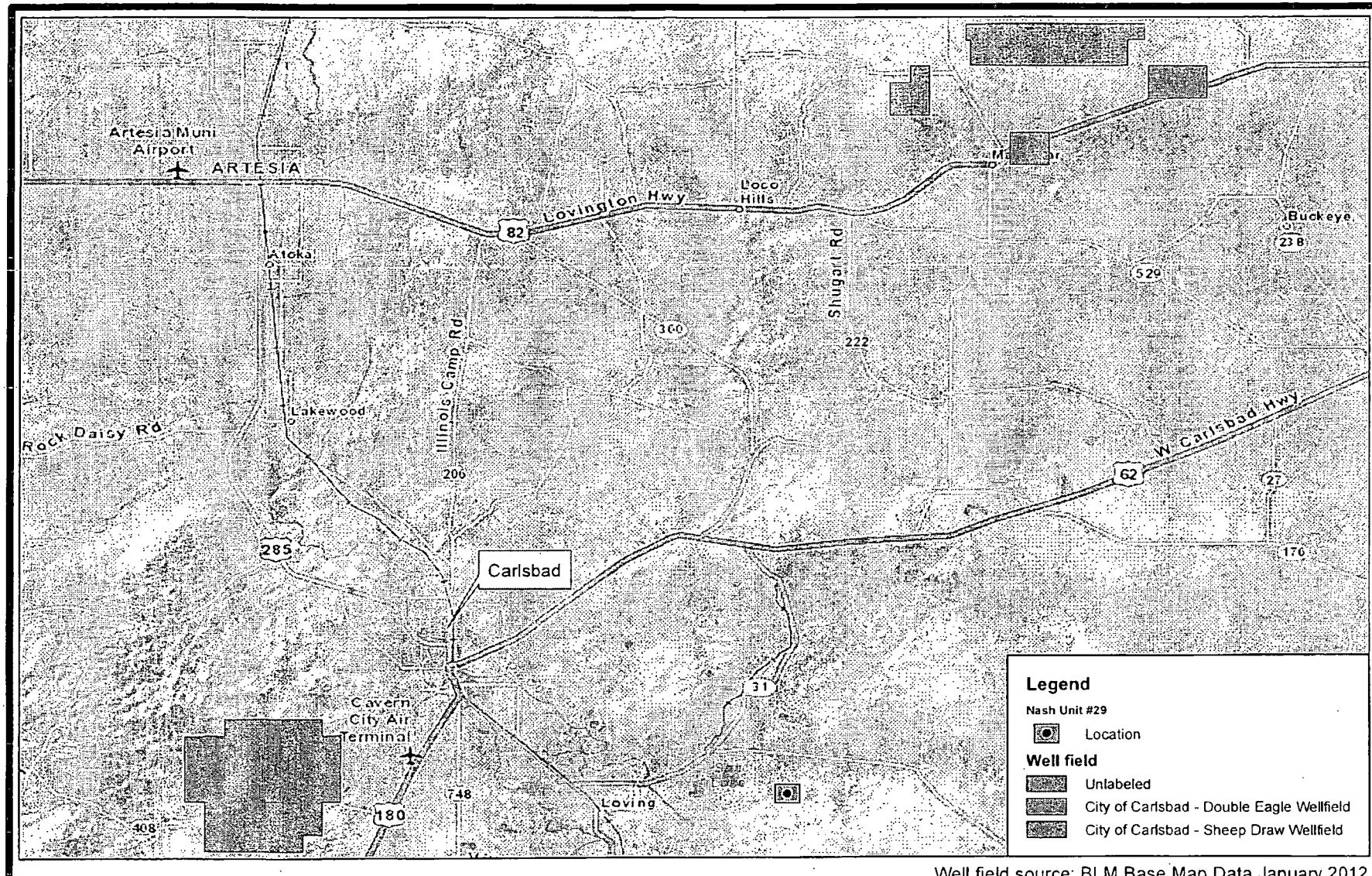
0 2,000 4,000
Feet

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Fresh Water Springs or Wells	Figure 4
	XTO Energy: Nash Unit #29	June 2012



Well field source: BLM Base Map Data January 2012

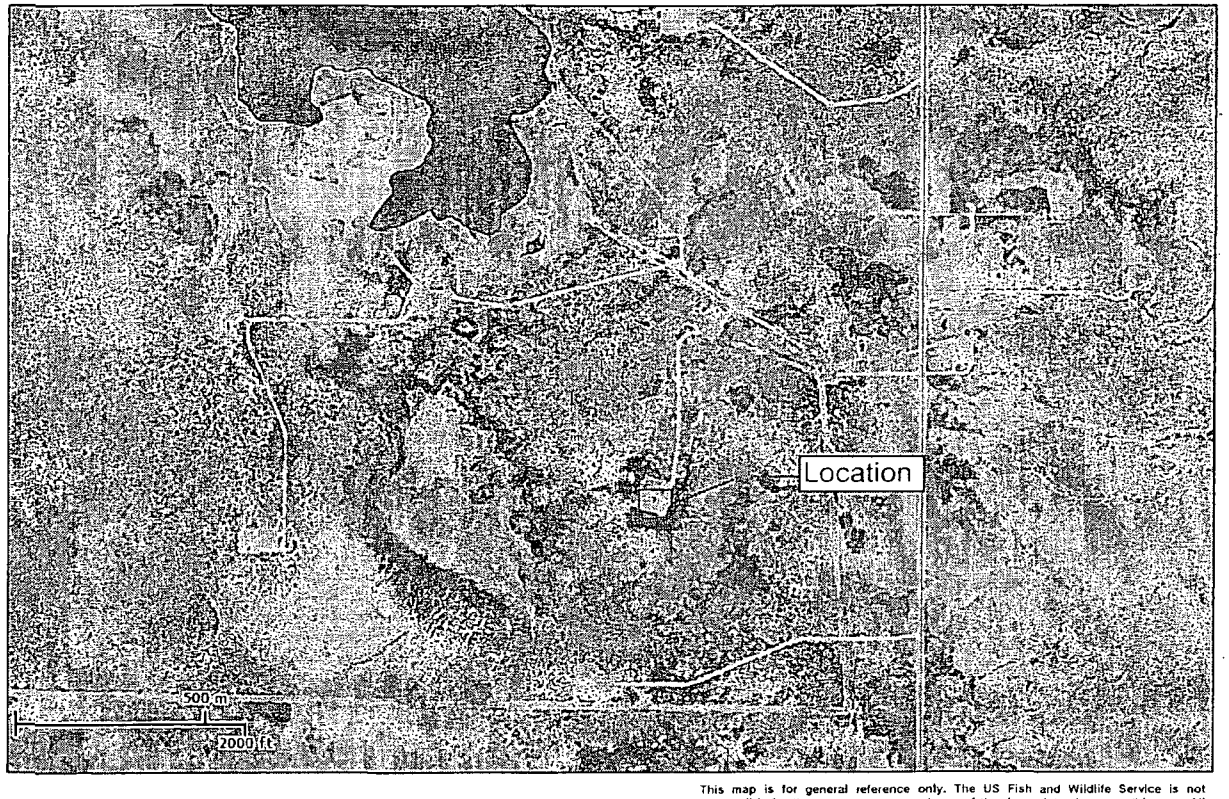
N W E S

0 4 8 Miles

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Municipal Areas and Well Fields	Figure 5
	XTO Energy: Nash Unit #29	June 2012

U.S. Fish and Wildlife Service

National Wetlands Inventory



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

Wetlands

May 10, 2012

Wetlands

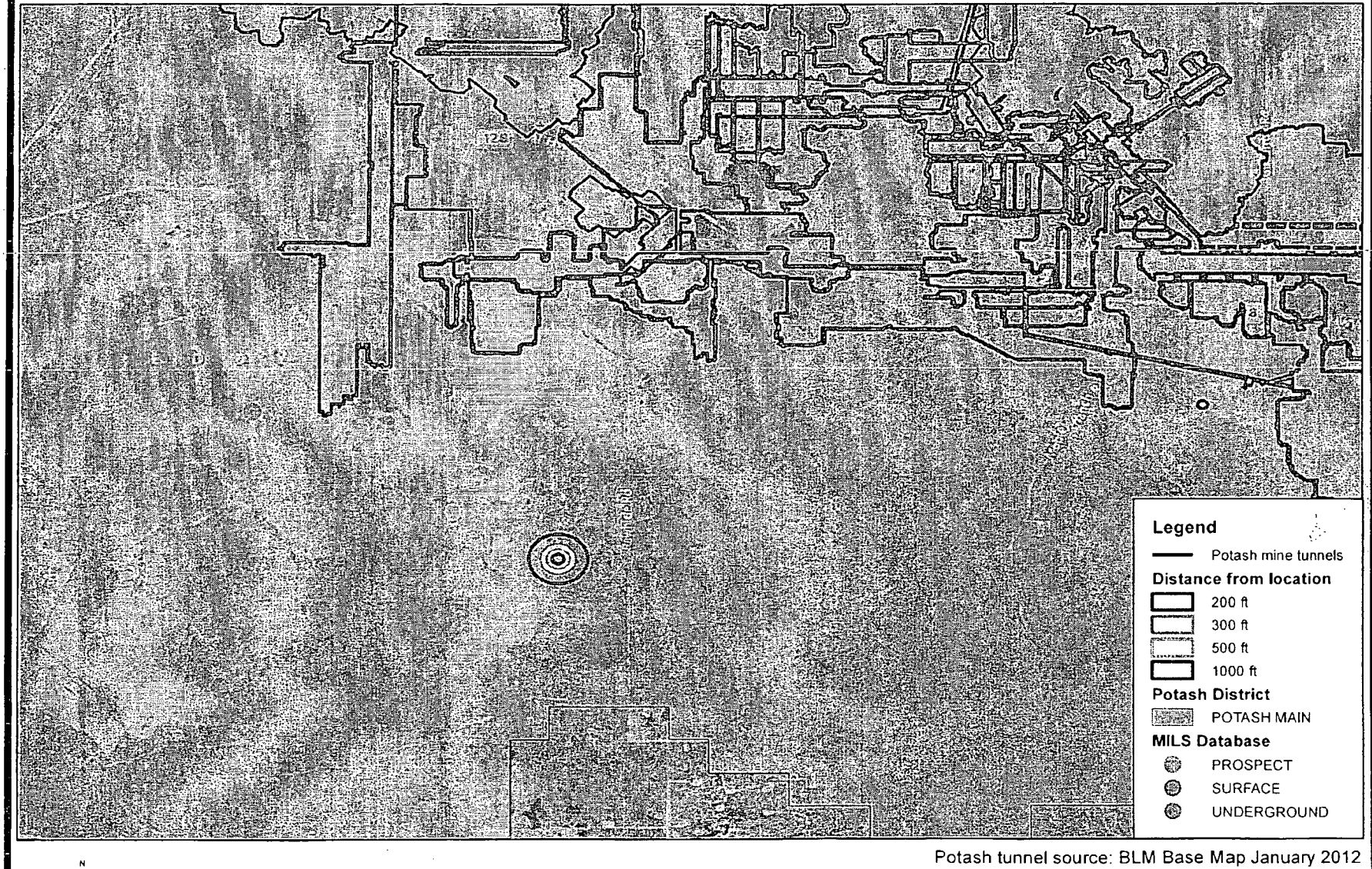
- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

User Remarks:

Figure 6

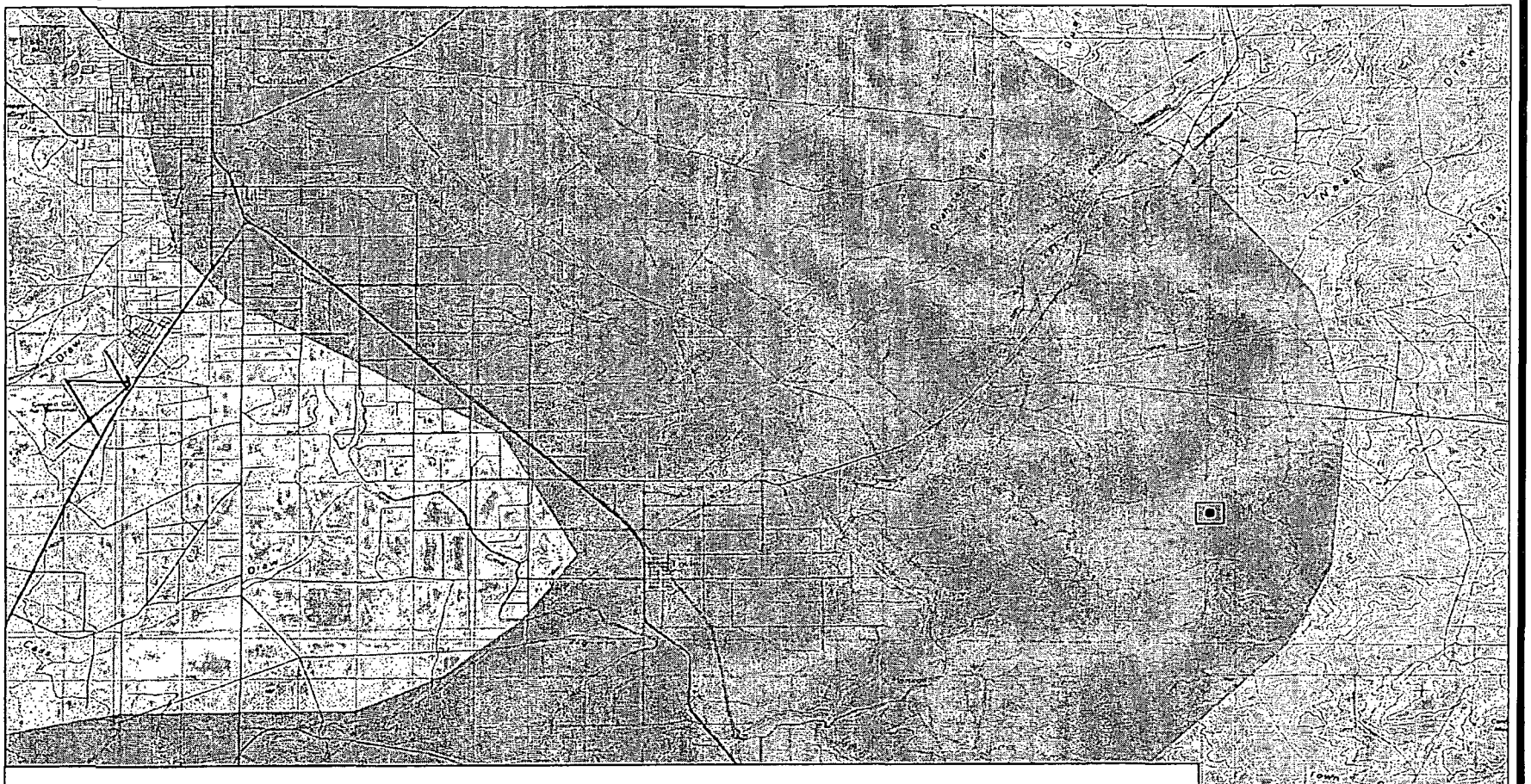


Potash tunnel source: BLM Base Map January 2012

N
W E
S

0 0.5 1 Miles

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Mines and Potash Tunnels	Figure 7
	XTO Energy: Nash Unit #29	June 2012



Legend

Pit Location

Nash Unit #29

Karst Description

Fissures, tubes, and caves over 1,000 ft (300 m) long; 50 ft (15 m) to over 250 ft (75 m) vertical extent; in gently dipping to flat-lying beds of gypsum

N W E S

0 1.5 3 Miles

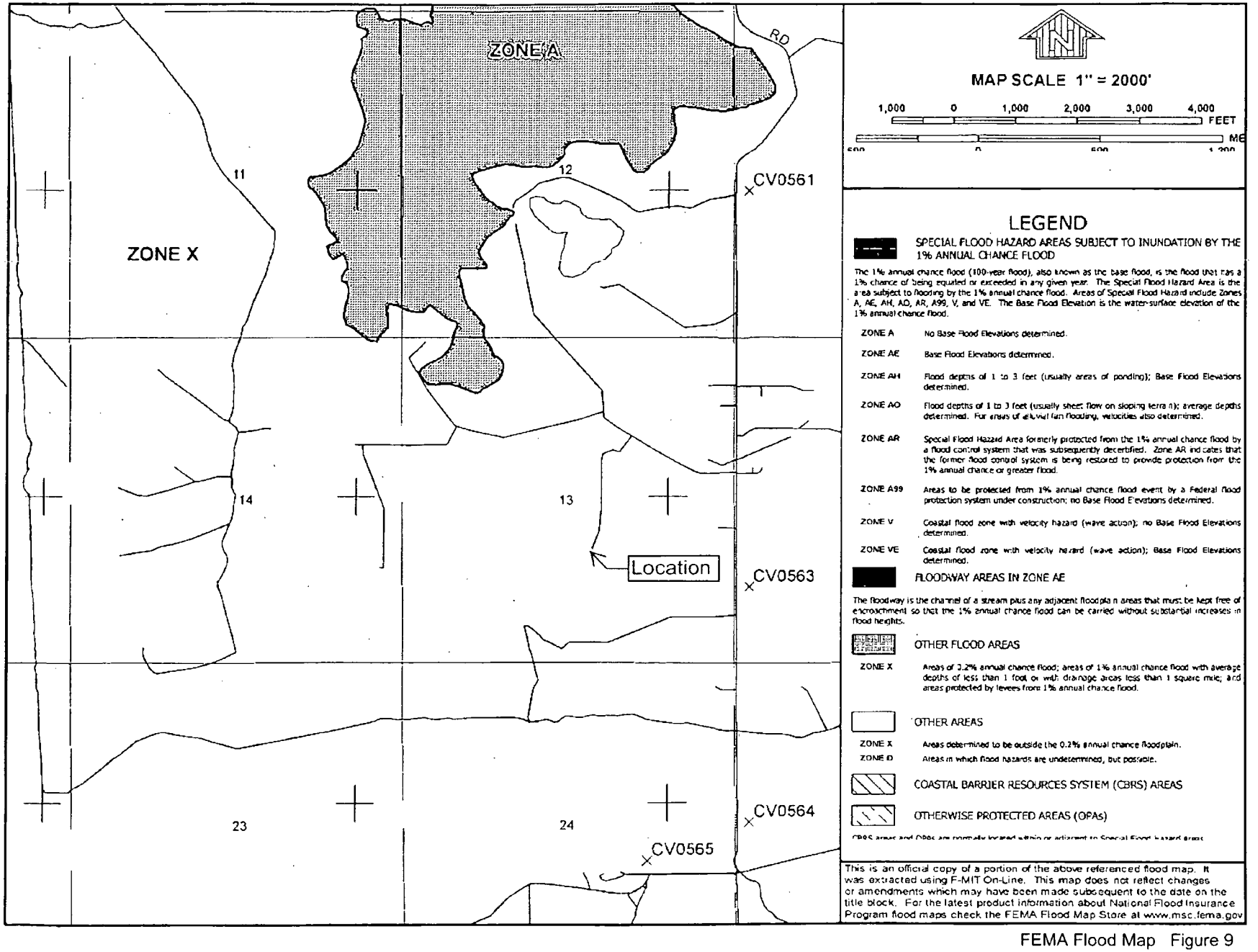
R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Nearby Unstable Areas

XTO Energy: Nash Unit #29

Figure 8

May 2012



FEMA Flood Map Figure 9

Siting Criteria (NMAC 19.15.17.10) with hydrogeologic report for depth to groundwater compliance demonstration

Figure 1a – 1b, Appendix SSI-1 (Site Visit Photos), and the hydrogeologic data presented below demonstrates that groundwater (fresh water as defined by NMOCD Rules that has a TDS < 10,000 mg/L) at the location is between 50 and 100 feet below the bottom of the temporary pit.

a. The location of the modular impoundment that shall temporarily store treated produced water is plotted as an orange rectangle with a black dot in the center (Figures 1a and 1b).
b. Water wells in the OSE database are shown as color coded circles as defined by the total depth of the well. OSE well labels include the permit number, depth to groundwater (ft) and date of measurement – some OSE wells are mis-located in the WATERS database as older wells are plotted in the center of the quarter quarter quarter of the Section Township and Range.
c. Water wells in the Go-Tech WAIDS database and Open File Report 95 are color coded squares defined by the total depth of the well as shown in Figures 1a and 1b. The closest fresh water well listed in publicly available databases is about 0.97 miles southeast of the modular impoundment.

Geology

The modular impoundment is located on Quaternary-Piedmont alluvial deposits (Figure 1a). The elevation at the bottom of the modular impoundment is 2,989.5 feet amsl. Underlying the alluvial deposits is the Rustler Formation that is composed of anhydrite, gypsum, interbedded sandy clay and shale, and irregular beds of dolomite. The Rustler overlies the Salado Formation.

The basal beds of the Rustler (Virginia Draw Member, Prv in OF-GM-77) consist of porous gypsum in a large part of Nash Draw and southwest to Malaga Bend. Hendrickson and Jones (1952) state that these basal beds commonly contain brine saturated with sodium chloride. The brackish groundwater within Nash Draw (in the alluvium and lower Rustler) flows southwest past what is mapped as a Salt Lake and discharges into the Pecos River near Malaga Bend.

Above the basal brine aquifer in the Rustler is the 35-foot thick unit of dolomitic limestone at the top of the lower part of the Rustler (probably the Culebra Dolomite, Prc). Fluid from this brackish aquifer is used by the potash mines to sluice tailings (Hendrickson and Jones, 1952).

Overlying the Rustler are Quaternary alluvial, lacustrine and piedmont deposits. Figure 1a shows that the modular impoundment lies on piedmont deposits (Qp) with playa/lacustrine deposits (Qpl) to the west and north and exposures of Rustler to the southeast and southwest.

Groundwater Elevations and Chemistry

Groundwater data from water wells near the modular impoundment location are shown on Figure 1a and 1b. Figure 2 shows that the Salt Lake/tailing pond, approximately 1,400 feet west of the modular impoundment location, is influenced by fluids from a nearby potash mine/mill (Figure

1b). In the upper central portion of the aerial photograph (Figure 1b); evidence of the tailings pile is clear – fluids emanating from the mill flow into the Salt Lake/tailing ponds along with occasional stormwater runoff. The fluids in the Salt Lake/tailings pond are a source of recharge to groundwater. As will be discussed below, TDS concentrations at Nash Unit #49H (3,250 feet to the east) provide evidence of the recharge effect on groundwater quality. The modular impoundment site is located even closer to the Salt Lake/tailings pond (about 1,400 feet east). Because concentrations will decrease continuously with distance from the Salt Lake/tailings pond due to dispersion, it is expected that concentrations in groundwater will be higher than those at Nash Unit #49H.

Water data within 1-mile

Hicks Consultants gauged and sampled groundwater from the recent drilling of the rathole (TD = 50 feet) at Nash Unit 49H, approximately 0.6 miles northeast of the modular impoundment. Brackish groundwater is present at 17.8 feet below ground surface (2,983.2 ft amsl). Chloride field titration exhibited 6,800 mg/L. A subsequent Hicks Consultants gauging event on May 23, 2012 of the conductor pipe at Nash Draw 49H exhibited TDS readings exceeding 10,000 ppm (Hanna pH/EC/TDS meter, model HI 87130).

Approximately 1-mile south of the modular impoundment is a water well (WAIDS-6) listed in Go-Tech's WAIDS database. This well is listed as a stock well completed within the Rustler formation; the WAIDS database provides no total depth or depth to groundwater data. However, the WAIDS reports a chloride concentration of 54 mg/L (07/31/1997). Hicks Consultants measured the depth to groundwater on May 23, 2012 at 49.5 feet below ground surface (2,978 ft amsl).

Approximately one mile southeast of the modular impoundment, Open File Report -95[3] describes a stock well (OFR95-9) completed within the Rustler formation with a depth to groundwater of 54.9 feet (10/1977) and a total well depth of 59.6 feet. The WAIDS database lists total depth of the well at 100 feet (12/10/76) with a chloride concentration of 36 mg/L. Hicks Consultants measured this well on May 23, 2012 with a depth to groundwater of 65.3 feet (2,977.7 feet amsl).

Water data beyond 1-mile

Approximately 2.3 miles north-northeast of the modular impoundment, New Mexico Bureau of Mines and Mineral Resources Open File Report -95 shows a well (OFR95-8) with a depth to groundwater of 110 feet below ground surface (2,895 ft amsl) and a total depth of 200 feet. Chloride data for this well does not exist. The difference between groundwater elevation at OFR95-8 and the bottom of the modular impoundment is approximately 95 feet. Therefore, we believe that groundwater that has the potential to be protectable (<10,000 mg/L TDS) exists between 50 and 100 feet below the modular impoundment.

Approximately three miles southwest of the modular impoundment, the OSE database describes well C 02707 with a depth to groundwater at 18 feet below ground surface (2,974 ft amsl) and a total depth of 40 feet. No chloride data exists for this well

[3] http://geoinfo.nmt.edu/publications/openfile/details.cfml?Volume=95

Approximately 4.8 miles west of the modular impoundment, the OSE database describes well C 02706 with a depth to groundwater at 10 feet below ground surface (2,942 ft amsl) and a total depth of 17 feet (Figure 1b). Water quality data from WAIDS database shows chloride concentrations ranging from 98,000 mg/L to 203,700 mg/L with an average concentration of 155,200 mg/L. The high chloride concentrations in groundwater within the alluvial sediments near the Salt Lake/tailings pond are consistent with the sources of this fluid.

Conclusion

The two wells and the rathole within 1-mile of the location (WAIDS-6, OFR95-9, Nash Unit #49H) suggest a local groundwater gradient to the southwest, consistent with local topography and regional southwest gradient (Hendrickson and Jones, 1952). Groundwater elevations in these wells range from 2,978 to 2,983 ft amsl and are considered to be within the same shallow groundwater zone less than 50 feet below ground surface. Subtracting the above groundwater elevations from the elevation of the bottom of the modular impoundment suggests that groundwater beneath the location is approximately 6 to 11 feet below ground surface.

Furthermore, TDS concentrations greater than 10,000 mg/L at Nash Unit #49H demonstrate that the shallow groundwater zone is impacted by the Salt Lake/tailing pond 3,250 feet to the west (Figure 2). The modular impoundment site is about 1,400 feet east from the Salt Lake/tailing pond, about 1,800 feet closer to the Salt Lake/tailing pond than Nash Unit #49. Because the concentration gradient from the Salt Lake/tailing pond will decrease continuously with distance from the pond due to dispersion, groundwater beneath the site will have higher concentrations than the groundwater at Nash Unit #49H. Groundwater exhibiting TDS concentrations greater than 10,000 mg/L is not defined as fresh water by 19.15.2.7.F (3) NMAC and is therefore not protectable. Because concentrations will be higher than those at Nash Unit #49H (TDS >10,000mg/L), the groundwater beneath the modular impoundment site is not protectable by 19.15.7.2.F(3) NMAC.

The next groundwater zone that may exist is between 50 to 100 feet below the modular impoundment. Evidence of this groundwater zone is exhibited at OFR95-8, 2.3 miles north of the location. Groundwater data at OFR95-8 suggest the difference between groundwater elevation at OFR95-8 and the bottom of the modular impoundment is approximately 95 feet. Therefore, we believe that groundwater that has the potential to be protectable (TDS < 10,000 mg/L) exists between 50 and 100 feet below the modular impoundment.

Siting Criteria Compliance Demonstration – continued (NMAC 19.15.17.10)

The information identified in Item 10, "Siting Criteria" of the C-144 is presented below. The descriptions below are associated with the maps presented in Figures 2-9, attached.

Figure 2 --- Demonstrates that the location is not within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).

a. Data from the USDA's National Hydraulic Dataset shows an intermittent stream (shown as a light blue dotted line in Figure 2) transecting the location.
b. Site reconnaissance identified no evidence of a watercourse as defined by NMAC 19.15.2.7. Photo 1, at right, shows the location of the "intermittent stream" identified by the USDA. As shown in Photo 1, no watercourse was identified having definite banks and beds with visible evidence of the occasional flow of water.
c. No other watercourses, water bodies, springs, or seeps exist with 200-feet of location.

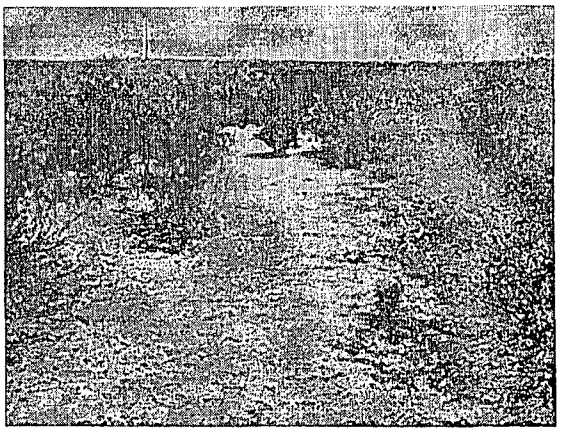


Photo 1: Photo of USDA identified intermittent stream. No definite banks and beds with visible evidence of occasional flow of water were identified.

Figure 3 --- Demonstrates that the location is not within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. No nearby structures exist within 300 feet of location.

a. As shown on the aerial photograph, no structures exist within 300 feet of the location.
b. Site reconnaissance supports this conclusion.

Figure 4 --- Demonstrates that the location is not within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.

a. The closest spring is approximately 2.3 miles northwest located within the Salt Lake of the potash mining district.
b. The closest water well listed in public files is approximately 0.9-mile southeast of the location.

Figure 5 --- Demonstrates that the location is not 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.

a. The closest incorporated municipality is Loving, NM; approximately 9 miles west.
b. The closest well field is approximately 23.5-miles west of the location.

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

a. The US Fish and Wildlife Wetlands Inventory does not identify wetlands within 500 feet of location.
b. Site reconnaissance identified no wetlands with 500 feet of location.

Figure 7 --- Shows that the location is within the Potash Mining District.

a. The closest potash mining tunnel is 1.5 miles north-northwest of the location. The closest surface mining location is 0.7 miles northwest. The MILS database lists the surface mine as a Prospect.
b. The construction of the modular impoundment will not require more than 18 inches excavation into the subsurface. The existing production pad consists of 6 inches of caliche on top of very dense clay (Photo 2). We conclude the construction of the modular impoundment will not compromise the subsurface integrity.

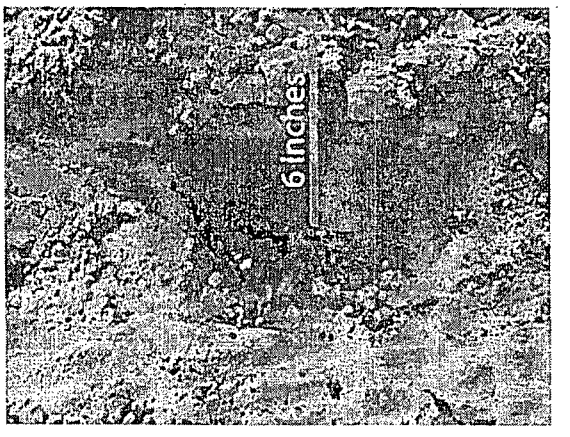


Photo 2: 6-inch caliche pad thickness. Dense clay underlies the pad.

Figure 8 --- Shows that the location may lie within an unstable area

a. The location is located within a known karst area identified by the USGS. Site reconnaissance observed no evidence of kart features (fissures, tubes, or caves) near the location.
b. The above ground modular impoundment will be placed upon a 6-inch caliche production pad. The production pad covers approximately 1.2 acres. Beneath the production pad is very dense clay.
c. The composition of the production pad and the underlying dense clay provides engineered surface stability to ensure that the modular impoundment's integrity is not compromised.

Figure 9 --- Demonstrates that the location is not within a 100-year floodplain.

a. The location is within Zone X of FEMA Flood Zone Designation. Zone X is defined as an area of minimal flood hazard and above the 500-year flood level.

Design and Construction Specifications (NMAC 19.15.17.11)

A. **General Specifications.** An operator shall design and construct a pit, closed-loop system, below-grade tank or sump to contain liquids and solids and prevent contamination of fresh water and protect public health and the environment.

Response –
XTO Energy shall construct a modular impoundment fluid storage system provided by Poseidon Concepts. The modular impoundment system model is the Atlantis[4]. Photo 3, right, is an example of Poseidon's modular impoundment. The modular impoundment shall be constructed according to manufacturer's specifications as described in Section 19.15.17.11.F, below. The modular impoundment is engineered to prevent contamination of fresh water and protect public health and the environment.

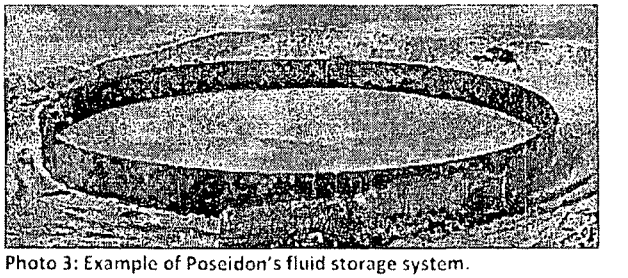


Photo 3: Example of Poseidon's fluid storage system.

The purpose of the modular impoundment is the temporary storage of treated produced water in a centralized location for six off-site well stimulations. The modular impoundment shall be constructed on an existing well pad currently used for operation and maintenance of the Nash Unit #29 well. XTO Energy shall restore the production pad to pre-existing condition prior to the installation of the modular impoundment.

B. **Stockpiling of topsoil.**

Response –
The modular impoundment shall be constructed on an existing production pad at Nash Unit #29. No additional surface disturbance shall occur. After modular impoundment closure, the production pad will remain in-place until proper abandonment of the production well.

Photo 4: Sign at Nash Unit #29 to be used in conjunction with the modular impoundment.

C. **Signs.**

Response –
The existing sign at Nash Unit #29 production well, which is on the same production pad as the proposed location, shall be used. Photo 4 is a photograph of

[4] http://poseidonconcepts.com/Customer-Centre/Models/index.php

the existing sign.

D. Fencing.

Response –
As described in Section 19.15.17.11.F, below, the modular impoundment is constructed with 12-foot high steel walls. In lieu of fencing to prevent unauthorized access and exclude entry of livestock, XTO Energy asks for administrative approve to use the modular impoundment's steel 12-foot high walls as an alternative to fencing. XTO Energy concludes that the 12-foot high steel walls are superior to fencing.

F. Temporary Pits. The operator shall design and construct a temporary pit in accordance with the following requirements.

(1) The operator shall design and construct a temporary system to ensure the confinement of liquids to prevent unauthorized releases.

Response -
The modular impoundment system is constructed from 5/8" thick steel welded to 4"x4"x144" vertical steel supports (see Photo 5) and is engineered to withstand the hydrostatic pressures exerted downwards and outwards by the weight of the fluid when full. The panels are connected with 1" thick steel plates that fit over solid steel "bosses" welded to the modular impoundment wall. These plates are then locked to the bosses with locking pins. The locking pins are secured with safety cotter pins (see Appendix SSI-2 for interlocking panel details and patent). The 30 mil LLDPE liner is then clamped to the top of these walls leaving an extra 2 feet of liner material hanging outside of the modular impoundment to provide a safety margin (Photo 6, below).

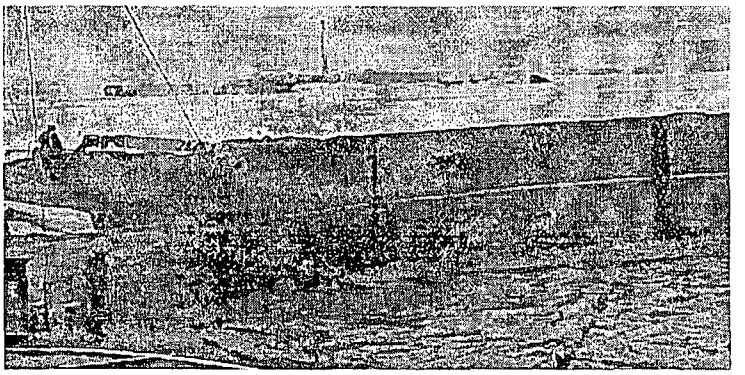


Photo 5: Interlocking panels of the modular impoundment.

The modular impoundment system was designed and engineered by Beck Engineering, Ltd for Poseidon Concepts. A letter from Beck Engineering (see Appendix SSI-2) is stamped by a Professional Engineer and confirms that the modular impoundment is structurally designed to resist all anticipated forces on the modular impoundment panels and panel connections from the start of erection to the complete filling of the modular impoundment. The modular impoundment is patented in Canada. Patent is pending for the United States. Therefore, Poseidon will not release schematics of the modular impoundment design until patenting in the United States is complete.

During installation, a representative from Poseidon shall be present. Appendix SSI-3 contains the set-up procedures. The set-up procedures were provided by Poseidon.

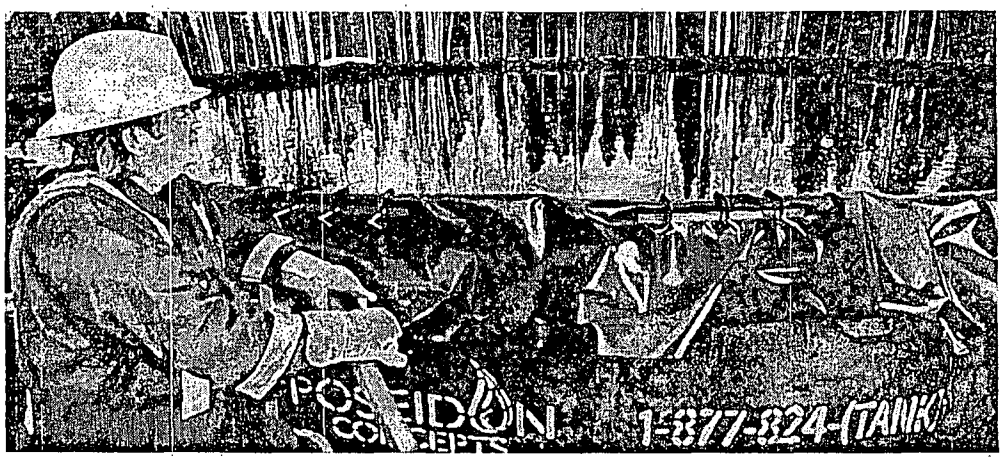


Photo 6: Clamping system holding liner in place. Spacing between clamping is 3-feet.

(2) A temporary pit shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. The operator shall construct a temporary pit so that the slopes are no steeper than two horizontal feet to one vertical foot (2H:1V). The appropriate division district office may approve an alternative to the slope requirement if the operator demonstrates that it can construct and operate the temporary pit in a safe manner to prevent contamination of fresh water and protect public health and the environment.

Response -
The modular impoundment shall be placed on the existing Nash Unit #29 production pad. The existing production pad is constructed of approximately 6-inches of caliche overlying very dense clay (see Photo 2).

Prior to installation, the production pad will be prepared to make it smooth and free of rocks. A minimum of 10 oz. per square foot nonwoven geotextile material from Brawler (product WID10, see Appendix SSI-2) shall be placed between the production pad and the liner of the modular impoundment to prevent liner rupture or tear from the underlying pad.

In lieu of slopes no greater than 2H:1V, XTO Energy asks for administrative approval for vertical slopes (steel walls) engineered for the modular impoundment. The modular impoundment's vertical steel walls are constructed from 5/8" thick steel welded to 4"x4"x144" vertical steel supports (see Photo 5) and is engineered to withstand the hydrostatic pressures exerted downward and outward by the weight of the fluid when full. The panels are connected with 1" thick steel plates that fit over solid steel "bosses" welded to the modular impoundment wall. These plates are then locked to the bosses

with locking pins. The locking pins are secured with safety cotter pins. Modular impoundment integrity will not fail or collapse because of the engineered design specifications.

A sump area in the configuration of a "Y", with each leg approximately 15 feet long, shall be excavated into the production pad to accommodate the modular impoundment suction pipes. The sump area is excavated 18 inches below the elevation of the production pad. The sump walls shall be no greater than 2H:1V sloping on the sides of the sump area, and an additional layer of the 10 oz. per square foot nonwoven geotextile material, as well as visual inspection, after excavation but prior to installation, to be sure that the underlying soil represents a property constructed smooth foundation free of rocks.

(3) The operator shall design and construct a temporary pit with a geomembrane liner. The geomembrane liner shall consist of 20-mil string reinforced LLDPE or equivalent liner material that the appropriate division district office approves. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. The liner material shall be resistant to ultraviolet light. Liner compatibility shall comply with EPA SW-846 method 9090A.

Response –
In lieu of a 20-mil string reinforced LLDPE liner, XTO Energy asks for administrative approval for a stronger and thicker 30 mil LLDPE liner. The liner material used for the modular impoundment is a 30-mil LLDPE material provided by GSE. See Appendix SSI-2 for specifications and data sheets on the GSE 30 mil UltraFlex Smooth Geomembrane liner. The liner is resistant to petroleum hydrocarbons, salts and acidic, alkaline solutions, and ultraviolet light. The 30 mil GSE liner is equivalent to or better than a 20-mil string reinforced LLDPE liner.

(4) The operator shall minimize liner seams and orient them up and down, not across a slope. The operator shall use factory welded seams where possible. Prior to field seaming, the operator shall overlap liners four to six inches and orient seams parallel to the line of maximum slope, i.e., oriented along, not across, the slope. The operator shall minimize the number of field seams in corners and irregularly shaped areas. Qualified personnel shall perform field seaming. The operator shall weld field liner seams.

Response –
The liner is manufactured with factory welds and seams going in one direction. The east and west oriented liner panels have a maximum width of 25-feet with 5-inch seams (see liner seam orientation diagram in Appendix SSI-4). The interior panels shall be 24.6-feet wide; with the width of one of the two middle panels adjusted to ensure that the overall dimension of the liner is 190x190 feet. All factory welds are designed according to GSE manufacture specifications and are engineered to withstand the weight of the water.

The outermost east- west panel liner seams are approximately 7-feet on the north-south axis from the floor-wall junction of the modular impoundment. The seam pattern, panel widths, and seam orientation will minimize liner seams and will orientate the seams up and down, not across the slope (steel walls).

(5) Construction shall avoid excessive stress-strain on the liner.

Response -
In accordance with the set-up procedures (Appendix SSI-3), additional 10oz per square foot geotextile material is placed on any "pinch point" where the liner could either have direct contact with the walls or become pinched between walls and/or the walls and the ground, the sump area, and the C-clamps holding the liner to the top of the modular impoundment.

As shown on the liner seam orientation diagram in Appendix SSI-4, all of the seams of the 25-foot wide panels are in an east-west orientation. Hence, all of the seams run up and down the vertical slopes rather than across the slopes. On the north-south axis, the closest east-west seam to the bottom wall corner is 7-feet. This seam orientation prevents undue stresses and stain on the liner material and seams.

(6) Geotextile is required under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity.

Response –
A 10 oz. per square foot nonwoven geotextile shall be placed between the production pad and the liner and at pinch-points where the liner could either have direct contact with the walls or become pinched between walls and/or the walls and the ground, including the C-clamps holding the liner to the top of the modular impoundment. An additional second geotextile layer shall be placed between the sump areas and the LLDPE liner.

(7) The operator shall anchor the edges of all liners in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

Response –
In lieu of an anchor trench, XTO Energy asks for administrative approval to use C-clamps to anchor the liner to the top of the modular impoundment (see Photo #6). The purpose of the clamps is to prevent the liner material from falling in and compromising the ability of the modular impoundment to contain fluids.

Each 3-foot clamp section is separated by three foot spacing. The sequence is repeated along the top of the modular impoundment. The liner overlaps the modular impoundment by at least 24 inches, providing a robust safety factor if the liner should need adjustment after installation.

(8) The operator shall ensure that the liner is protected from any fluid force or mechanical damage at any point of discharge into or suction from the lined temporary pit.

Response –
The intake pipe for the suction system will sit on the floor in the sump area. The suction intake is a 15-foot long pipe with legs (to prevent rotation) and has horizontal slots for the fluid that are 4-inches up the side of the pipe. The suction pipe riser is a 10-inch pipe that mounts to the top of the modular impoundment and descends down the exterior wall (Photo #7) and connects to a pump.

The 4-inch filler pipes mount to the top of the modular impoundment in similar fashion to the suction pipe. The discharge end of the filler pipe is 4-inches from the bottom of the modular impoundment.

One suction pipe and four filler pipes shall be installed on the modular impoundment.

Photo 7: Photograph of the suction and filler pipes.

(9) The operator shall design and construct a temporary pit to prevent run-on of surface water. A berm, ditch, proper sloping or other diversion shall surround a temporary pit to prevent run-on of surface water. During drilling operations, the edge of the temporary pit adjacent to the drilling or workover rig is not required to have run-on protection if the operator is using the temporary pit to collect liquids escaping from the drilling or workover rig and run-on will not result in a breach of the temporary pit.

Response -
A 2-foot high berm shall be constructed around the modular impoundment to prevent run-on of surface water. As there are no drilling or workover operations at the location, the berm will surround the entire modular impoundment. A 2-foot freeboard shall be maintained to prevent overflow.

(10) The volume of a temporary pit shall not exceed 10 acre-feet, including freeboard.

Response –
The volume (full capacity) of the modular impoundment plus the three 18-inch deep by 15-foot long sump areas is less than 42,000 bbls (about 5.5 acre-feet). During normal operation, the modular impoundment will hold less water to allow for 2-feet of freeboard.

Operational Requirements (NMAC 19.15.17.12)

Note: The modular impoundment will contain treated produced water. Between well stimulations, the modular impoundment will contain enough treated produced water to hold down the liner. Weekly inspections shall occur when there is 1-foot depth or less of treated produced water in the modular impoundment. Daily inspections shall occur when there is greater than 1-foot depth of treated produced water in the modular impoundment.

A. **General Specifications**. XTO Energy shall maintain and operate the modular impoundment according to manufacturer's operating and maintenance specifications as described in Section 19.15.17.12.B, below.

(1) The operator shall operate and maintain a pit to contain liquids and solids and maintain the integrity of the liner, liner system or secondary containment system, prevent contamination of fresh water and protect public health and the environment.

Response –
XTO Energy shall operate the modular impoundment for the temporary storage of treated produced water for off-site well stimulations. XTO Energy shall inspect the modular impoundment for liner integrity, to ensure that a 2-foot freeboard is maintained, and to inspect berm stability around the modular impoundment to protect from surface water run-on/run-off.

(2) The operator shall recycle, reuse, reclaim or dispose of all drilling fluids in a manner, approved by division rules, that prevents the contamination of fresh water and protects public health and the environment.

Response –
XTO Energy shall operate the modular impoundment for the temporary storage of treated produced water for off-site well stimulations. Unused treated produced water, if present, will be sent to XTO Energy's SWD-53 well for recycling or a division-approved disposal facility. Proper disposal of excess treated produced water prevents the contamination of fresh water and protects public health and the environment.

(3) The operator shall not discharge into or store any hazardous waste in a pit, closed-loop system, below-grade tank or sump.

Response –
XTO Energy shall operate the modular impoundment for the temporary storage of treated produced water for off-site well stimulations.. XTO Energy shall not discharge hazardous waste into the modular impoundment.

(4) If any pit liner's integrity is compromised, or if any penetration of the liner occurs above the liquid's surface, then the operator shall notify the appropriate division

district office within 48 hours of the discovery and repair the damage or replace the liner.

Response –
If the liner integrity is found to be compromised during an inspection, XTO Energy shall notify the appropriate division district office within 48 hours of the discovery and repair the damage or replace the liner.

(5) If a pit, below-grade tank, closed-loop system or sump develops a leak, or if any penetration of the pit liner, below-grade tank, closed-loop system or sump occurs below the liquid's surface, then the operator shall remove all liquid above the damage or leak line within 48 hours, notify the appropriate division district office within 48 hours of the discovery and repair the damage or replace the pit liner, below-grade tank, closed-loop system or sump.

Response –
If the modular impoundment contains any volume of liquid and liner integrity is found to be compromised below the liquid's surface, XTO Energy shall remove all liquid above the damage or leak line within 48 hours, notify the appropriate division district office within 48 hours of the discovery and repair the damage or replace the modular impoundment.

(6) The injection or withdrawal of liquids from a pit shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

Response –
Inspections shall verify that suction (intake), riser and filler pipes (see Photo #7) are intact and properly connected and secured.

The intake pipe for the suction system will sit on the floor in the sump area. The suction intake is a 15-foot long pipe with legs (to prevent rotation). The suction pipe riser is a 10-inch pipe that mounts to the top of the modular impoundment and descends down the exterior wall and connects to a pump.

The 4-inch filler pipes mount to the top of the modular impoundment in similar fashion to the suction pipe. The discharge end of the filler pipe is 4-inches from the bottom of the modular impoundment bottom to prevent damage to the liner by discharging operations.

(7) The operator shall operate and install a pit, below-grade tank or sump to prevent the collection of surface water run-on.

Response –
The modular impoundment's 12-foot high steel walls prevent the collection of surface water run-on. XTO Energy shall provide additional prevention to reduce

undercutting of the steel walls from surface water run-on by the construction of a 2-foot high berm along the bottom perimeter of the modular impoundment. Inspections shall verify that the berm surrounding the modular impoundment remains intact. Berm sections that lose integrity shall be repaired within 48 hours.

(8) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain and remove oil from a pit's surface

Response –
XTO Energy shall verify that no oil is on the modular impoundment surface. If oil is observed, the oil shall be removed using an absorbent boom or other device and properly disposed at an approved facility.

B. Temporary pits. An operator shall maintain and operate a temporary pit in accordance with the following additional requirements

(1) Only fluids used or generated during the drilling or workover process may be discharged into a temporary pit. The operator shall maintain a temporary pit free of miscellaneous solid waste or debris. The operator shall use a tank made of steel or other material, which the appropriate division district office approves, to contain hydrocarbon-based drilling fluids. Immediately after cessation of a drilling or workover operation, the operator shall remove any visible or measurable layer of oil from the surface of a drilling or workover pit.

Response –
The modular impoundment shall be used for temporary storage of treated produced water for well stimulation. No other fluids other than treated produced water shall be discharged into the modular impoundment.

(2) The operator shall maintain at least two feet of freeboard for a temporary pit.

Response –
The modular impoundment shall be inspected daily by XTO Energy when containing more than 1-foot of treated produced water to ensure that a 2-foot freeboard is maintained.

(3) The operator shall inspect a temporary pit containing drilling fluids at least daily while the drilling or workover rig is on-site. Thereafter, the operator shall inspect the temporary pit weekly so long as liquids remain in the temporary pit. The operator shall maintain a log of such inspections and make the log available for the appropriate division district office's review upon request. The operator shall file a copy of the log with the appropriate division district office when the operator closes the temporary pit.

Response –

XTO Energy shall inspect the modular impoundment daily when containing more than 1-foot of treated produced water for: liner integrity, to ensure that a 2-foot freeboard is maintained, to prevent the presence of oil on the fluid surface, and to maintain berm stability around the modular impoundment to protect from surface water run-on/run-off. When less than one foot or less of treated produced water is present in the modular impoundment, XTO Energy shall inspect weekly. A log of these inspections shall be maintained by XTO Energy and made available upon division request. The log shall be filed with the modular impoundment closure report.

(4) The operator shall remove all free liquids from a temporary pit within 30 days from the date that the operator releases the drilling or workover rig. The operator shall note the date of the drilling or workover rig's release on form C-105 or C-103 upon well or workover completion. The appropriate division district office may grant an extension of up to three months.

Response –
The purpose of the modular impoundment is to provide fluid for six off-site well stimulations. The modular impoundment is not associated with a drilling or workover rig. The anticipated duration of the six stimulations is approximately 4 months. After the transfer of treated produced water to the 6th off-site well stimulation is complete, XTO Energy shall within 30-days remove remaining treated produced water from the modular impoundment. The modular impoundment is not associated with a drilling or workover rig. Therefore, XTO shall mark the transfer completion date on the C-144 and C-105 in lieu of rig release date.

Closure Requirements (NMAC 19.15.17.13)

A. Time requirements for closure per NMAC 19.15.17.13.

(7) An operator shall close any other permitted temporary pit within six months from the date that the operator releases the drilling or workover rig. The appropriate division district office may grant an extension not to exceed three months.

Response –
After the transfer of treated produced water to the 6th off-site well stimulation is complete, XTO Energy shall within six months close the modular impoundment. The modular impoundment is not associated with any drilling or workover rig.

B. Closure methods for temporary pits.

(1) Waste Excavation and removal

a) The operator shall close the temporary pit by excavating all contents and, if applicable, synthetic pit liners and transferring those materials to a division-approved facility.

Response –
Prior to disassembly of the modular impoundment, any remaining treated produced water shall be removed and injected into XTO Energy's SWD-53 (API#: 3001539400).

After the remaining fluid is removed the liner material, geomembranes and non-reusable pipe (suction and filler pipes) shall be transported to one of the following division-approved facilities:

- Controlled Recovery, Inc NM-01-0006
- Lea Land, LLC NM-01-0035

Reusable pipes, pumps, and other components owned by Poseidon will be loaded onto Poseidon trailers and transported off site.

b) The operator shall test the soils beneath the temporary pit to determine whether a release has occurred.

i. For temporary pits where ground water is between 50 and 100 feet below the bottom of the temporary pit or for cavitation pits allowed pursuant to Subparagraph (a) of Paragraph (1) of Subsection A of 19.15.17.10 NMAC, the operator shall collect, at a minimum, a five point, composite sample; collect individual grab samples from any area that is wet, discolored or showing other evidence of a release; and analyze for benzene, total BTEX, TPH, the GRO and DRO combined fraction and chlorides to demonstrate

that benzene, as determined by EPA SW-846 method 8021B or 8260B or other EPA method that the division approves, does not exceed 0.2 mg/kg; total BTEX, as determined by EPA SW-846 method 8021B or 8260B or other EPA method that the division approves, does not exceed 50 mg/kg; TPH, as determined by EPA SW-846 method 418.1 or other EPA method that the division approves, does not exceed 2500 mg/kg; the GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, does not exceed 500 mg/kg; and chlorides, as determined by EPA method 300.1, do not exceed 500 mg/kg or the background concentration, whichever is greater. The operator shall notify the division of its results on form C-141. The division may require additional delineation upon review of the results.

Response –
XTO Energy shall collect, at a minimum, a five point, composite sample; collect individual grab samples from any area that is wet, discolored or showing other evidence of a release; and analyze for benzene (EPA 8260B), total BTEX (EPA 8260B), TPH (EPA 418.1), the GRO and DRO combined fraction (EPA SW-846 method 8015M) and chlorides (EPA 300.1). XTO Energy shall notify the division of its results on form C-141.

c) If the operator or the division determines that a release has occurred, then the operator shall comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.

Response –
If the division or XTO Energy determines that a release has occurred, XTO Energy shall comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.

d) If the sampling program demonstrates that a release has not occurred or that any release does not exceed the concentrations specified in Subparagraph (b) of Paragraph (1) of Subsection B of 19.15.17.13 NMAC, then the operator shall backfill the temporary pit excavation with compacted, non-waste containing, earthen material; construct a division-prescribed soil cover; recontour and re-vegetate the site. The division-prescribed soil cover, recontouring and re-vegetation requirements shall comply with Subsections G, H and I of 19.15.17.13 NMAC.

Response –
The modular impoundment is an above ground modular impoundment, no backfilling is necessary except the "Y" shaped sump area that has an excavated depth of 18-inches. The sump area will be filled with dense clay and topped with 6-inches of caliche to match existing production pad construction and grade. In lieu of revegetation, XTO Energy asks division approval for the reclamation of the sump area to pre-existing conditions – an active production pad for the Nash Unit #29 well. See 19.15.17.13.G, below.

G. Reclamation of pit locations, on-site burial locations and drying pad locations.

(1) Once the operator has closed a pit or trench or is no longer using a drying pad, below-grade tank or an area associated with a closed-loop system, pit, trench or below-grade tank, the operator shall reclaim the pit location, drying pad location, below-grade tank location or trench location and all areas associated with the closed-loop system, pit, trench or below-grade tank including associated access roads to a safe and stable condition that blends with the surrounding undisturbed area. The operator shall substantially restore the impacted surface area to the condition that existed prior to oil and gas operations by placement of the soil cover as provided in Subsection H of 19.15.17.13 NMAC, recontour the location and associated areas to a contour that approximates the original contour and blends with the surrounding topography and re-vegetate according to Subsection I of 19.15.17.13 NMAC.

Response –
The modular impoundment is an above ground fluid storage system, no backfilling is necessary except the "Y" shaped sump area that has a depth of 18-inches. The sump area shall be reclaimed to pre-existing conditions, an active production pad for the Nash Unit #29 well. The sump area shall be backfilled with dense clay and topped with 6-inches of caliche to match existing production pad grade. Revegetation of the sump area shall occur during reclamation activities for Nash Unit #29 plugging and abandonment per agreement with BLM (Appendix SSI-5).

(2) The operator may propose an alternative to the re-vegetation requirement if the operator demonstrates that the proposed alternative effectively prevents erosion, and protects fresh water, human health and the environment. The proposed alternative shall be agreed upon by the surface owner. The operator shall submit the proposed alternative, with written documentation that the surface owner agrees to the alternative, to the division for approval.

Response –
In lieu of re-vegetation, XTO Energy asks the division to allow interim reclamation to pre-existing conditions - an operational production pad. Interim reclamation of the sump area shall consist of reclaiming the sump area to pre-existing production pad conditions by backfilling with dense clay and topping with 6-inches of caliche to match existing production pad grade. Re-vegetation shall occur during the plugging and abandonment of Nash Unit#29 per agreement with BLM (see Appendix SSI-5).

H. Soil cover designs.

(1) The soil cover for closures where the operator has removed the pit contents or remediated the contaminated soil to the division's satisfaction shall consist of the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

Response –
In lieu of soil cover, XTO Energy asks the division to allow interim reclamation to pre-

existing conditions - an operational production pad. Interim reclamation of the sump area shall consist of reclaiming the sump area to pre-existing production pad conditions by backfilling with dense clay and topping with 6-inches of caliche to match existing production pad grade. Soil cover shall occur during the plugging and abandonment of Nash Unit#29 per agreement with BLM (see Appendix SSI-5).

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

Response –
In lieu of soil cover, XTO Energy asks the division to allow interim reclamation to pre-existing conditions - an operational production pad. Interim reclamation of the sump area shall consist of reclaiming the sump area to pre-existing production pad conditions by backfilling with dense clay and topping with 6-inches of caliche to match existing production pad grade. Proper soil cover construction shall occur during the plugging and abandonment of Nash Unit#29 per agreement with BLM (see Appendix SSI-5).

I. Re-vegetation.

Response –
In lieu of re-vegetation, XTO Energy asks the division to allow interim reclamation to pre-existing conditions - an operational production pad. Interim reclamation of the sump area shall consist of reclaiming the sump area to pre-existing production pad conditions by backfilling with dense clay and topping with 6-inches of caliche to match existing production pad grade. Re-vegetation shall occur during the plugging and abandonment of Nash Unit#29 per agreement with BLM (see Appendix SSI-5).

J. Closure notice.

(1) The operator shall notify the surface owner by certified mail, return receipt requested, that the operator plans to close a temporary pit, a permanent pit, a below-grade tank or where the operator has approval for on-site closure. Evidence of mailing of the notice to the address of the surface owner shown in the county tax records is sufficient to demonstrate compliance with this requirement.

Response –
XTO Energy shall notify the surface owner by certified mail, return receipt requested, that XTO Energy plans to close a modular impoundment.

(2) The operator of a temporary pit or below-grade tank or an operator who is approved for on-site closure shall notify the appropriate division district office verbally or by other means at least 72 hours, but not more than one week, prior to any closure operation. The notice shall include the operator's name and the location to be closed by unit letter, section, township and range. If the closure is associated with a particular well, then the notice shall also include the well's name, number and API number.
Response –

XTO Energy shall notify the appropriate division district office verbally or by other means at least 72 hours, but not more than one week, prior to any closure operation. The notice shall include the operator's name and the location to be closed by unit letter, section, township and range.

K. Closure report.

Within 60 days of closure completion, the operator shall submit a closure report on form C-144, with necessary attachments to document all closure activities including sampling results; information required by 19.15.17 NMAC; a plot plan; and details on back-filling, capping and covering, where applicable. In the closure report, the operator shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan. If the operator used a temporary pit, the operator shall provide a plat of the pit location on form C-105 within 60 days of closing the temporary pit.

Response –

Within 60 days, XTO Energy shall submit a closure report on form C-144 ,with necessary attachments documenting all closure activities including sampling results; information required by 19.15.17 NMAC; a plot plan; and details on back-filling the sump area, capping and covering back to pre-existing conditions. In the closure report, XTO Energy shall certify that all information in the report and attachments are correct and that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan. XTO Energy shall provide a plat of the pit location on form C-105 within 60 days of closing the modular impoundment.

Appendix SSI-1

Site Visit Photographs

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

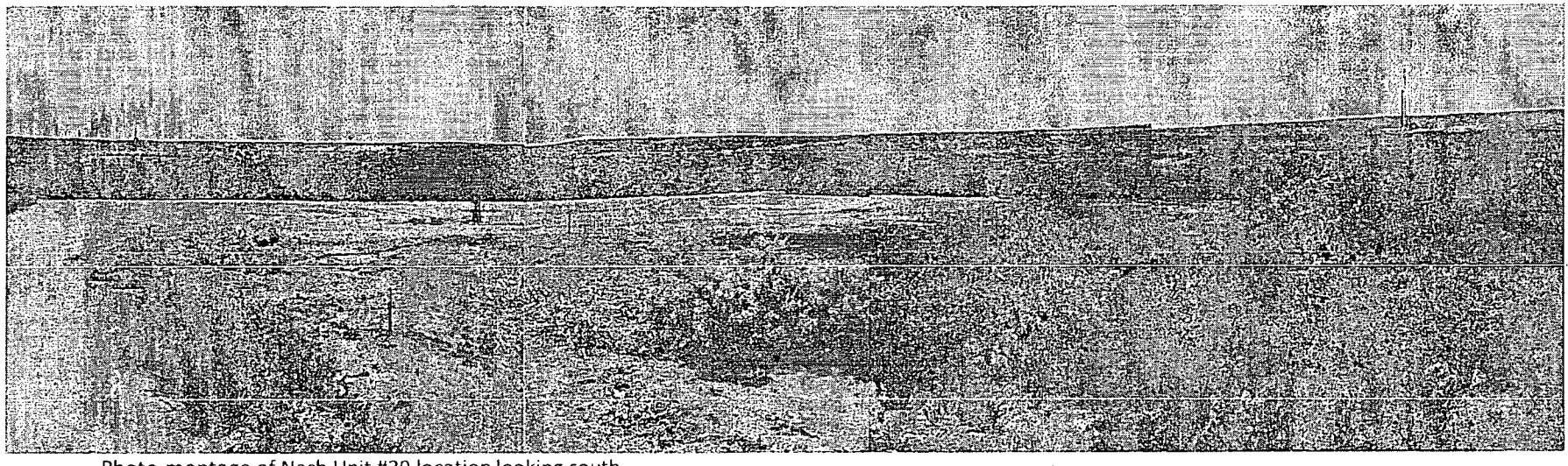
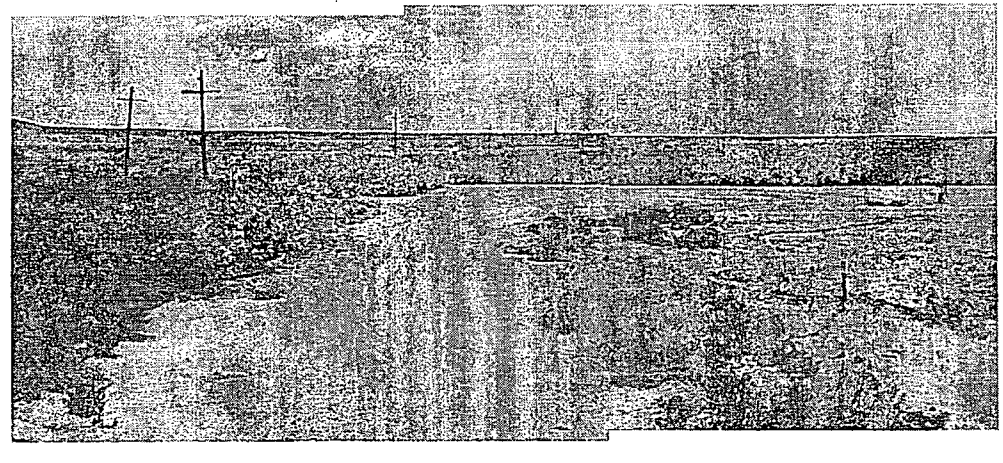
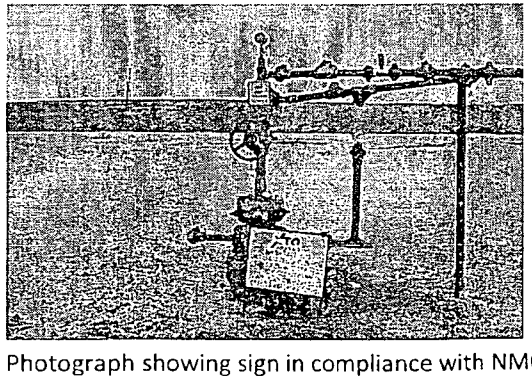


Photo-montage of Nash Unit #29 location looking south from a small rise. Temporary pit will lie on east (left) of the pad.

East portion of photo-montage Topography is very flat and site inspections found no evidence of a continuously-flowing arroyo on southeast portion of pad.





Photograph showing sign in compliance with NMOCD Rules.

Appendix SSI-2

- Canadian Patent
- Beck Engineering Letter
- Geotextile Specifications
- Liner Specifications

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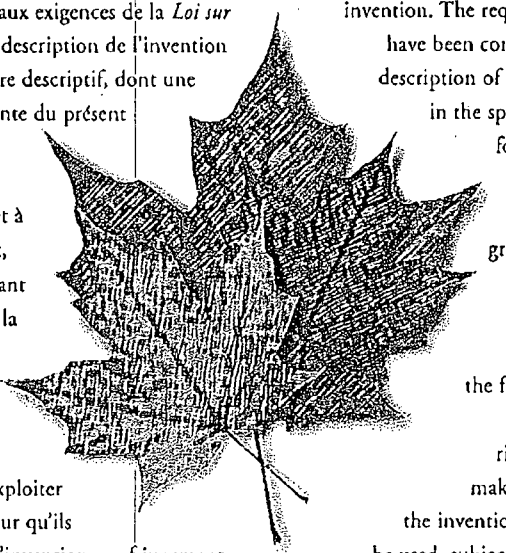
Office de la propriété intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An Agency of Industry Canada

Brevet canadien / Canadian Patent

Le commissaire aux brevets a reçu une demande de délivrance de brevet visant une invention. Ladite requête satisfait aux exigences de la *Loi sur les brevets*. Le titre et la description de l'invention figurent dans le mémoire descriptif, dont une copie fait partie intégrante du présent document.

Le présent brevet confère à son titulaire et à ses représentants légaux, pour une période expirant vingt ans à compter de la date du dépôt de la demande au Canada, le droit, la faculté et le privilège exclusif de fabriquer, construire, exploiter et vendre à d'autres, pour qu'ils l'exploitent, l'objet de l'invention, sauf jugement en l'espèce rendu par un tribunal compétent, et sous réserve du paiement des taxes périodiques.



The Commissioner of Patents has received a petition for the grant of a patent for an invention. The requirements of the *Patent Act* have been complied with. The title and a description of the invention are contained in the specification, a copy of which forms an integral part of this document.

The present patent grants to its owner and to the legal representatives of its owner, for a term which expires twenty years from the filing date of the application in Canada, the exclusive right, privilege and liberty of making, constructing and using the invention and selling it to others to be used, subject to adjudication before any court of competent jurisdiction, and subject to the payment of maintenance fees.

BREVET CANADIEN **2,692,016** CANADIAN PATENT

Date à laquelle le brevet a été accordé et délivré	**2011/07/19**	Date on which the patent was granted and issued
Date du dépôt de la demande	**2010/02/05**	Filing date of the application
Date à laquelle la demande est devenue accessible au public pour consultation	**2010/07/05**	Date on which the application was made available for public inspection

Commissaire aux brevets / Commissioner of Patents

Canada

3266 (CIPO 91) 01/06

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B65D 5/44 (2006.01)

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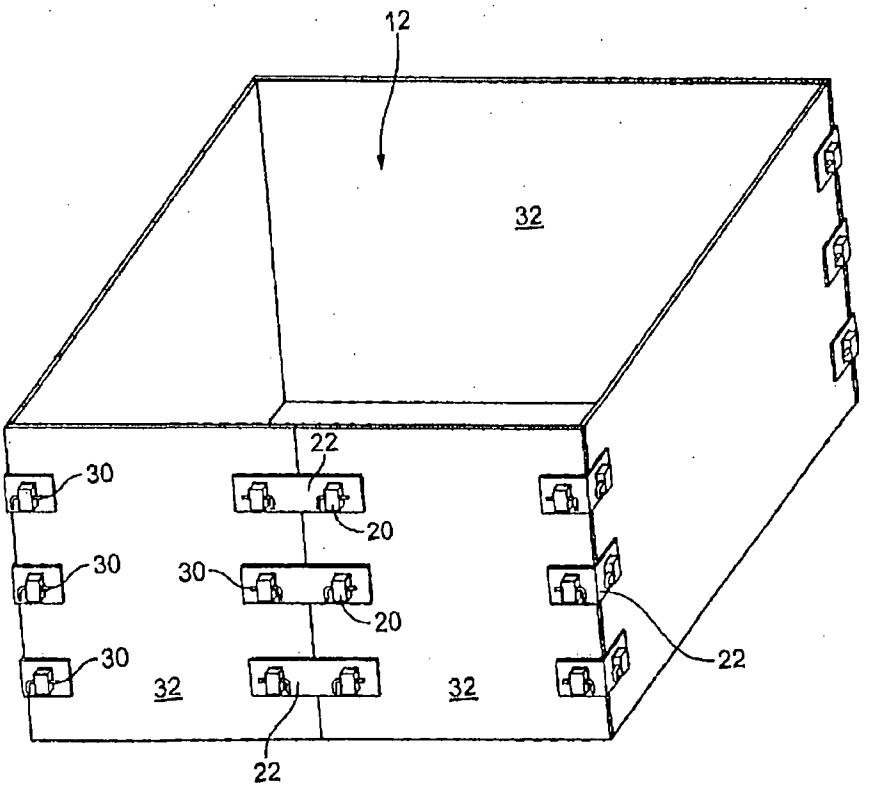
(54) Titre : ENSEMBLE DE FIXATION DE RECIPIENTS
(54) Title: CONTAINER FASTENING ASSEMBLY



(57) Abrégé/Abstract:
A connection arrangement for connection of vertically and/or horizontally arranged containers. Each of the containers provides bosses or projections over a collinear pair of which is placed a separate plate. The plate provides matched polygonal apertures to

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(57) Abrégé(suite)/Abstract(continued):
receive the projections. Each of the projections provides an aperture there through to receive a retainer pin or bolt. the pin or bolt abuts the plate when engaged. The arrangement greatly expedites the separation of the containers when desired. The user need only tap out the retainer pin and pull off the plate. This obviates the use of fasteners which can freeze, rust or become otherwise inoperative or cumbersome.

CONTAINER FASTENING ASSEMBLY

TECHNICAL FIELD

The present invention relates to fasteners for modular containers/enclosures and more particularly , the present invention relate to a fastening assembly which is expeditiously removed and assembled to allow separation and assembly of the containers by the user without the need to unfasten bolts etc.

BACKGROUND OF THE INVENTION

Fastening assemblies of a broad variety have been used for some time in connecting modular containers and panels or segments making up the enclosures or containers. Contributory to the problem with the fastening arrangements known is that they are not designed for simplicity of use and with the least number of parts. It is well known that the nut and bolt or other mechanical arrangements are very often overly complex for the purpose of securing containers together. In the bolt system, the user is often faced with rusted connectors which are difficult if not impossible sometimes to disconnect. This often leads to complete destruction of the fastener and potential damage to the container which elevates costs for wasted time, materials and repairs.

As a further problem, the possibility of attempting to remove nuts from bolts etc. in inclement weather such as freezing weather becomes exceedingly difficult considering the clothing the user must wear to stay warm. The result is that the user often must at least remove hand protection to operate a wrench etc., thus introducing the possibility of frostbite or other exposure.

The prior art is replete with as many variations of fastening systems, all of which are not designed for user ease.

SUMMARY OF THE INVENTION

One object of the invention is to provide an improved fastening assembly for fastening adjacent containers.

A further object of one embodiment is to provide a connection assembly for connecting similar containers, comprising, in combination:

a first container and a second container in contact;

first cooperating engagement means projecting from each container of the containers, the first cooperating engagement means being in alignment on containers in contact;

second cooperating engagement means adapted for overlying releasable engagement with the first cooperating engagement means, the second cooperating means having a configuration matched in shape to the first cooperating engagement means, the first cooperating engagement means extending beyond the second cooperating engagement means when the second cooperating engagement means overlies the first cooperating engagement means;

third cooperating engagement means integral with the first cooperating engagement means; and

fourth cooperating engagement means adapted for releasable engagement with the third cooperating engagement means and for retaining the second cooperating engagement means when overlying the first cooperating engagement means, whereby when the first cooperating engagement means receives the second cooperating engagement means and the third cooperating engagement means receives the fourth cooperating engagement means, each container is connected and secured against substantial vertical and horizontal separation.

The arrangement has been found to be particularly simple to use in any weather conditions. The first cooperating engagement means in one embodiment comprises a polygonal boss or projection extending outwardly from each adjacently positioned container.

The second cooperating engagement means comprises, in one embodiment, a plate adapted to overly the bosses. The plate is provided with apertures matched in configuration to the bosses. It is preferred that the shape of the bosses and the plate apertures be selected from a polygonal repertoire; circular arrangements do not provide any protection for horizontal and/or vertical movement between adjacent containers. The polygonal shape is advantageous to avoid such potentially hazardous and damaging movement. Further, the distance between the bosses of contacted containers is identical to a vertical distance between the bosses of an individual container.

The bosses are horizontally and vertically collinear to allow any plate to be used over any projections.

With respect to the fourth cooperating engagement means, the same may comprise in one possible embodiment, a pin or L bolt which is simply inserted in to the aperture extending through each boss.

The arrangement is particularly convenient, since a user wishing to disconnect connected containers, simply pushes out the pin from each boss and pulls the plate free of the bosses.

A further object of one embodiment of the present invention is to provide a connection assembly for connecting similar containers, comprising, in combination:

a first container and a second container in contact;

a plurality of projections projecting from each container of the containers arranged in alignment on containers in contact;

a separate plate member adapted for overlying releasable engagement with the projections projecting from each container, the plate having apertures matched in shape to the projections, the projections extending beyond the plate when in overlying relation with the projections;

aperture means extending through the projections; and

retainer means adapted for releasable engagement with the aperture means, whereby when the projections receive the separate plate and the aperture means receives the retainer means, each container is connected and secured against substantial vertical and horizontal separation.

Yet another object of one embodiment of the present invention is to provide a modular container, comprising:

a plurality of separate container wall segments adapted for releasable connection with each other to form a container or enclosure;

first cooperating engagement means projecting from each container wall segment of the containers, the first cooperating engagement means being in alignment on each container wall segment;

second cooperating engagement means adapted for overlying releasable engagement with the first cooperating engagement means, the second cooperating

means having a configuration matched in shape to the first cooperating engagement means, the first cooperating engagement means extending beyond the second cooperating engagement means when the second cooperating engagement means overlies the first cooperating engagement means;

third cooperating engagement means integral with the first cooperating engagement means; and

fourth cooperating engagement means adapted for releasable engagement with the third cooperating engagement means and for retaining the second cooperating engagement means when overlying the first cooperating engagement means, whereby when the first cooperating engagement means receives the second cooperating engagement means and the third cooperating engagement means receives the fourth cooperating engagement means, each container wall segment is connected forming a container or enclosure and secured against substantial vertical and horizontal separation.

Advantageously, the use of the cooperating engagement means significantly reduces the time required to assemble and disassemble the enclosure or container and presents a marked benefit over existing arrangements.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of the container arrangement and fastening assembly according to one embodiment;

Figure 2 is an enlarged view of the assembly illustrated in Figure 1;

Figure 3 is an enlarged view of Figure 2;

Figure 4 is a section along line 4-4 of Figure 3;

Figures 5A through 5D illustrate alternate embodiments of Figure 3;

Figure 6 is an illustration of an alternate embodiment of the present invention; and

Figure 7 is an illustration of yet another alternate embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to Figure 1, shown is a perspective view of a first embodiment of the present invention. Numeral 10, generally refers to the arrangement. Large containers 12 for storage of, for example, water are desirably connected together for modulation at a site. The overall fastening assembly is referenced by numeral 14 and is more detailed in Figure 2.

Each container 12 is positioned for contact with an adjacent container 12 at an interface16. A wall or extension 18 is provided on each container 12 for abutment with a similar component from the adjacent container 12. Each wall 18 includes a plurality of projecting bosses 20 extending outwardly in parallel planar relation from wall 18. The bosses 20 function as a first cooperating engagement. The bosses 20 may be welded to the walls 18. The bosses 20 on an individual container 12 are arranged in collinear equidistant relation and are horizontally aligned when walls 18 are abutted between containers 12. The horizontal distance between bosses 20 of adjacent containers, in this embodiment is the same and this is true of the spacing of bosses on an individual container 12.

With reference to Figure 3, shown is an enlarged view of the arrangement. The bosses 20, shown in the example as having a rectangular shape, receive, in overlying relation, a second releasable cooperating engagement member 22. The member 22 is shown in the example as a plate. The plate 22 has spaced apart apertures 24 which receive the bosses 20. The boss 20 shape and aperture 24 are configured for cooperation.

Plate 22 may comprise a similar material of which the containers 12 are made, such as steel. The plate 22 is dimensioned to overlie the interface of abutment, referenced by numeral 16, of the adjacent containers 12. The plate is also dimensioned to be of a lesser thickness than the height of the bosses 20. In this manner, the plate 22 can be loosely retained on the bosses 20 in a parallel plane to the walls 18.

In order to further assist in retaining the plate 22 on the bosses 20, a third releasably engageable cooperating means in the form of an aperture 28 (chain line) cooperates with a fourth releasably engageable cooperating means in the form of, for example, a pin or L-bolt 30. As is illustrated in the example, the pin 30 is received within the aperture

28. The reception is such that the pin 30 abuts the surface of the plate 22. This relationship ensures that the plate 22 remains snugly against the walls 18. The former relationship is depicted in Figure 4.

The Figures illustrate the boss 20 shape as a rectangle. This is useful when combined with a keyed or matched configuration in the plate 22 to reduce if not eliminate any vertical or horizontal movement of connected containers. Any suitable polygonal shape is envisioned as a possibility. Figures 5A through 5D illustrate a number of variations for the plate 22 in terms of the apertures 24 being diamond, square, hexagonal and generally square in shape. The bosses 20 would obviously have a keyed shape for cooperation. In addition, Figures 5A through 5D show variations on the shape and disposition of the pins or L bolts 30. The pins or bolts may be inserted into the aperture 28 of the bosses 20 vertically, horizontally or angularly. Further, the pins may be of a varying dimension, i.e. conical, straight, or bent. As a further variation, the plate 22 may comprise any suitable shape variations of which are shown in Figures 5C and 5D with a generally dumbbell configuration. Other variations will be appreciated by those skilled.

Referring now to Figure 6, shown is another alternate embodiment of the present invention.

In this embodiment, two bosses 20, a pair from each container 12 are connected by a modified plate 22'. In this embodiment, two plates are joined by joining members 32, shown in the example to be vertical arms. Any suitable configuration to achieve this end is possible and will be appreciated by those skilled. Further, any number of bosses 20 may be connected.

Referring now to Figure 7, shown is a further variation of the present invention. In this embodiment, the container 12 is formed of a plurality of individual wall segments 32. Each segment includes the bosses 20 which cooperate with an adjacent segment 32 in a manner similar to that discussed with respect to the previous embodiments. Plate 22 joins the adjacent segments. Conveniently, the intersection of two segments at a corner can be easily accommodated by modifying plate 22 by a right angle bend as shown in the illustration. In situations where the angle required is acute or obtuse, the plate will be modified accordingly.

Although embodiments of the invention have been described above, it is not limited thereto and it will be apparent to those skilled in the art that numerous modifications form part of the present invention insofar as they do not depart from the spirit, nature and scope of the claimed and described invention.

WE CLAIM:

1. A connection assembly for connecting similar containers, comprising, in combination:

a first container and a second container in contact;

boss means integral with and projecting outwardly from an extension wall of each said container of said containers, said boss means being in horizontal alignment on containers to be connected;

a second cooperating engagement member for overlying releasable engagement with at least a pair of said boss means of containers to be connected, said second cooperating engagement member being independent of each said container, said second cooperating member having a configuration matched in shape to said boss means, said boss means extending beyond said second cooperating engagement member when said second cooperating engagement member overlies said boss means, said second cooperating engagement member when engaged with said boss means overlies a contact interface of connected containers;

third cooperating engagement means integral with said boss means; and

fourth cooperating engagement means adapted for releasable engagement with said third cooperating engagement means and for retaining said second cooperating engagement member when overlying said boss means, connection between containers being effected solely when said boss means receives said second cooperating engagement member and said third cooperating engagement means receives said fourth cooperating engagement means, each said container is connected and secured against substantial vertical and horizontal separation.

2. The combination as set forth in claim 1, wherein said second cooperating engagement member is separate and unconnected to each said container.

3. The combination as set forth in claim 1, wherein each container has a plurality of projecting boss means in vertical spaced relation.

4. The combination as set forth in claim 3, wherein said projecting boss means are in collinear arrangement.

5. The combination as set forth in claim 1, wherein said boss means of said first container and said second container are in a collinear arrangement.

6. The combination as set forth in claim 2, wherein said second cooperating engagement member comprises a removable plate.

7. The combination as set forth in claim 1, wherein a horizontal distance between said boss means between contacted containers is identical to a vertical distance between said boss means of an individual container of said first container and said second container.

8. The combination as set forth in claim 1, wherein at least a boss means between adjacent containers is connected.

9. The combination as set forth in claim 1, wherein said third cooperating engagement means comprises an aperture extending through said boss means.

10. The combination as set forth in claim 1, wherein said fourth cooperating engagement means comprises a separate member unconnected to said container.

11. The combination as set forth in claim 10, wherein said fourth cooperating engagement means comprises an L-shaped pin releasably connectable within said third cooperating engagement means.

12. The combination as set forth in claim 1, wherein said fourth cooperating engagement means, when engaged with said third cooperating engagement means, abuts said second cooperating engagement member.

13. The combination as set forth in claim 1, wherein said first container and said second container are arranged in horizontal disposition.

14. The combination as set forth in claim 1, wherein said first container and said second container are arranged in vertical disposition.

15. The combination as set forth in claim 1, wherein said boss means and said second cooperating engagement member have matched polygonal shapes.

16. A connection assembly for connecting similar containers, comprising, in combination:

a first container and a second container in contact;

a plurality of projections projecting from the walls of each container of said containers arranged in alignment on containers in contact;

a separate plate member for overlying releasable engagement with said projections projecting from each container, said separate plate member being independent of each said container, said plate having apertures matched in shape to said projections, said projections extending beyond said plate when in overlying relation with said projections;

aperture means extending through said projections; and

retainer means adapted for releasable engagement with said aperture means, connection between containers being effected solely when said projections receive said separate plate and said aperture means receives said retainer means, each said container is connected and secured against substantial vertical and horizontal separation.

17. A modular container, comprising:

a plurality of separate container wall segments adapted for releasable connection with each other to form a container or enclosure;

boss means projecting from each said container wall segment of said containers, said boss means being in alignment on each container wall segment;

a second cooperating engagement plate for overlying releasable engagement with at least a pair of said boss means of each juxtaposed wall, said second cooperating engagement member being independent of said container wall segments, said second cooperating plate having a configuration matched in shape to said boss means, said boss means extending beyond said second cooperating engagement means when said second cooperating engagement plate overlies said boss means of juxtaposed walls;

third cooperating engagement means integral with said boss means; and

fourth cooperating engagement means adapted for releasable engagement with said third cooperating engagement means and for retaining said second cooperating engagement member when overlying said first cooperating engagement means, formation of said container being effected solely by said boss means being received in said second cooperating engagement member and when said third cooperating engagement means is received in said fourth cooperating engagement means, whereby said container or enclosure is secured against substantial vertical and horizontal separation.

18. The container as set forth in claim 17, wherein said plate is planar.

19. The container as set forth in claim 17, wherein said plate is angular.

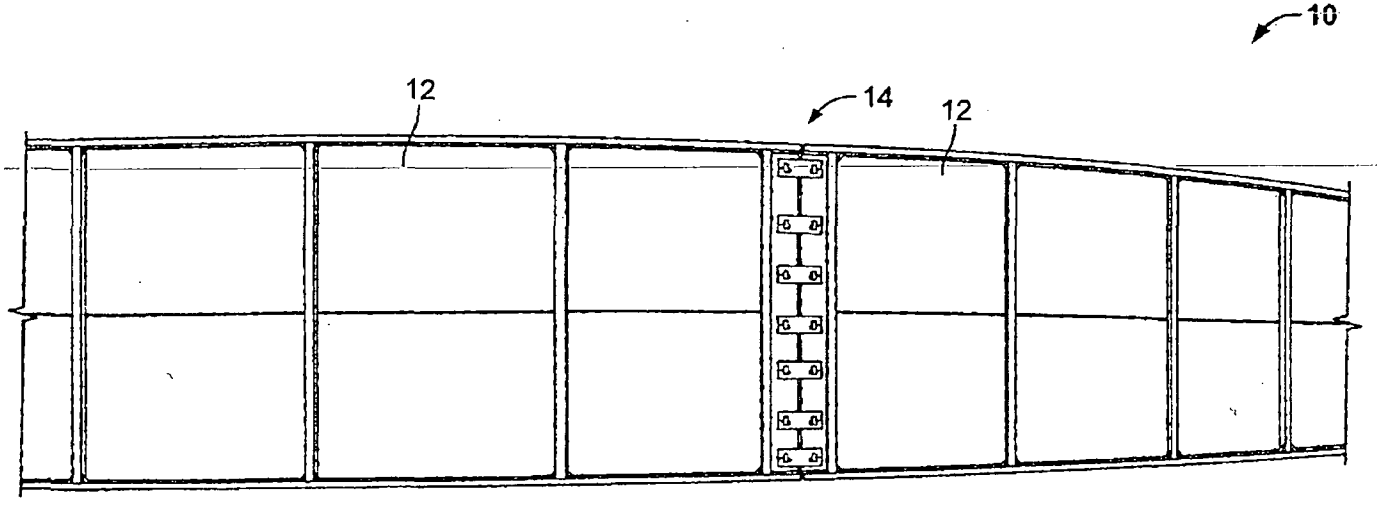

FIG. 1

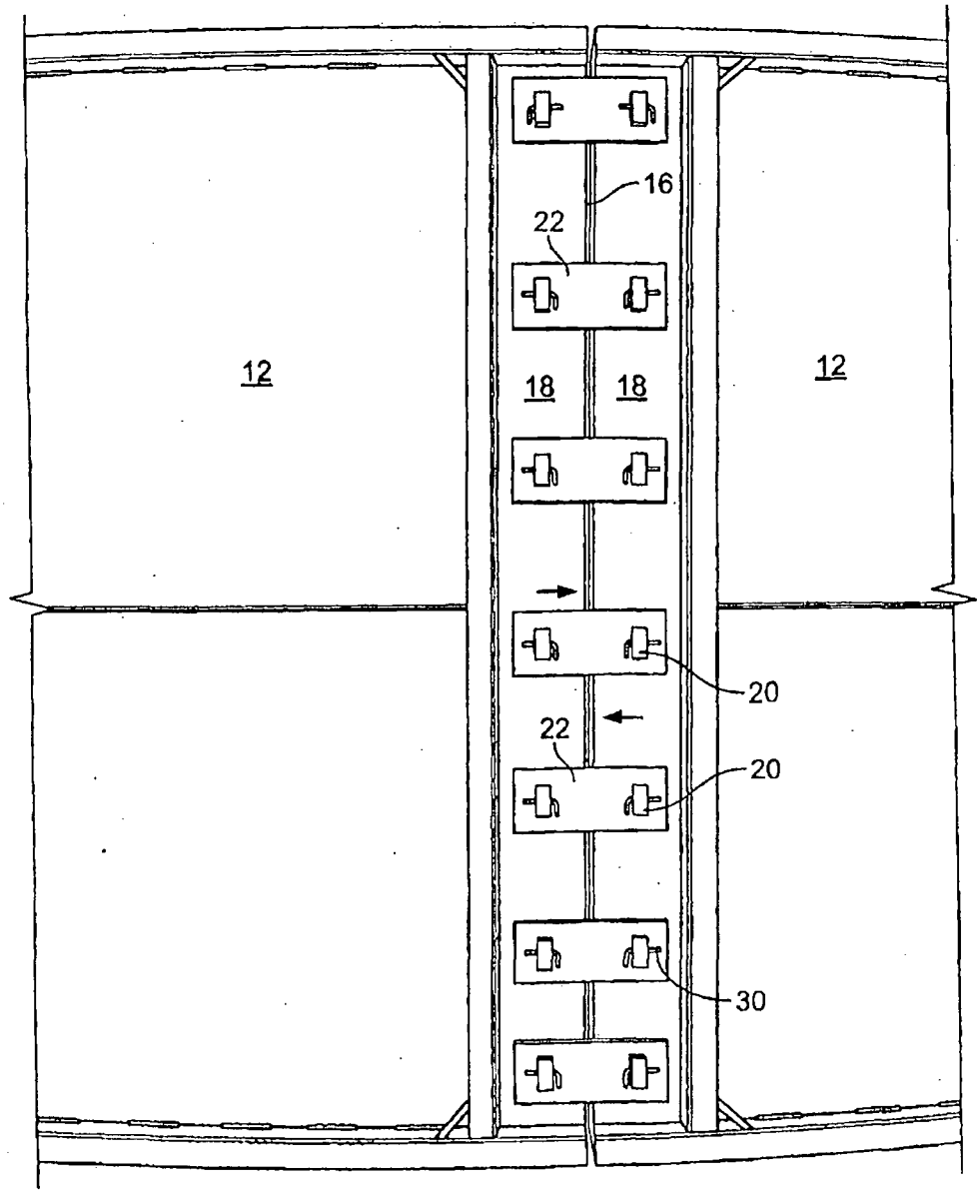

FIG. 2

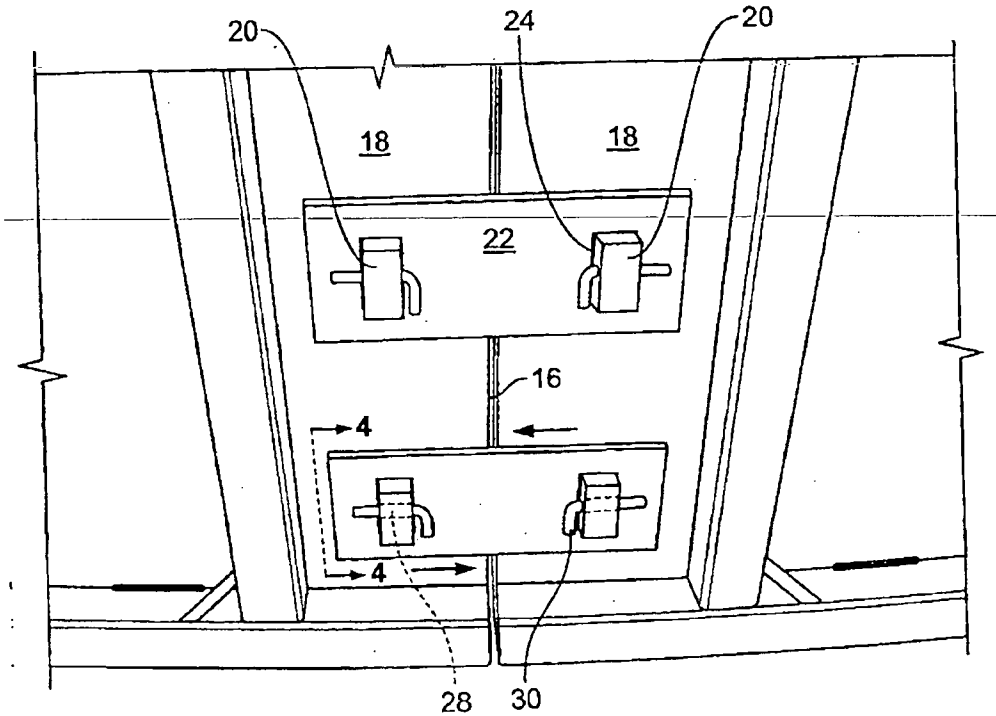

FIG. 3

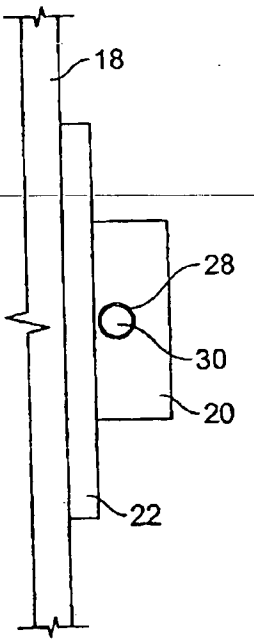

FIG. 4

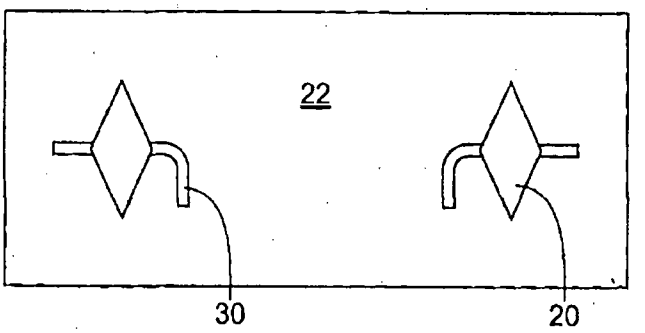

FIG. 5A

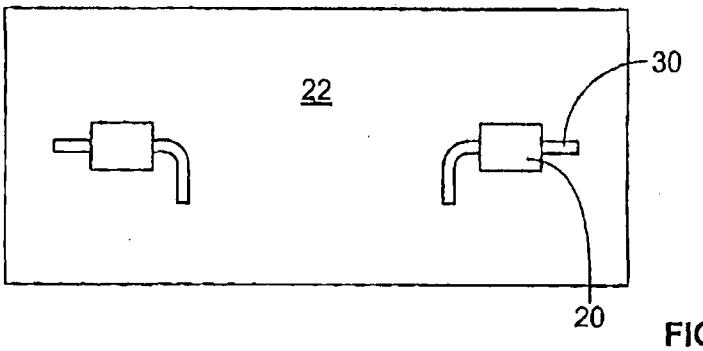

FIG. 5B

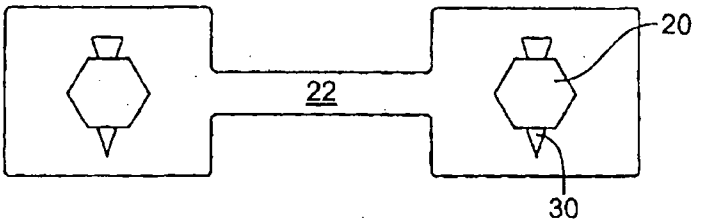

FIG. 5C

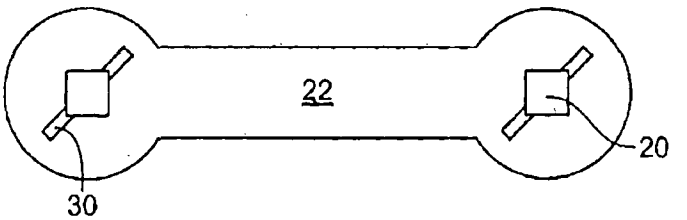

FIG. 5D

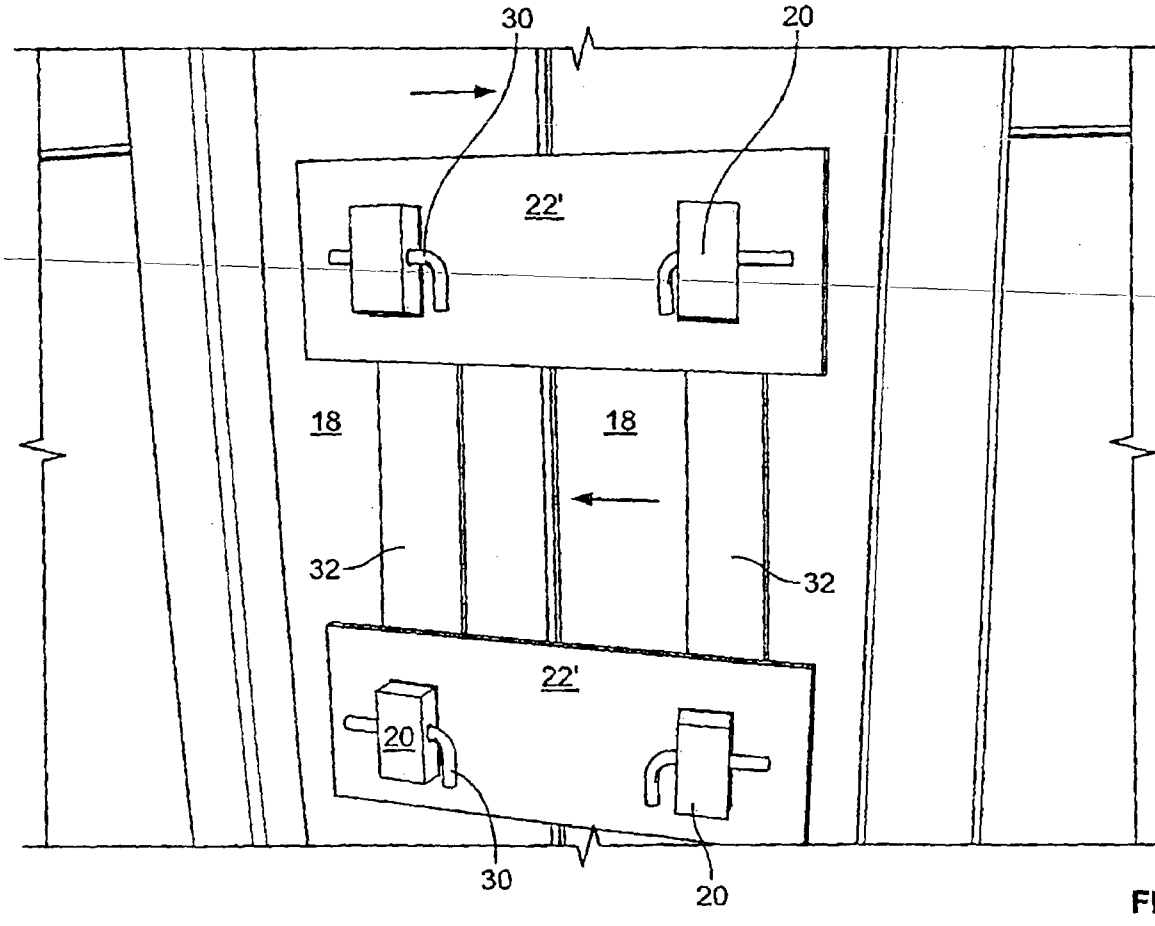

FIG. 6

Patent eBusiness

- Electronic Filing
- Patent Application Information (PAIR)
- Patent Ownership
- Fees
- Supplemental Resources & Support

Patent Information

Patent Guidance and General Info
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12/985,362 | CONTAINER FASTENING ASSEMBLY | PCLP-003

Select New Case | Application Data | Transaction History | Image File Wrapper | Foreign Priority | Published Documents | Address & Attorney/Agent | Display References

Bibliographic Data

Application Number:	12/985,362	Customer Number:	-
Filing or 371 (c) Date:	01-06-2011	Status:	Docketed New Case - Ready for Examination
Application Type:	Utility	Status Date:	01-26-2012
Examiner Name:	EDWARDS, BRETT J	Location:	ELECTRONIC
Group Art Unit:	3781	Location Date:	-
Confirmation Number:	4194	Earliest Publication No:	US 2011-0194893 A1
Attorney Docket Number:	PCLP-003	Earliest Publication Date:	08-11-2011
Class / Subclass:	206/504	Patent Number:	-
First Named Inventor:	Cliff WIEBE , Calgary, (CA)	Issue Date of Patent:	-

Title of Invention: CONTAINER FASTENING ASSEMBLY

If you need help:

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- *Send general questions about USPTO programs to the USPTO Contact Center (UCC).*
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Beck
ENGINEERING (1992) LTD.

August 26, 2011
Doc. 11341M1101

Poseidon Concepts Ltd.
1100, 645 - 7th Ave SW
Calgary, Alberta T2P 4G8

Attention: To Whom It May Concern

Re: Atlantis, Poseidon & Triton Modular Tanks

This letter confirms that Beck Engineering (1992) Ltd. has designed and engineered the Poseidon Concepts modular tanks. Specifically, Beck Engineering has designed and reviewed the 6500m^3 "Atlantis", the 2900m^3 "Poseidon" and the 1440m^3 "Triton" models.

Beck Engineering has structurally designed the tank wall panels and panel connections to fully withstand all forces and stresses that the modular tank may be subject to during transport, erection, filling and emptying the tank. Hydrostatic forces, considering a specific gravity of 1.05 have been considered during design of all components. Further, the modular tanks system has been designed to withstand the forces and stresses generated by potential out-of-plumb and out-of-round installation conditions.

The modular tanks have been designed in accordance with accepted engineering principles with reference to CSA S16 "Limit States Design of Steel Structures" as applicable. The total (von Mises) stress condition has also been considered for all components within the modular tank system including the panel connections. All stresses within the modular tank system components have been limited to ensure a minimum Factor of Safety of 3.0 has been maintained throughout the modular system. Beck Engineering has also provided signed and sealed erection procedures and ground preparation requirements.

The Poseidon, Atlantis and Triton modular tanks models are structurally designed to resist all anticipated forces on the tank panels and panel connections from the start of erection to the complete filling of the tank. The modular tank systems have been designed considering all hydrostatic forces, the associated tension developed in the wall panels and the tension forces and associated out-of-plane and out-of-plumb forces developed within the panel connections. Further consideration has been given to the forces and stresses introduced during erection considering lifting and handling and wind forces during assembly.

Beck Engineering has provided Poseidon Concepts (via Open Range Energy Corp.) with signed and sealed drawings showing all required connection details and material specifications as necessary for fabrication of the 3 modular tank models described herein.

I trust this is the information you currently require. Beck Engineering would be pleased to provide further information as necessary within the limits of our confidentiality obligations to Poseidon Concepts.

Regards,
Beck Engineering (1992) Ltd.
APEGGA Permit No. 204

PROFESSIONAL ENGINEER ALBERTA MICHAEL HAYDEN

Michael Hayden, P.Eng.

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Miles City, Montana 59301
(406) 234-1680
(406) 234-7774 Fax
(800) 488-3592

8, 10 & 12 oz.
Nonwoven Geotextile

	WID8	WID10	WID12	
Property				**ASTM**
Weight	8 oz/yd²	10 oz/yd²	12 oz/yd²	
Grab Tensile	205 lbs	250 lbs	300 lbs	D-4632
Grab Elongation	50%	50%	50%	D-4632
Trapezoidal Tear	80 lbs	100 lbs	115 lbs	D4533
Puncture Resistance	525 lbs	625 lbs	825 lbs	D-6241
UV Resistance After 500 hrs.	70% Strength Retained	70% Strength Retained	70% Strength Retained	D-4355
		Hydraulic		
Apparent Opening Size (AOS)[3].	80 US Std. Sieve	100 US Std. Sieve	100 US Std. Sieve	D-4751
Permittivity	1.5 sec^{-1}	1.2 sec^{-1}	1.0 sec^{-1}	D-4491
Water Flow Rate	110 gpm/ft²	85 gpm/ft²	75 gpm/ft²	D-4491

These values are typical data and are not intended as limiting specifications.

Material Safety Data Sheet
May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910 1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(as Used on Label and List)*
GSE Low Density Polyethylene Geomembrane (LLDPE)

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

Section 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer's name GSE Lining Technology	Emergency Telephone Number 1-800-435-2008 CHEMTREC (800) 424-9300
Address *(Number, Street, City, State and ZIP Code)*	Telephone Number for Information 1-800-435-2008
19103 Gundle Rd	Date Prepared 1/1/1999
Houston, Texas 77073	Signature of Preparer *(optional)*

Section2 Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
PRODUCT NAME: LLDPE (ALL GRADES)	None	None	None	

CHEMICAL NAME:
Polyethylene or Ethylene-Olefin Copolymer
CHEMICAL FAMILY:
Ethylene-Based Polymer
PRODUCT DESCRIPTION:
Odorless opaque white pellets or granules.

This product is not hazardous as defined in 29 CFR1910.1200

Section 3 COMPOSITION/INFORMATION ON INGREDIENTS

POTENTIAL HEALTH EFFECTS EYE CONTACT: Particulates may scratch eye surfaces/cause mechanical irritation.
SKIN CONTACT:
Negligible hazard at ambient temperatures (-18 to +38 degrees C; 0 to 100 degrees F).
Exposure to hot material may cause thermal burns.
INHALATION:
Negligible hazard at ambient temperature (-18 to 38 Deg C; 0 to 100 Deg F)
Vapors and/or aerosols which may be formed at elevated temperatures may be irritating to eyes and respiratory tract.
INGESTION:
Minimal toxicity.

Section 4 FIRST AID MEASURES

EYE CONTACT:
This product is an inert solid. If in eye, remove as one would any foreign object.
SKIN CONTACT:
For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention. No attempt should be made to remove material from skin or to remove contaminated clothing, as the damaged flesh can be easily torn.
INHALATION:
In case of adverse exposure to vapors and/or aerosols formed at elevated temperatures, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.
INGESTION:
First aid is normally not required.

Liner

Product Description
The Liner geomembranes are economical lining materials made from blended/reprocessed resins selected for optimum performance at the lowest cost. Products are intended for use in gomembrane applications such as oil and gas reserve pits, temporary containment of frac water, backflow water high in salt concentration, seepage control, water containment and short-term protective covers. Prefabricated liners are also ideal for installation by contractors, owners, or agricultural operators.

Technical Data
Materials information is below.

Installation
Liner is flexible enough to be prefabricated at our facility into large panels (Up to 27,000 square feet at 30 mil). The prefabricated panel is accordion folded, rolled on a core, and delivered to the job site secured to a pallet. Prefabricated panels can often cover a small project with a single panel. Local labor forces are used to unroll and unfold the panels. Our entire primary field welding of liner is based on hot wedge welding technology. Field wedge welding Liner provides strong seams, and fast installations on large projects. Small welds and repairs can be completed with the Layfield Enviro Liner® welding kit.

9. Material Properties

19 Nov 2011	Series Typical Properties			
Style	**ASTM**	**20 mil**	**30 mil**	**40 mil**
Thickness (Nominal)	D5199	20 mil 0.50 mm	30 mil 0.75 mm	40 mil 1.0 mm
Tensile Strength at Break	D638	75 ppi 13.8 N/mm	114 ppi 21 N/mm	154 ppi 28.5 N/mm
Elongation	D638	800%	800%	800%
Tear Resistance	D1004	11 lbs 49 N	16 lbs 71 N	22 lbs 98 N
Puncture Resistance	D4833	30 lbs 130 N	45 lbs 200 N	60 lbs 270
Low Temperature Impact Resistance	D1790	-40°F -40°C	-40°F -40°C	-40°F -40°C
Dimensional Stability	D1204 Max Chng	<2.0%	<2.0%	<2.0%

10. Shop Seam Strengths

19 Nov 2011	Shop Seam Strengths			
Style	**ASTM**	**20 mil**	**30 mil**	**40 mil**
Heat Bonded Seam Strength	D6392 25.4 mm (1") Strip	25 ppi 4.4 N/mm	36 ppi 6.3 N/mm	48 ppi 8.4 N/mm
Heat Bonded Peel Adhesion Strength	D6392 25.4 mm (1") Strip	FTB 18 ppi 3.2 N/mm	FTB 29 ppi 5.1 N/mm	FTB 39 ppi 6.8 N/mm

The Pioneer of Geosynthetics
since 1979

Product Data Sheet - 01

GSE 30 mil UltraFlex Smooth Geomembrane (Nominal)

GSE 30 mil UltraFlex is a smooth linear low density polyethylene (LLDPE) geomembrane manufactured with the highest quality resin specifically formulated for flexible geomembranes. This product is used in applications that require increased flexibility and elongation properties where differential or localized subgrade settlements may occur such as in a landfill closure application.

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	NOMINAL VALUE 30 mil
Thickness, (Nominal) mil (mm) with a tolerance +/- 10%	ASTM D 5199	every roll	27 (0.68)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.92
Tensile Properties (each direction) Strength at Break, lb/in-width (N/mm) Elongation at Break, %	ASTM D 6693, Type IV Dumbell, 2 ipm G.L. 2.0 in (5.1 mm)	20,000 lb	 114 (20) 800
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	16 (70)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	42 (190)
Carbon Black Content[1], % (Range)	ASTM D 1603*/4218	20,000 lb	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	Note[1]
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>140
TYPICAL ROLL DIMENSIONS			
Roll Length[2], ft (m)			1,120 (341)
Roll Width[2], ft (m)			22.5 (6.9)
Roll Area, ft^2 (m^2)			25,200 (2,341)

NOTES:

- [1]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- [2]Roll lengths and widths have a tolerance of ± 1%.
- GSE UltraFlex is available in rolls weighing approximately 3,900 lb (1,769 kg).
- All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
- *Modified.

OTDSUF R02/15/10

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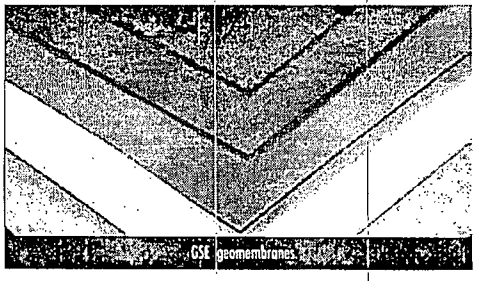
SINCE 1972

Technical Note

Chemical Resistance for Geomembrane Products



GSE geomembranes are made of high quality, virgin polyethylene which demonstrates excellent chemical resistance. GSE polyethylene geomembranes are resistant to a great number and combinations of chemicals. It is this property of (HDPE) high density polyethylene geomembranes that makes it the lining material of choice.

In order to gauge the durability of a material in contact with a chemical mixture, testing is required in which the material is exposed to the chemical environment in question. Chemical resistance testing is a very large and complex topic because of two factors. First, the number of specific media is virtually endless and second, there are many criteria such as tensile strength, hardness, etc. that may be used to assess a material's resistance to degradation.

The chemical resistance of polyethylene has been investigated by many people over the past few decades. We are able to draw from that work when making statements about the chemical resistance of today's polyethylene geomembranes. In addition to that, many tests have been performed that specifically use geomembranes and certain chemical mixtures. Naturally, however, every mixture of chemicals cannot be tested for. As a result of these factors, GSE published a chemical resistance chart, demonstrating general guidelines.

Polyethylene is, for practical purposes, considered impermeable. Be aware, however, that all materials are permeable to some extent. Permeability varies with concentration, temperature, pressure and type of permeant. The rates of permeation are usually so low, however, that they are insignificant. As a point of reference, polyethylene is commonly used for packaging of several types of materials. These include gasoline, motor oil, household cleaners (i.e. bleach), muratic acid, pesticides, insecticides, fungicides, and other highly concentrated chemicals. Also, you should be aware that there are some chemicals which may be absorbed by the material but only when present at very high concentrations. These include halogenated and/or aromatic hydrocarbons at greater than 50%; their absorption results in swelling and slight changes in physical properties such as increased tensile elongations. This includes many types of fuels and oils. Recognize that this action, however, does not affect the liner's ability to act as a barrier for the material it is containing.

Since polyethylene is a petroleum product, it can absorb other petroleum products. Like a sponge, the material becomes slightly thicker and more flexible but does not produce a hole or void. However, unlike a sponge, this absorption is not immediate. It takes a much longer time for a polyethylene liner to swell than it does for a sponge. The exact time it takes for swelling to occur depends on the particular constituents and concentrations of the contained media. However, a hole would not be produced. Also, this absorption is reversible and the material will essentially return to it's original state when the chemical is no longer in contact with the liner.

With regard to typical municipal landfills in the United States, legally allowable levels of chemicals have been demonstrated to have no adverse affect on polyethylene geomembrane performance. The very low levels of salts, metals and organic compounds do not damage polyethylene. A double-lined containment with a leachate (leak detection) removal system effectively prevents any significant, continuous exposure of the secondary membrane to these materials and for practical purposes makes the total liner system even more impermeable.

GSE

The Pioneer Of Geosynthetics

Chemical Resistance Chart

GSE is the world's leading supplier of high quality, polyethylene geomembranes. GSE polyethylene geomembranes are resistant to a great number and combinations of chemicals. Note that the effect of chemicals on any material is influenced by a number of variable factors such as temperature, concentration, exposed area and duration. Many tests have been performed that use geomembranes and certain specific chemical mixtures. Naturally, however, every mixture of chemicals cannot be tested for, and various criteria may be used to judge performance. Reported performance ratings may not apply to all applications of a given material in the same chemical. Therefore, these ratings are offered as a guide only.

Medium	Concentration	Resistance at: 20° C (68° F)	60° C (140° F)
A			
Acetic acid	100%	S	L
Acetic acid	10%	S	S
Acetic acid anhydride	100%	S	L
Acetone	100%	L	L
Adipic acid	sat. sol.	S	S
Allyl alcohol	96%	S	S
Aluminum chloride	sat. sol.	S	S
Aluminum fluoride	sat. sol.	S	S
Aluminum sulfate	sat. sol.	S	S
Alum	sol.	S	S
Ammonia, aqueous	dil. sol.	S	S
Ammonia, gaseous dry	100%	S	S
Ammonia, liquid	100%	S	S
Ammonium chloride	sat. sol.	S	S
Ammonium fluoride	sol.	S	S
Ammonium nitrate	sat. sol.	S	S
Ammonium sulfate	sat. sol.	S	S
Ammonium sulfide	sol.	S	S
Amyl acetate	100%	S	L
Amyl alcohol	100%	S	L
Aniline	100%	S	L
Antimony trichloride	90%	S	S
Arsenic acid	sat. sol.	S	S
Aqua regia	HCl-HNO3	U	U
B			
Barium carbonate	sat. sol.	S	S
Barium chloride	sat. sol.	S	S
Barium hydroxide	sat. sol.	S	S
Barium sulfate	sat. sol.	S	S
Barium sulfide	sol.	S	S
Benzaldehyde	100%	S	L
Benzene	—	L	L
Benzoic acid	sat. sol.	S	S
Beer	—	S	S
Borax (sodium tetraborate)	sat. sol.	S	S
Boric acid	sat. sol.	S	S
Bromine, gaseous dry	100%	U	U
Bromine, liquid	100%	U	U
Butane, gaseous	100%	S	S
1-Butanol	100%	S	S
Butyric acid	100%	S	L
C			
Calcium carbonate	sat. sol.	S	S
Calcium chlorate	sat. sol.	S	S
Calcium chloride	sat. sol.	S	S
Calcium nitrate	sat. sol.	S	S
Calcium sulfate	sat. sol.	S	S
Calcium sulfide	dil. sol.	L	L
Carbon dioxide, gaseous dry	100%	S	S
Carbon disulfide	100%	L	U
Carbon monoxide	100%	S	S
Chloracetic acid	sol.	S	S
Carbon tetrachloride	100%	L	U
Chlorine, aqueous solution	sat. sol.	L	U
Chlorine, gaseous dry	100%	L	U
Chloroform	100%	U	U
Chromic acid	20%	S	L
Chromic acid	50%	S	L
Citric acid	sat. sol.	S	S

Medium	Concentration	Resistance at: 20° C (68° F)	60° C (140° F)
Copper chloride	sat. sol.	S	S
Copper nitrate	sat. sol.	S	S
Copper sulfate	sat. sol.	S	S
Cresylic acid	sat. sol.	L	—
Cyclohexanol	100%	S	S
Cyclohexanone	100%	S	L
D			
Decahydronaphthalene	100%	S	L
Dextrine	sol.	S	S
Diethyl ether	100%	L	—
Dioctylphthalate	100%	S	L
Dioxane	100%	S	S
E			
Ethanediol	100%	S	S
Ethanol	40%	S	L
Ethyl acetate	100%	S	U
Ethylene trichloride	100%	U	U
F			
Ferric chloride	sat. sol.	S	S
Ferric nitrate	sol.	S	S
Ferric sulfate	sat. sol.	S	S
Ferrous chloride	sat. sol.	S	S
Ferrous sulfate	sat. sol.	S	S
Fluorine, gaseous	100%	U	U
Fluorosilicic acid	40%	S	S
Formaldehyde	40%	S	S
Formic acid	50%	S	S
Formic acid	98-100%	S	S
Furfuryl alcohol	100%	S	L
G			
Gasoline	—	S	L
Glacial acetic acid	96%	S	L
Glucose	sat. sol.	S	S
Glycerine	100%	S	S
Glycol	sol.	S	S
H			
Heptane	100%	S	U
Hydrobromic acid	50%	S	S
Hydrobromic acid	100%	S	S
Hydrochloric acid	10%	S	S
Hydrochloric acid	35%	S	S
Hydrocyanic acid	10%	S	S
Hydrofluoric acid	4%	S	S
Hydrofluoric acid	60%	S	L
Hydrogen	100%	S	S
Hydrogen peroxide	30%	S	L
Hydrogen peroxide	90%	S	U
Hydrogen sulfide, gaseous	100%	S	S
Lactic acid	100%	S	S
Lead acetate	sat. sol.	S	—
M			
Magnesium carbonate	sat. sol.	S	S
Magnesium chloride	sat. sol.	S	S
Magnesium hydroxide	sat. sol.	S	S
Magnesium nitrate	sat. sol.	S	S
Maleic acid	sat. sol.	S	S
Mercuric chloride	sat. sol.	S	S
Mercuric cyanide	sat. sol.	S	S
Mercuric nitrate	sol.	S	S

-Continued-

Technical Note

Medium	Concentration	Resistance at: 20° C (68° F)	60° C (140° F)
Mercury	100%	S	S
Methanol	100%	S	S
Methylene chloride	100%	L	—
Milk	—	S	S
Molasses	—	S	S
N			
Nickel chloride	sat. sol.	S	S
Nickel nitrate	sat. sol.	S	S
Nickel sulfate	sat. sol.	S	S
Nicotinic acid	dil. sol.	S	—
Nitric acid	25%	S	S
Nitric acid	50%	S	U
Nitric acid	75%	U	U
Nitric acid	100%	U	U
O			
Oils and Grease	—	S	L
Oleic acid	100%	S	L
Orthophosphoric acid	50%	S	S
Orthophosphoric acid	95%	S	L
Oxalic acid	sat. sol.	S	S
Oxygen	100%	S	L
Ozone	100%	L	U
P			
Petroleum (kerosene)	—	S	L
Phenol	sol.	S	S
Phosphorus trichloride	100%	S	L
Photographic developer	cust. conc.	S	S
Picric acid	sat. sol.	S	—
Potassium bicarbonate	sat. sol.	S	S
Potassium bisulfide	sol.	S	S
Potassium bromate	sat. sol.	S	S
Potassium bromide	sat. sol.	S	S
Potassium carbonate	sat. sol.	S	S
Potassium chlorate	sat. sol.	S	S
Potassium chloride	sat. sol.	S	S
Potassium chromate	sat. sol.	S	S
Potassium cyanide	sol.	S	S
Potassium dichromate	sat. sol.	S	S
Potassium ferricyanide	sat. sol.	S	S
Potassium ferrocyanide	sat. sol.	S	S
Potassium fluoride	sat. sol.	S	S
Potassium hydroxide	10%	S	S
Potassium hydroxide	sol.	S	S
Potassium hypochlorite	sol.	S	L
Potassium nitrate	sat. sol.	S	S
Potassium orthophosphate	sat. sol.	S	S
Potassium perchlorate	sat. sol.	S	S
Potassium permanganate	20%	S	S
Potassium persulfate	sat. sol.	S	S
Potassium sulfate	sat. sol.	S	S
Potassium sulfite	sol.	S	S
Propionic acid	50%	S	S
Propionic acid	100%	S	L
Pyridine	100%	S	L
Q			
Quinol (Hydroquinone)	sat. sol.	S	S
S			
Salicylic acid	sat. sol.	S	S
Silver acetate	sat. sol.	S	S
Silver cyanide	sat. sol.	S	S
Silver nitrate	sat. sol.	S	S
Sodium benzoate	sat. sol.	S	S
Sodium bicarbonate	sat. sol.	S	S
Sodium biphosphate	sat. sol.	S	S
Sodium bisulfite	sol.	S	S
Sodium bromide	sat. sol.	S	S
Sodium carbonate	sat. sol.	S	S
Sodium chlorate	sat. sol.	S	S
Sodium chloride	sat. sol.	S	S
Sodium cyanide	sat. sol.	S	S
Sodium ferricyanide	sat. sol.	S	S
Sodium ferrocyanide	sat. sol.	S	S
Sodium fluoride	sat. sol.	S	S
Sodium hydroxide	40%	S	S
Sodium hydroxide	sat. sol.	S	S
Sodium hypochlorite	15% active chlorine	S	S
Sodium nitrate	sat. sol.	S	S
Sodium nitrite	sat. sol.	S	S
Sodium orthophosphate	sat. sol.	S	S
Sodium sulfate	sat. sol.	S	S
Sodium sulfide	sat. sol.	S	S
Sulfur dioxide, dry	100%	S	S
Sulfur trioxide	100%	U	U
Sulfuric acid	10%	S	S
Sulfuric acid	50%	S	S
Sulfuric acid	98%	S	U
Sulfuric acid	fuming	U	U
Sulfurous acid	30%	S	S
T			
Tannic acid	sol.	S	S
Tartaric acid	sol.	S	S
Thionyl chloride	100%	L	U
Toluene	100%	L	U
Triethylamine	sol.	S	L
U			
Urea	sol.	S	S
Urine	—	S	S
W			
Water	—	S	S
Wine vinegar	—	S	S
Wines and liquors	—	S	S
X			
Xylenes	100%	L	U
Y			
Yeast	sol.	S	S
Z			
Zinc carbonate	sat. sol.	S	S
Zinc chloride	sat. sol.	S	S
Zinc (II) chloride	sat. sol.	S	S
Zinc (IV) chloride	sat. sol.	S	S
Zinc oxide	sat. sol.	S	S
Zinc sulfate	sat. sol.	S	S

Specific immersion testing should be undertaken to ascertain the suitability of chemicals not listed above with reference to special requirements.

NOTES:

(S) **Satisfactory**: Liner material is resistant to the given reagent at the given concentration and temperature. No mechanical or chemical degradation is observed.

(L) **Limited Application Possible**: Liner material may reflect some attack. Factors such as concentration, pressure and temperature directly affect liner performance against the given media. Application, however, is possible under less severe conditions, e.g. lower concentration, secondary containment, additional liner protections, etc.

(U) **Unsatisfactory:** Liner material is not resistant to the given reagent at the given concentration and temperature. Mechanical and/or chemical degradation is observed.

(–) **Not tested**

sat. sol. = Saturated aqueous solution, prepared at 20°C (68°F)

sol. = aqueous solution with concentration above 10% but below saturation level

dil. sol. = diluted aqueous solution with concentration below 10%

cust. conc. = customary service concentration

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Appendix SSI-3

- **Atlantis system set-up procedures**

R.T. Hicks Consultants, Ltd.
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Albuquerque, NM 87104

Steps for setting a tank

Prejob checklist

Get site info

Company rep name

Check site for level and ground material make-up

Where are tank and accessories coming from, who is shipping?

Inventory needed on site day of tank install

Geo

Liner

Tank walls

Piping (and all bolts, washers, nuts required)

Ladders w/ fall arrestors

Plate stands with plates, pins and safety pins

Clamps

Tools needed

Trackhoe with operator

Boom truck or crane capable of reaching 7000 lbs at least 50 feet with operator

**On sites where acceptable – a 12,000 lb. telehandler with proper jig may be substituted for the crane/boom truck, (manbasket also recommended)

Genie boom – min. 30 foot reach

Laser level – for checking ground work prior to tank setup

Wrenches for tightening plumbing

Impact wrench for tightening clamps more quickly

Wrecking bar for prying/moving plates

Crowfoot bar for prying plates inserting pins

Heavy duty liner bar at least 80 gauge probably 120 gauge steel pipe

Marking paint and dispenser

300' tape measure

Set of four 20 foot long, min. 8,000 lb. capacity two straps for pulling out liner.

Poseidon Concepts

Tank setting Procedures

Use proper safety procedures for all steps. Hoisted loads must have tag lines, genie operators will be harnessed properly and anchored, and all required PPE will be worn at all times.

- Check pad for rocks, sharp objects, irregularities, proper suction pits.
  - Suction pits should be deeper in the center than toward the edge of the tank. This will prevent air from being trapped and the suction box floating.
  - Y-trenches should be no less than 8" and nor more than 18" deep.
- Unroll geo-fabric (rough/rocky pad may require two layers of geo)
  - Overlap at least 1 foot unless using a one-piece fabricated geo
    Start on the downwind side when using single rolls
  - Paint circle for tank walls on top of the geo
- Setting liner
  - Paint stop lines to indicate how far to pull liner.
  - Set picker to boom out so you can unroll the liner with the trackhoe
  - Use laborers to unfold liner to the stop lines.
  - Square the liner up, if needed.
  - Repeat procedure, if double lined.
  - Fold liner back to center to allow room to place tank walls
  - Paint a circle as a top-of-wall guide for pulling liner, trim outside that line so it will hang at least two feet outside of the tank.
  - At this point it is very helpful to fill your y-trenches to weight down the liner.
- Placing tank walls (with crane)
  - If using a crane or boom truck, position to start placing tank panels
  - Back truck with panels within reach of the crane or pack with the trackhoe.
  - With a 4-point hook, lift panel, swing into place.
  - Picker will set panel on ground and reposition hooks to a four-point lift using the slide arms on the panels to stand upright and position it on the circle painted on the geo.
  - If using a telehandler, hook up to the four inside angled pick points. Then pick and carry to desired starting point. You will need to measure and paint a center reference to make setting panels easier for the telehandler operator.
  - Trackhoe will need to use thumb to "hold" panel in place until the next panel is attached.
  - Repeat steps with next panel, connect with plates, pins and safety pins. Trackhoe may release panel at this point unless high wind conditions exist, then should hold for at least three panels.
  - After connecting each panel, a 3 foot wide length of geo will be placed and secured to protect the liner from the seams of the tank.
  - Continue these steps until tank walls are all in place. Do not connect the last panel until liner-pulling crew has entered the tank, do not make the connections on the last seam until ladders are in place and liner pull is nearing completion.
  - Connect final panel.
- Pulling liner
  - Worker inside the tank straps liner, and hands to genie workers. Genie workers pull the liner so that the pull line is at the top of the wall. Worker inside tank will make sure the liner is to the wall of the tank

along the floor. Clamp the liner in place. (It is helpful in windy situations to be filling the tank as you are pulling liner to add weight and keep the wind from blowing it out.)

- Continue procedure until the entire liner has been pulled over the wall and secured in place.
- Clamps should be spaced and an adequate number put on the wall to minimize wind inside the tank behind the liner.
- After liner is pulled and clamped, trim excess liner 2-3 feet outside of the tank. Trackhoe should clean up and prevent dispersion by covering with dirt, snow, etc.

- Assemble suction, piping and ladders and place over wall
  - Make sure all bolts, connections and clamps are securely fastened. Flexible suction needs to have TWO clamps on each end.
  - Place filler tubes and circulating pipes around tank as needed.
  - Leave all valves open to allow air to escape.
  - Make sure sure fall arrestors are in place and functional.
- Walk outside of tank, make sure all plates are in place, pins properly secured with safety pins in place.
- Check area for garbage, debris, tools, etc..

Appendix SSI-4

- Design diagram for liner seam orientation

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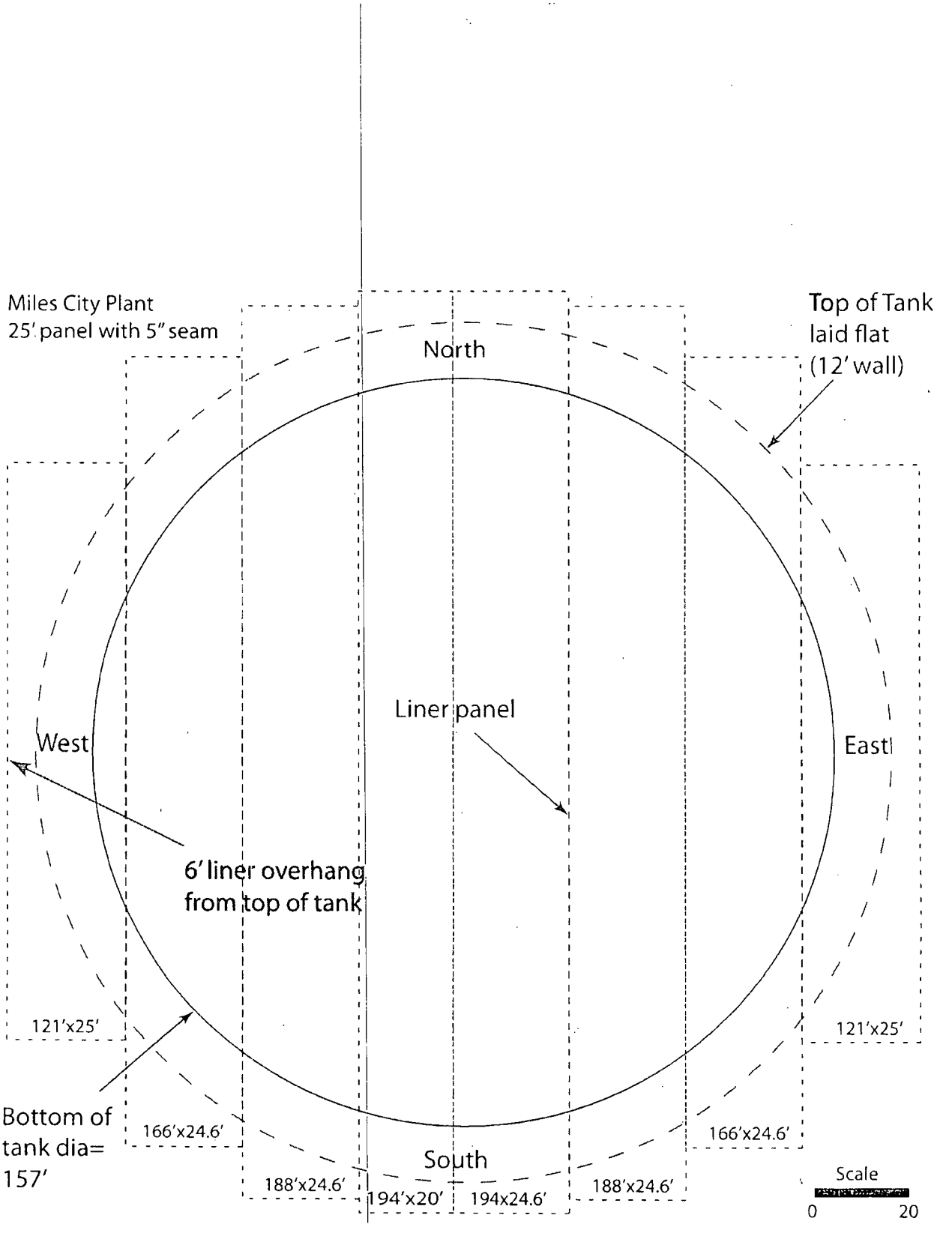
Miles City Plant
25' panel with 5" seam
Top of Tank
laid flat
(12' wall)
North
Liner panel
West
East
6' liner overhang
from top of tank
121'x25'
121'x25'
Bottom of
tank dia=
157'
166'x24.6'
166'x24.6'
South
188'x24.6'
194'x20'
194x24.6'
188'x24.6'
Scale
0
20

Appendix SSI-5

- Reclamation section for BLM APD

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Albuquerque, NM 87104

ECIAL DRILLING STIPULATION

THE FOLLOWING DATA IS REQUIRED ON THE WELL SIGN

OPERATOR'S NAME STRATA PRODUCTION COMPANY WELL NO. & NAME #29 NASH UNIT
LOCATION 1980' F S L & 2310' F E L SEC. 13, T. 23S., R. 29E.
LEASE NO. NM-17589 COUNTY EDDY STATE NEW MEXICO

The special stipulations check marked below are applicable to the above described well and approval of this application to drill is conditioned upon compliance with such stipulations in addition to the General Requirements. The permittee should be familiar with the General Requirements, a copy of which is available from a Bureau of Land Management office. EACH PERMITTEE HAS THE RIGHT OF ADMINISTRATIVE APPEAL TO THESE STIPULATIONS PURSUANT TO TITLE 43 CFR 3165.3 and 3165.4.

This permit is valid for a period of one year from the date of approval or until lease expiration or termination whichever is shorter.

I. SPECIAL ENVIRONMENT REQUIREMENTS

( ) Lesser Prairie Chicken (Stips attached) ( ) Floodplain (Stips attached)
( ) San Simon Swale (Stips attached) ( ) Other

II. ON LEASE - SURFACE REQUIREMENTS PRIOR TO DRILLING

(✓) The BLM will monitor construction of this drill site. Notify the (✓) Carlsbad Resource Area Office at (505) 887-6544 ( ) Hobbs Office at (505) 393-3612, at least 3 working days prior to commencing construction.

(✓) Roads and the drill pad for this well must be surfaced with 6 inches of compacted caliche.

( ) All topsoil and vegetation encountered during the construction of the drill site area will be stockpiled and made available for resurfacing of the disturbed area after completion of the drilling operation. Topsoil on the subject location is approximately ____ inches in depth. Approximately ____ cubic yards of topsoil material will be stockpiled for reclamation.

( ) Other

III. WELL COMPLETION REQUIREMENTS

( ) A Communitization Agreement covering the acreage dedicated to the well must be filed for approval with the BLM. The effective date of the agreement must be prior to any sales.

(✓) Surface Restoration: If the well is a producer, the reserve pit(s) will be backfilled when dry, and cut-and-fill slopes will be reduced to a slope of 3:1 or less. All areas of the pad not necessary for production must be re-contoured to resemble the original contours of the surrounding terrain, and topsoil must be re-distributed and re-seeded with a drill equipped with a depth indicator (set at a depth of 1/2 inch) with the following seed mixture, in pounds of Pure Live Side (PLS), per acre.

( ) A. Seed Mixture 1 (Loamy Sites)
Lehmanns Lovegrass (Eragrostis lehmannlana) 1.0
Side Oats Grass (Bouteloua curtipendula) 5.0
Sand Dropseed (Sporobolus cryptandrus) 1.0

( ) B. Seed Mixture 2 (Sandy Sites)
Sand Dropseed (Sporobolus cryptandrus) 1.0
Sand Lovegrass (Eragrostis trichodes) 1.0
Plains Bristlegrass (Setaria magrostachya) 2.0

( ) C. Seed Mixture 3 (Shallow Sites)
Sideoats Grama (Boute curtipendula) 1.0
Lehmanns Lovegrass (Eragrostis lenmanniana) 1.0
or Boar Lovegrass (E. chloromalas)

(✓) D. Seed Mixture 4 ("Gyp" Sites)
Alkali Sacaton (Sporobolus airoides) 1.0
Four-Wing Saltbush (Atriplex canescens) 5.0

Seeding should be done either late in the fall (September 15 - November 15, before freeze up) or early as possible the following spring to take advantage of available ground moisture.

( ) Other

C. The reserve pit will be lined with a high quality plastic sheeting (5-7 mil thickness).

10. Plan for Restoration of the Surface:

A. Upon completion of the proposed operations, should the well be abandoned, the pit area, after allowed to dry, will be broken out and leveled. The original top soil will be returned to the entire location, and leveled and contoured to the original topography as nearly as possible.

All trash, garbage and pit lining will be removed in order to leave the location in an aesthetically pleasing condition. All pits will be filled and the location leveled within 120 days after abandonment.

B. The disturbed area will be revegetated by reseeding during the proper growing season with a seed mixture of native grasses as recommended by the BLM.

C. Three sides of the reserve pit will be fenced prior to and during drilling operations. At the time the rig is removed, the reserve pit will be fenced on the rig (fourth) side to prevent livestock or wildlife from being entrapped. The fencing will remain in place until the pit area is cleaned and leveled. No oil will be left on the surface of the fluid in the pit.

D. Upon completion of the proposed operations, should the well be productive, the reserve pit area will be treated as outlined above within the same prescribed time. The caliche from an area of the original drillsite not needed for production operations or facilities will be removed and used for construction of thicker pads or firewalls for the tank battery installation. Any additional caliche required for facilities will be obtained from a BLM approved caliche pit. Topsoil removed from the drillsite will be used to recontour the pit area and unused portions of the drill pad to the original natural level and reseeded as per BLM specifications.