District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, 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
July 21, 2008

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.

8003

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: EnerVest Operating, LLC OGRID #: 143199
Address: 1001 Fannin St. Ste 800 Houston, Texas 77002
Facility or well name: Jicarilla Apache 102 No. 011M
API Number: 30-039-29912 OCD Permit Number:
U/L or Qtr/Qtr L Section 10 Township 26N Range 04W County: Rio Arriba
Center of Proposed Design: Latitude 36.498200 Longitude 107.246211 NAD: ☐ 1927 ☒ 1983
Surface Owner: ☐ Federal ☐ State ☐ Private ☒ Tribal Trust or Indian Allotment

2.
☒ **Pit:** Subsection F or G of 19.15.17.11 NMAC
Temporary: ☒ Drilling ☐ Workover
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A
☒ Lined ☐ Unlined Liner type: Thickness 20 mil ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other
☒ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☒ Other Field Volume: 8550 bbl Dimensions: 150 x 75 x 10

RECEIVED
APR 2011
OIL CONS. DIV. DIST. 3

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

4.
☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC
Volume: bbl Type of fluid: Primarily produced water w/ compressor skid precipitation & incidental lubricating oil
Tank Construction material: Steel w/ expanded metal cover
☐ Secondary containment with leak detection ☐ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☒ Other electronic monitoring
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.

74

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_____42" Hog-wire fence with 2 strands barbed-wire on top_____

7.

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

☒ Screen ☐ Netting ☐ Other_____

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

8.

Signs: Subsection C of 19.15.17.11 NMAC

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

☒ Signed in compliance with 19.15.3.103 NMAC

9.

Administrative Approvals and Exceptions:

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

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

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

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

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

16.
Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only: (19.15.17.13.D NMAC)
Instructions: Please indentify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?
☐ Yes (If yes, please provide the information below) ☐ No

Required for impacted areas which will not be used for future service and operations:
☐ Soil Backfill and Cover Design Specifications - - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.
Siting Criteria (regarding on-site closure methods only): 19.15.17.10 NMAC
Instructions: Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17.10 NMAC for guidance.

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

18.
On-Site Closure Plan Checklist: (19.15.17.13 NMAC) ***Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.***
☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of 19.15.17.11 NMAC
☐ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC
☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
☒ Waste Material Sampling Plan - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)
☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

19.
Operator Application Certification:

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

Name (Print): Janet M. Bienski Title: Regulatory Assistant

Signature: Janet M Bienski Date: 4-1-11

e-mail address: jbienski@enervest.net Telephone: 713-495-1571

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

OCD Representative Signature: Brandon Powell **Approval Date:** 4-15-11

Title: Environ Spec **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:

Attachment to Form C-144
Below-grade Tank Permit Application
Temporary Drill Pit Application

Introduction:

EnerVest Operating, LLC (EV) is submitting this permit application to operate a new below-grade tank at a well to be drilled under the authority of 19.15.17 NMAC. The tank is not currently permitted; therefore this document serves as supporting documentation referenced in the attached Form C-144. This tank will be used to capture small amounts of produced water from the primary and secondary separators.

This C-144 application also seeks permission to construct a Temporary Pit for the drilling phase of this well under the authority of 19.15.17 NMAC. Supporting documentation for this pit is included with this application.

This application is being submitted for the following well site:

Well Name: Jicarilla Apache 102 #11M
API No: 30-039-29912
Location: UL L, Sec 10, 26N, 04W

The supporting documentation contained in this C-144 attachment is organized as follows:

BELOW GRADE TANKS

Section I – Sitting Criteria Compliance Demonstration
Section II – Design Plan
Section III – Operating and Maintenance Plan
Section IV – Closure Plan
Section V – Hydrogeology Report

Appendices:
01 – USGS 7.5 Minute Topo Map
02 – Groundwater (water well search)
03 – Aerial Photo
04 – Municipal Boundary Map
05 – U.S. Fish & Wildlife Wetland Identification Map
06 – FEMA 100-year Floodplain map
07 – Mine Map
08 – C-102 Location Plat & Site Physical Inspection Sheet
09 – Karst Map for unstable areas

TEMPORARY DRILL PITS

Section VI – Design & Construction Plan
Section VII – Operation and Maintenance Plan
Section VIII – Closure Plan

Appendices:
10 – Design Plat
11 – Liner Specifications

All mapping and site hydrogeology report are under Below Grade Tank section.

References

Section I

Sitting Criteria Compliance Demonstration

Jicarilla Apache 102 #11M

API No. 30-039-29912

Sitting Criteria Compliance Demonstration

Criteria as per 19.15.17.10.(A) (1)	In Compliance	Comments
Ground water less than 50' below bottom of tank	Yes	Refer to "Site Hydrology Report" in Section V
Within 300' of continuously flowing watercourse or 200 feet of other significant watercourse, lakebed, sinkhole, or playa lake (measured from ordinary high-water mark)	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08
Within 300 feet of a permanent residence, school, hospital, institution, or church	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08
Within 500 ft of a private, domestic freshwater well or spring or within 1000 ft of freshwater well or spring in existenance at time of application	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08
Within incorporated municipal boundary of defined municipal fresh water field	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08
Within 500 feet of a wetland	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08 and USF&W Map in Appendix 5
Within the area overlying a subsurface mine.	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08
Within an unstable area	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08 and Karst Map in Appendix 09
Within a 100-year floodplain	Yes	Refer to Observed Setting Requirements completed by field personnel in Appendix 08 and FEMA Map in Appendix 06

Section II

Design & Construction Plan

EnerVest Operating, LLC (EV)

BELOW-GRADE TANK
DESIGN AND CONSTRUCTION SPECIFICATIONS

Rule 19.15.17.11

C. Enervest Operating is the official operator of record for all wells which have below-grade tanks to be addressed in this specification. All below-grade tanks are located on these leases and will be in full compliance with 19.15.16.8 regarding signage.

D. EV will ensure a fence shall be constructed and maintained in good repair with gates that are closed and locked when responsible personnel are not on site. EV shall insure that all gates are closed and locked when responsible personnel are not on-site.

If the below-grade tank is located within 1,000 feet of a permanent residence, school, hospital, institution or church, the fence shall be a chain link security fence at least 6 feet in height with at least two strands of barbed wire on top.

If the below-grade tank is not within 1,000 feet of the above mentioned structures, the fence shall constructed to exclude livestock with at least four strands of barbed wire evenly spaced between one foot from the ground and four foot above the ground.

EV is requesting administrative approval to use a 42" Hog wire fence with 2 strands barbed-wire on top in lieu of the required four strand barbed wire fence. This will be supported with iron posting at the corners and 10 – 12 feet apart. EV believes this will offer better protection for wildlife in these tank areas. Please refer to Exhibit 2.1 of this Section.

E. EV shall ensure an open top tank is screened with expanded 3/16" metal screen or a fully closed top, both of which are welded on the top of the tank. Such screening will be painted to blend with the below-grade tank. EV believes this is sufficient strength to protect migratory birds or other wildlife.

I. EV will ensure all below-grade tanks will be constructed of 3/16" steel, resistant to the tank's contents and to damage from sunlight. Based on water production and road condition for access during the winter months there are a choice of three different sizes which could be used:

CAPACITY	DIAMETER	HEIGHT
125 bbl	15'	4'
120 bbl	12'	6'
100 bbl	12'	5'

This tank will contain liquids and should prevent contamination of fresh water to protect the public health and environment.

The below-grade system will include a excavated area for the tanks which will be dependent upon the size of the tank used:

18' x 18' x 4' High Square excavated area
18' Diameter x 4' High Circular excavated area
18' Diameter x 5' High Circular excavated area

The particular area and well conditions will determine which design best for that particular well. EV will ensure that there will be room to walk around the tank inside the containment area which will better enable our field personnel to inspect for damage to liners or incidental leaks. Please refer to tank diagram under Exhibit 2.2 of this section for details.

All excavated areas will be reinforced with metal walls to prevent collapse. There will be sufficient open area on all sides of the tank to witness any incidental release that may occur. Please refer to tank diagram under Appendix 8.

EV will ensure the base of any excavated area containing a below-grade tank will be level and free of rocks, debris, sharp edges or irregularities to prevent punctures, cracks or indentations of the liner or tank bottom.

EV will ensure that any geomembrane liner used shall consist of 30-mil flexible PVC or 60-mil HDPE liner or equivalent liner material. The liner shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salt and acidic and alkaline solutions and shall be resistant to ultraviolet light. The liner shall have a hydraulic conductivity no greater than 1 x 10^{-9} cm/sec. The liner shall be compatible with EPA SW-846 method 9090A. EV will install the liner in such a manner as to divert any possible leak for visual inspection. EV will demonstrate to the OCD that the liner complies with the specifications within Subparagraph (a) of Paragraph (4) of Section I of 19.156.17.11 NMAC and obtain approval from the division prior to the installation of the new design.

EV is requesting administrative approval to use an equivalent liner. The "Dura-Skirm J45 BB" is a 45-mil reinforced liner which we feels offers the same or better protection as the required 60-mil liner as indicated above. Please refer to Exhibit 2.3 of this Section for the specification sheets for this liner.

EV will ensure the fluid levels of tanks will be monitored by automatic high level alarms at 24" from the top and shut-off devise at 10 1/2 inches from the top of the tank. The tanks will be also equipped with a manual shut-off valve in the event it is needed. Please see design specification sheet of this system in this section.

The majority of our below-grade tanks are within the berm around our tank battery and as so are protected from run-on water. Those outside this berm will be protected with an earthen berm which will extend at least 6" above surface ground level to divert run-on around the tank. The side walls of the excavated area will extend at least 6" above the ground level to divert run-on water around the tank. Any possible leak will be diverted, on the liner, in such a way can be visually inspected. Please refer to Exhibit 2.4 of this Section for details of this automatic shut-off system.

EV tank design will be a single walled tank constructed to ensure that the side walls are open for visual inspection for leaks; the bottom will be elevated six inches above the ground surface and will contain a geomembrane liner, as described above, directly on the ground level of the containment area.

Once a below-grade tank which was installed prior to June 16, 2008 does not demonstrate integrity, EV shall promptly repair or remove that below-grade tank and close the tank or install a below-grade tank that is in full compliance with Paragraph 1 thru 4 of Section I of 19.15.17.11 NMAC. EV shall comply with the operational requirements of 19.15.17.12 NMAC. Please refer to tank diagram under Appendix 8 for details

Any single walled below-grade tank installed before June 16, 2008 where any portion of the tank sidewall is below the ground surface and not totally visible shall be closed, retrofited or replaced before June 15, 2013. EV will fully comply with Paragraph 1 thru 4 of Section I of 19.15.17.11 NMAC for all retrofitting or replacement of below-grade tanks.

ENERVEST OPERATING, LLC

Proposed Alternative Fencing

Below-Grade Tank Construction

42" Hogwire Fence with 2 strands barbed-wire on top

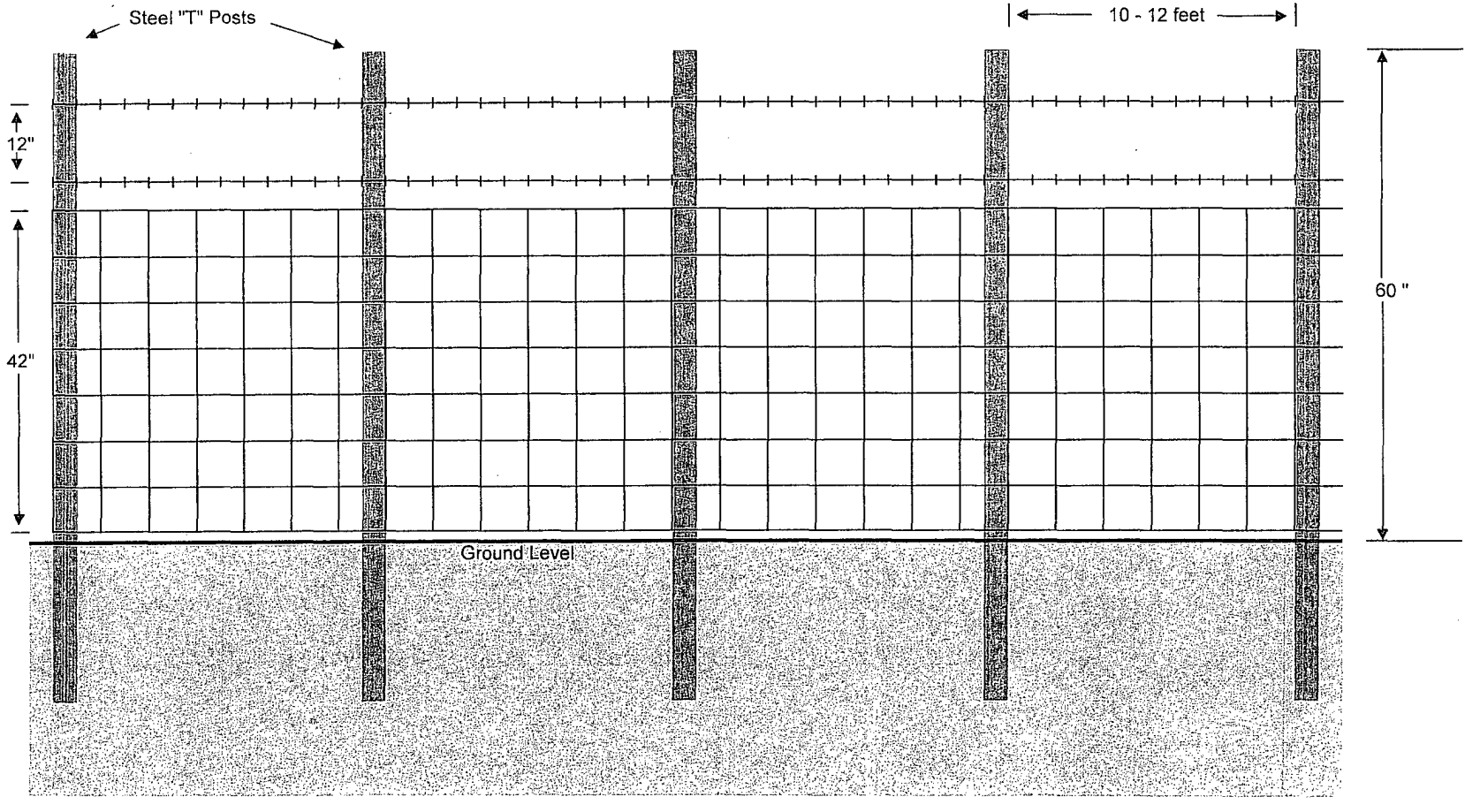
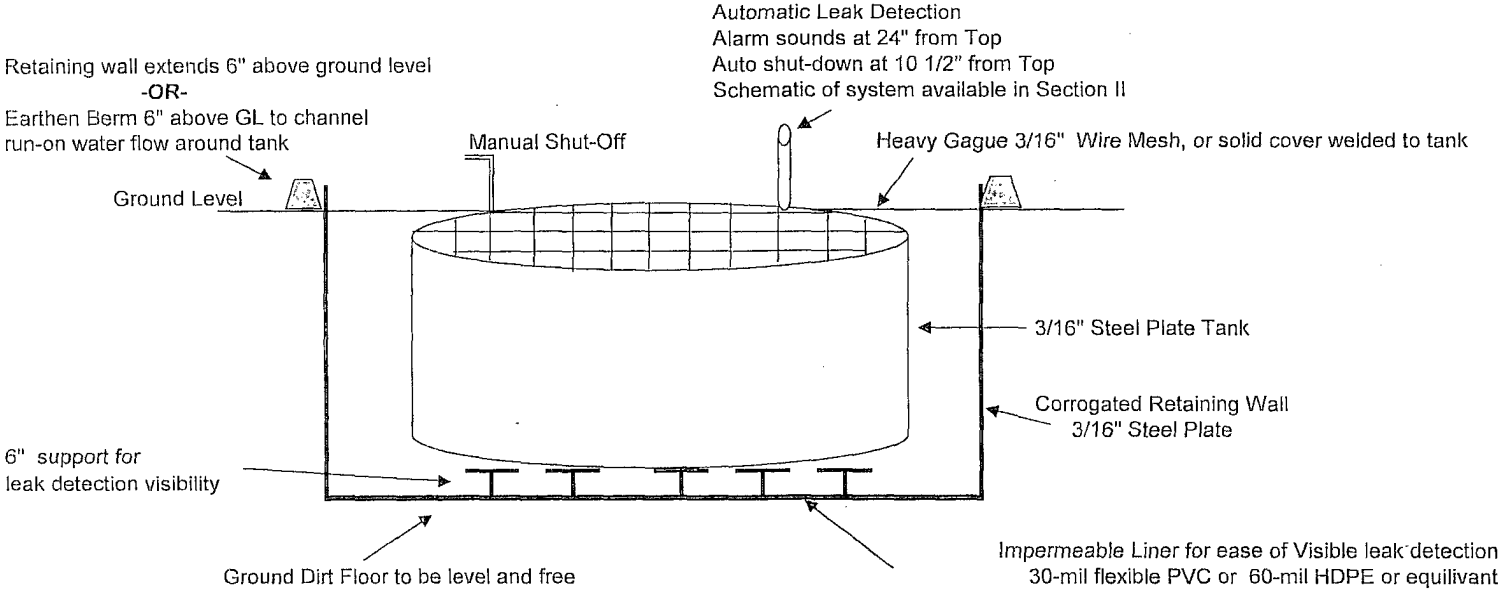


Exhibit 2.1

EnerVest Operating, LLC
Western Division

Below-Grade Tank System

Gravity Fed - Produced Water



Impermeable Liner for ease of Visible leak detection
30-mil flexible PVC or 60-mil HDPE or equilivant Liner
Liner shall have a hydraulic condictivity no greater than

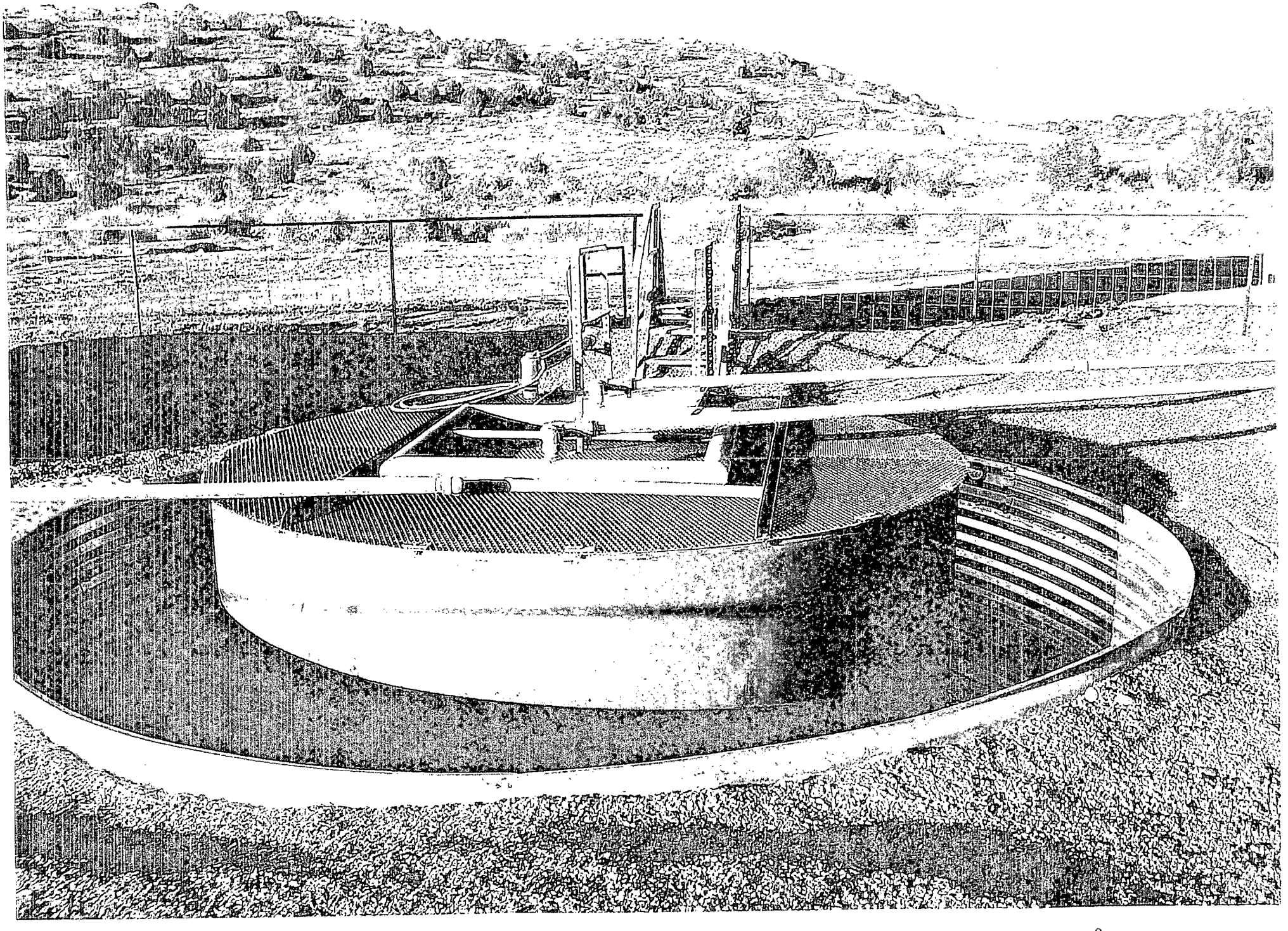
1×10^{-9} cm/sec.

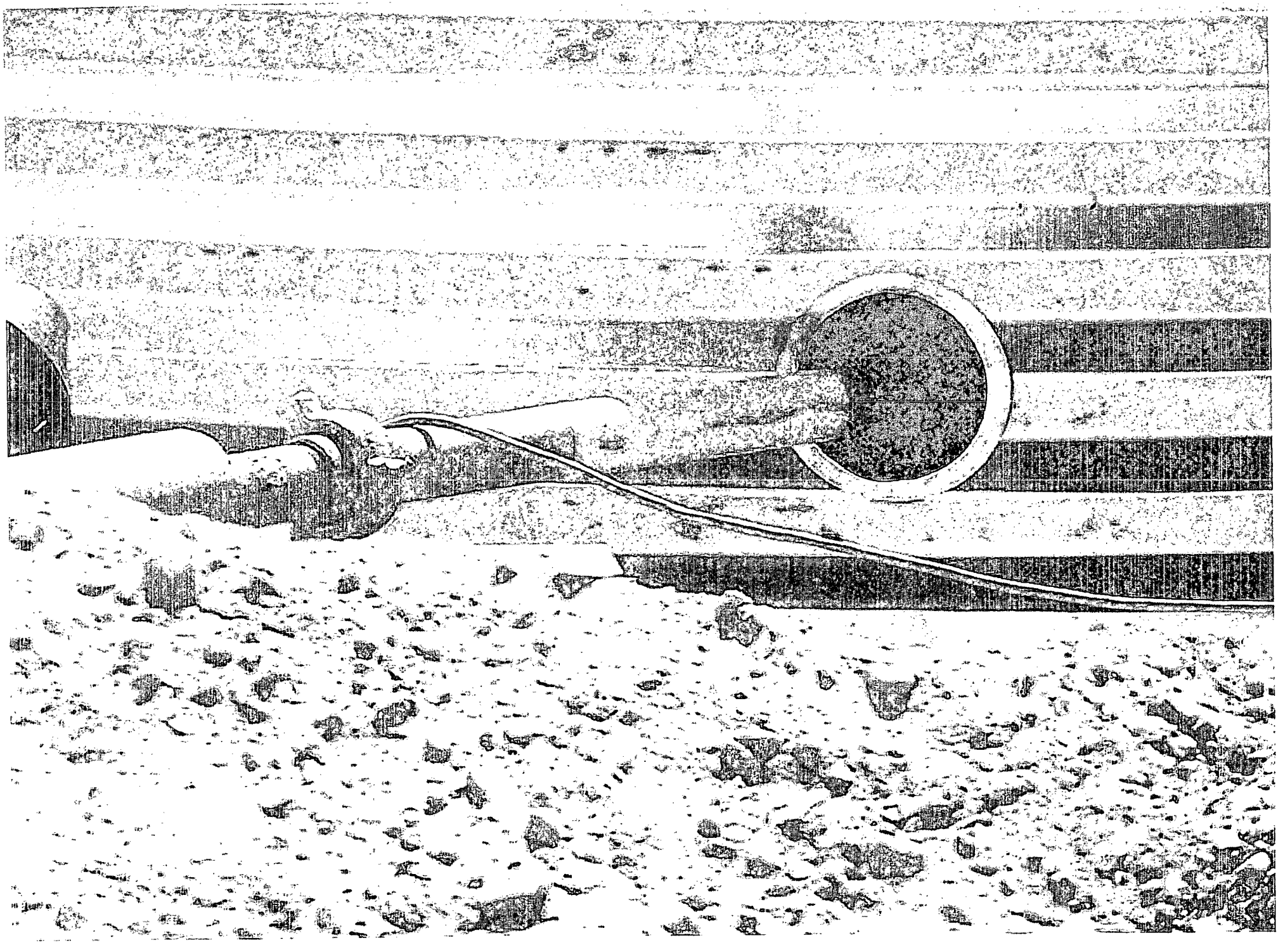
Liner compatibility shall comply with EPA SW-846 method 9090A.
Liner to be impervious to hydrocarbons, salt &
acidic and alkiline solutions.
Any liner installation will be done in such a way as to easily
detect any possible leak.

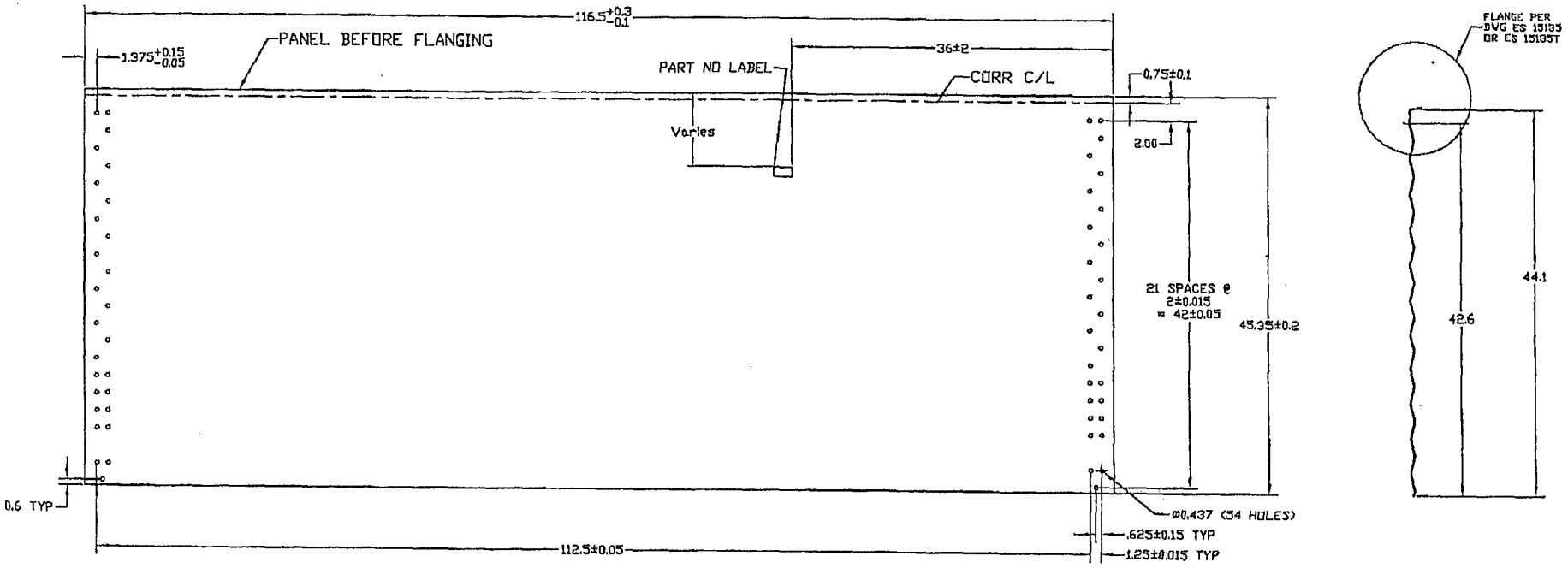
Below-Grade System Components

Tank Size		Excavation Areas
Capacity	Dia x Height	
125 Bbl	15' x 4'	18' x 18' x 4' Square
120 Bbl	12' x 6'	18' x 4' Circular
100 Bbl	12' x 5'	18' x 5' Circular

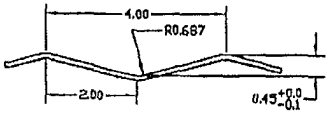
Tank size dependent upon water production & road conditions
Excavation Area size dependent upon tank size







44' WALL PANEL BEFORE FLANGING



CORRUGATING DETAIL

MANUFACTURING NOTES:
1. CORRUGATION..... SEE DETAIL
2. HOLE OFF CENTER OF CORR..... ± .05
3. HOLE BURR MAX..... .01
4. CUT OFF BURR MAX..... .01
5. CORNER HOLE TO HOLE DIAGONAL ± .15

MATERIAL SPECIFICATIONS

THICKNESS		BLANK WIDTH	WALL SHEET PART NO	WEIGHT (lb)
NOMINAL	MINIMUM			
0.066	0.061	46.5	CW4415F	98.5
0.096	0.088	46.3	CW4413F	143.4

NO	DATE	REVISION	E.C.R.	BY	CH.
1	01.28.04	LOWERED CLAMP LOCATION 4"	A6786	RF	BA

DIMENSIONS SHOWN ARE IMPERIAL
UNITS SHOWN IN BRACKETS

TOLERANCES (UNLESS OTHERWISE NOTED)
DIMENSIONS:
IMPERIAL (in.) METRIC (mm)
.X ± .1 X ± 2
.XX ±.03 .X ± 1.0
.XXX ±.010 .XX ± .50
ANGULAR ± 1°

MATERIAL: SEE CHART - ASTM A653 SS GR 50 G115 OIL
BLANK SIZE: 46.5 x 116.5
SURFACE AREA:
WEIGHT (LBS): see chart

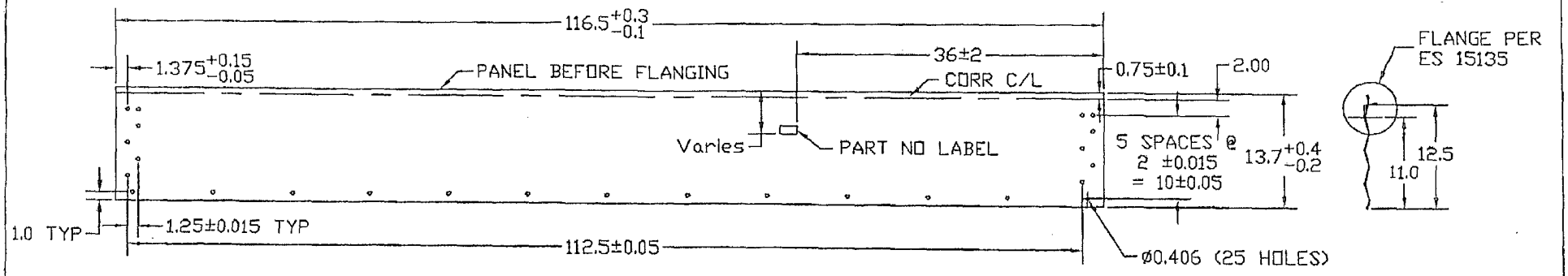
DESND. RM
DWN. RF
CHKD. BA
APPD. BA

WESTEEL

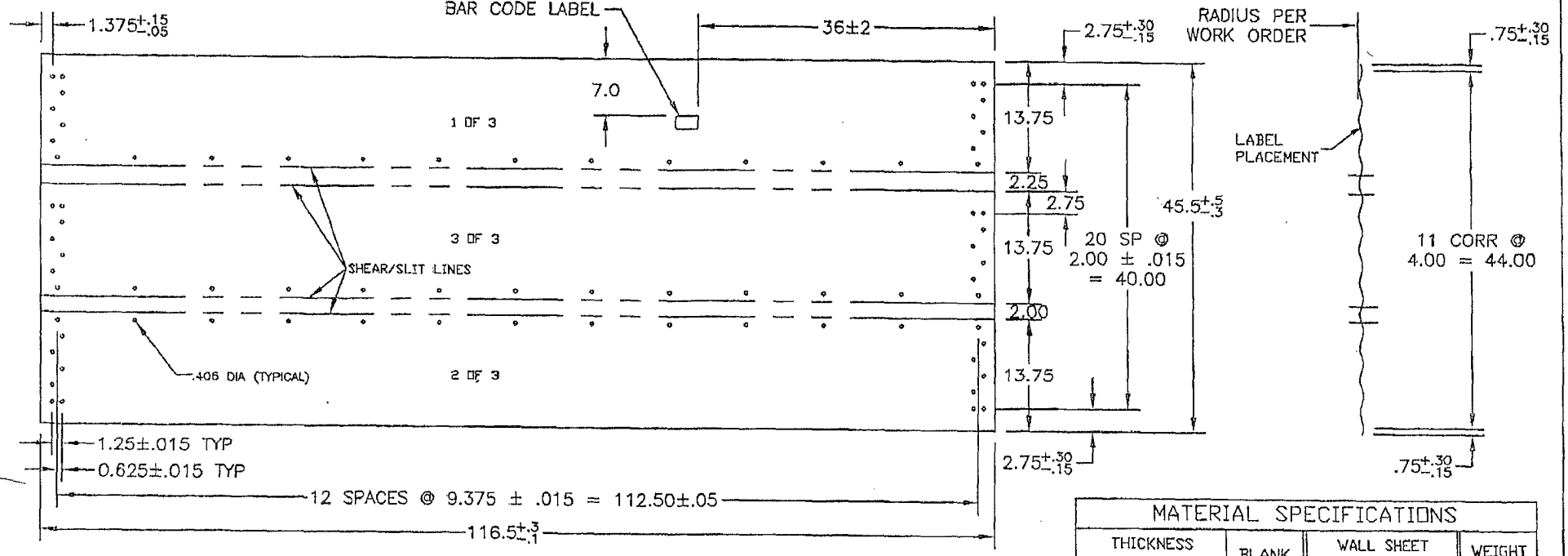
SCALE: nts
DWN. (Y.M.D.): 02.02.19
LOCATION: WINNIPEG
E.C.R.: A6647
E.P. NO.: 02-255
TYPE: ACAD14

DRAWING TITLE: CONTAINMENT RING 44' WALL PANEL
CUSTOMER:
PRINTING DATE:

SIZE: B
DRAWING NO.: ES 15510
REV. NO.: 1



13 1/2" WALL PANEL LAYOUT BEFORE FLANGING



MANUFACTURING VIEW ONLY - TRIPLE PANEL AFTER CORR & PUNCH, BEFORE SLITTING & FLANGING

MATERIAL SPECIFICATIONS				
THICKNESS		BLANK WIDTH	WALL SHEET PART NO	WEIGHT (lb)
NOMINAL	MINIMUM			
0.066	0.061	14.75	CW1357F	31.5

NO	DATE	REVISION	E.C.R.	BY	CH.

DIMENSIONS SHOWN ARE IMP
MM UNITS SHOWN IN BRACKETS

TOLERANCES (UNLESS OTHERWISE NOTED)

DIMENSIONS:

IMPERIAL (in.)	METRIC (mm)
.x ? .1	.x ? .2
.xx ? .03	.x ? 1.0
.xxx ? .010	.xx ? .50

ANGULAR: ± 1°

DESND.	BA
DWN.	RF
CHKD.	BA
APPD.	BA

MATERIAL: SEE CHART - ASTM A653 SS GR50 G115 OIL

BLANK SIZE: 46.5x116.5 (3 pcs)

WEIGHT (LBS): 31.5

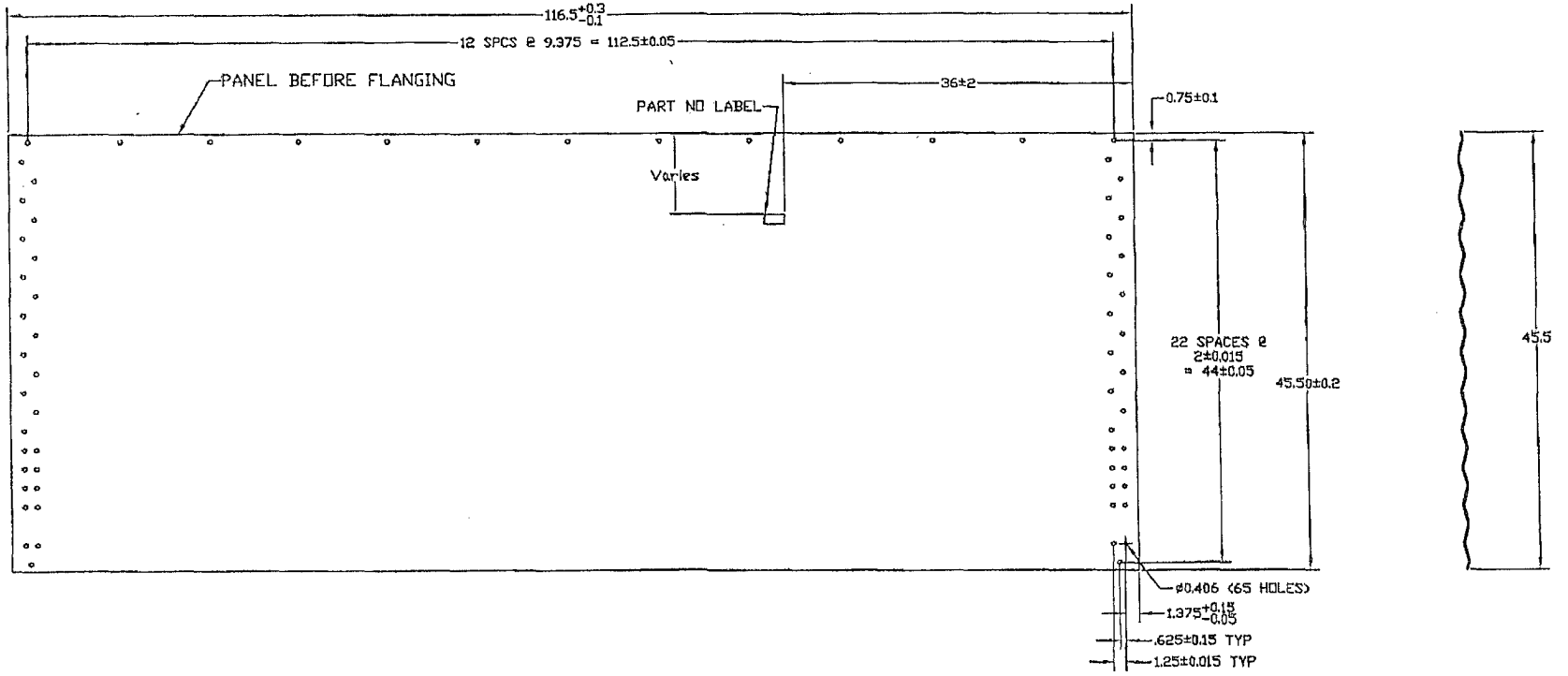
SCALE	DWN. (Y.M.D.)	LOCATION
N.T.S.	2004.11.30	WPG
E.C.R.	E.P. NO.	DWG TYPE
A6834	02-255	A-2000

DRAWING TITLE: 13.5" FULL PANEL - 57" ONLY CONTAINMENT RING

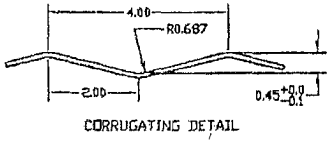
CUSTOMER: -

PRINTING DATE (Y.M.D.): -

SIZE	DRAWING NO.	REV. NO.
A	ES 15516	O



44" WALL PANEL AFTER CORRUGATING AND PUNCHING



CORRUGATING DETAIL

MANUFACTURING NOTES:
1. CORRUGATION..... SEE DETAIL
2. HOLE OFF CENTER OF CORR..... ± .05
3. HOLE BURR MAX..... .01
4. CUT OFF BURR MAX..... .01
5. CORNER HOLE TO HOLE DIAGONAL ± .15

MATERIAL SPECIFICATIONS				
THICKNESS		BLANK WIDTH	WALL SHEET PART NO	WEIGHT (lb)
NOMINAL	MINIMUM			
0.066	0.061	46.5	CW445715F	97.7
0.139	0.130	46.2	CW445710F	208.5

NO	DATE	REVISION	E.C.R.	BY	CH.

DIMENSIONS SHOWN ARE IMPERIAL
____ UNITS SHOWN IN BRACKETS

TOLERANCES (UNLESS OTHERWISE NOTED)

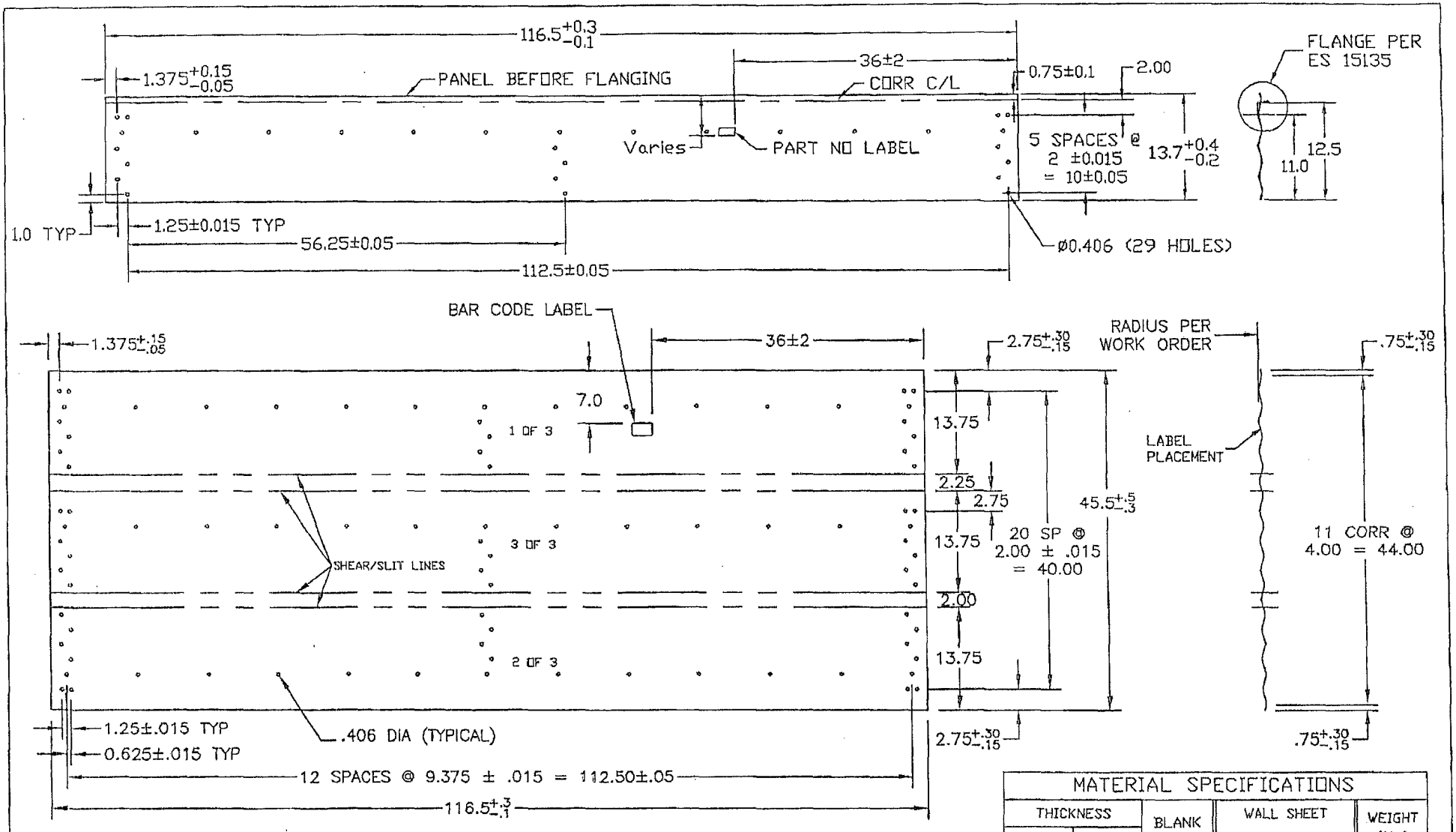
DIMENSIONS:

IMPERIAL (in.)	METRIC (mm)
.x ± .1	.x ± 2
.xx ±.03	.xx ± 1.0
.xxx ±.010	.xxx ± .50

ANGULAR: ± 1°

DESND.	BA
DWN.	RF
CHKD.	BA
APPD.	BA

MATERIAL: SEE CHART - ASTM A653 SS GR 50 G115 DIL	BLANK SIZE: 46.5 x 116.5	SURFACE AREA	WEIGHT (LBS.): see chart		
SCALE: nts	DWN. (Y.M.D.): 04.12.01	LOCATION: WINNIPEG			
E.C.R.: A6834	E.P. NO.	TYPE: A-2000			
DRAWING TITLE: 44" FULL PANEL - 57" ONLY CONTAINMENT RING	SIZE: B	DRAWING NO.: ES 15518	REV. NO.: 0		
CUSTOMER	PRINTING DATE				



MANUFACTURING VIEW ONLY - TRIPLE PANEL AFTER CORR & PUNCH, BEFORE SLITTING & FLANGING

MATERIAL SPECIFICATIONS				
THICKNESS		BLANK WIDTH	WALL SHEET PART NO	WEIGHT (lb)
NOMINAL	MINIMUM			
0.066	0.061	14.75	019401	31.5

NO	DATE	REVISION	E.C.R.	BY	CH.

DIMENSIONS SHOWN ARE IMP. MM UNITS SHOWN IN BRACKETS

TOLERANCES (UNLESS OTHERWISE NOTED)

DIMENSIONS:

IMPERIAL (in.)	METRIC (mm)
.x ? .1	.x ? 2
.xx ? .03	.xx ? 1.0
.xxx ? .010	.xx ? .50

ANGULAR: ± 1°

DESND.	BA
DWN.	RF
CHKD.	BA
APPD.	BA

MATERIAL: SEE CHART - ASTM A653 SS GR50 G115 OIL

BLANK SIZE: 46.5x116.5 (3 pcs)

WEIGHT (LBS.): 31.5

WESTEEL

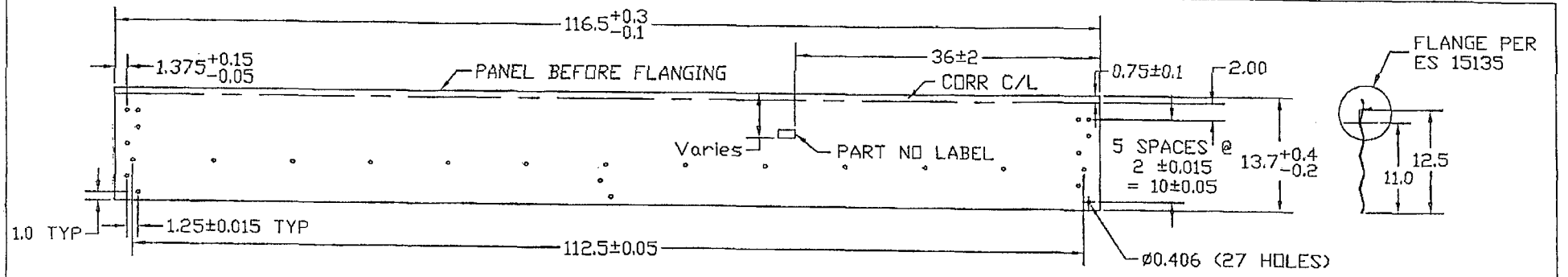
SCALE	DWN. (Y.M.D.)	LOCATION
N.T.S.	2004.11.30	WPG
E.C.R.	E.P. NO.	DWG TYPE
A6834	02-255	A-2000

DRAWING TITLE: 13.5" FULL PANEL - 4" RISER CONTAINMENT RING

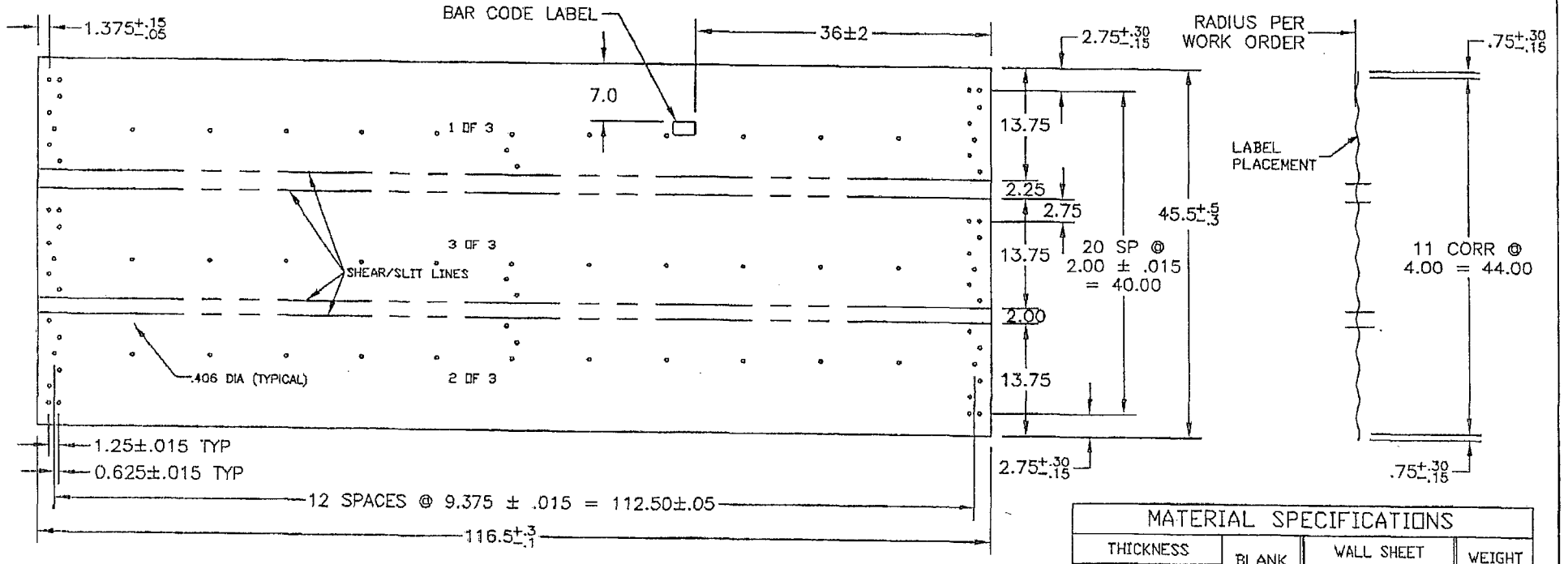
SIZE	DRAWING NO.	REV. NO.
A	019401	O

CUSTOMER: -

PRINTING DATE (Y.M.D.): -



13 1/2" WALL PANEL LAYOUT BEFORE FLANGING



MANUFACTURING VIEW ONLY - TRIPLE PANEL AFTER CORR & PUNCH, BEFORE SLITTING & FLANGING

MATERIAL SPECIFICATIONS				
THICKNESS		BLANK WIDTH	WALL SHEET PART NO	WEIGHT (lb)
NOMINAL	MINIMUM			
0.066	0.061	14.75	019419	31.5

NO	DATE	REVISION	E.C.R.	BY	CH.

DIMENSIONS SHOWN ARE IMP
MM UNITS SHOWN IN BRACKETS

TOLERANCES (UNLESS OTHERWISE NOTED)

DIMENSIONS:

IMPERIAL (in.)	METRIC (mm)
.x ? .1	x ? 2
.xx ? .03	.x ? 1.0
.xxx ? .010	.xx ? .50

ANGULAR: ± 1°

DESND.	BA
DWN.	RF
CHKD.	BA
APPD.	BA

MATERIAL	BLANK SIZE	WEIGHT (LBS.)
SEE CHART - ASTM A653 SS GR50 G115 OIL	46.5x116.5 (3 pcs)	31.5

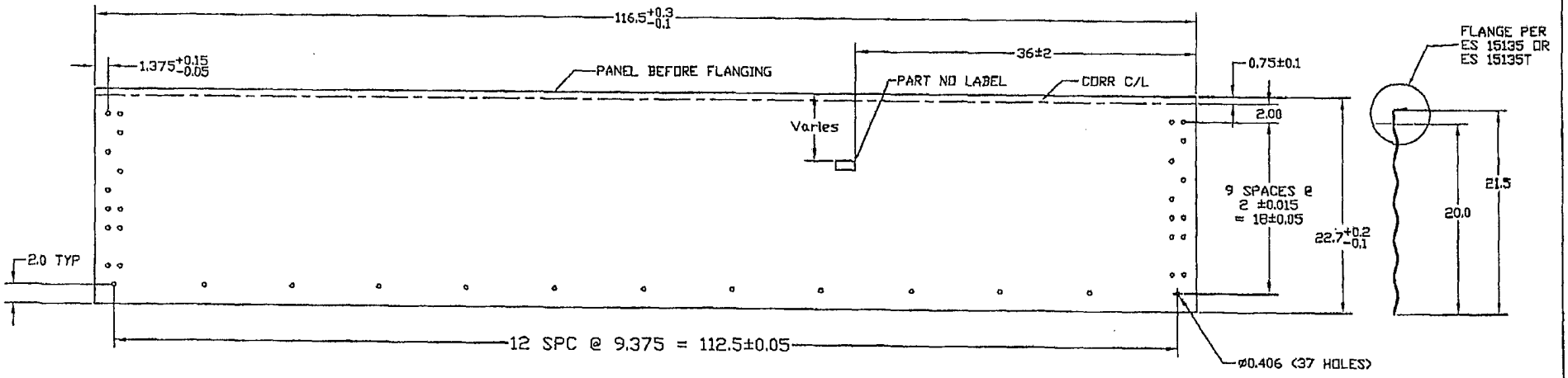
SCALE	DWN. (Y.M.D.)	LOCATION
N.T.S.	2006.08.08	WPG
E.C.R.	E.P. NO.	DWG TYPE
A6834	02-255	A-2000

DRAWING TITLE: 9.5" FULL PANEL - 52.5" ONLY CONTAINMENT RING

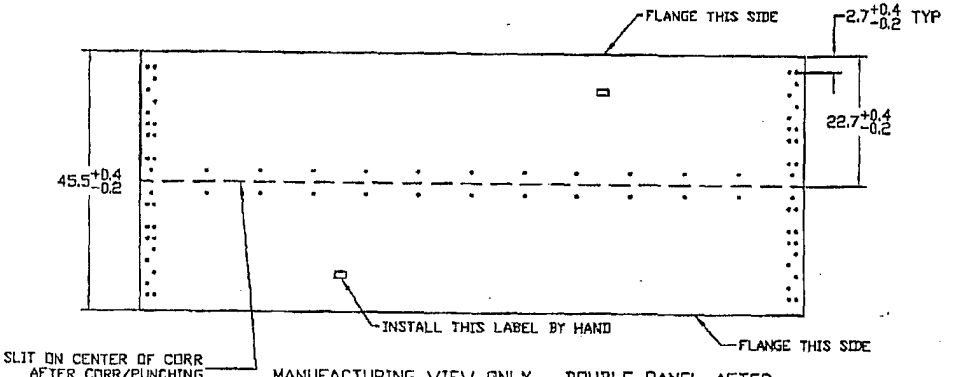
SIZE	DRAWING NO.	REV. NO.
A	019419	O

CUSTOMER: -

PRINTING DATE (Y.M.D.): -



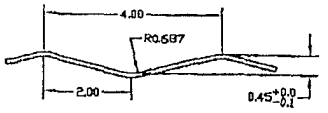
21 1/2" WALL PANEL LAYOUT BEFORE FLANGING



MANUFACTURING VIEW ONLY - DOUBLE PANEL AFTER CORR & PUNCH, BEFORE SLITTING & FLANGING

MANUFACTURING NOTES:
1. CORRUGATION ..... SEE DETAIL
2. HOLE OFF CENTER OF CORR ..... ± .05
3. HOLE BURR MAX ..... .01
4. CUT OFF BURR MAX ..... .01
5. CORNER HOLE TO HOLE DIAGONAL ± .15

MATERIAL SPECIFICATIONS				
THICKNESS		BLANK WIDTH	WALL SHEET PART NO	WEIGHT (lb)
NOMINAL	MINIMUM			
0.066	0.061	23.3	C10514	49.4



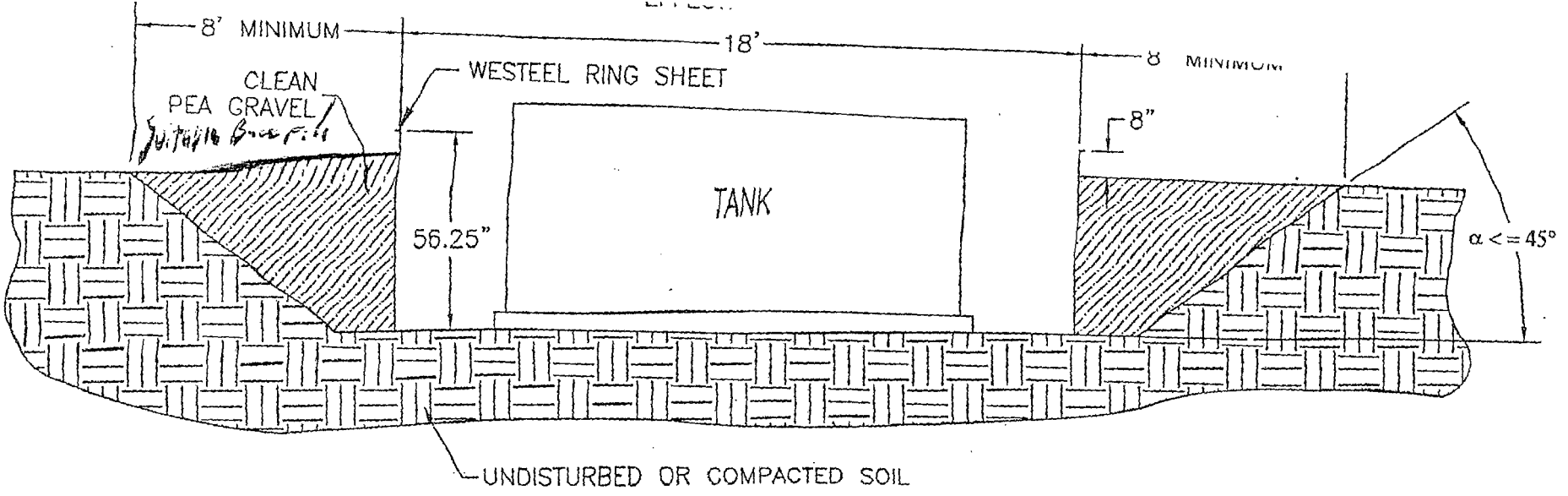
CORRUGATING DETAIL

NO	DATE	REVISION	E.C.R.	BY	CH.
1	06/12/06	CORRECTED HOLE PATTERN ON BOTTOM BLANK	A6898	RF	RF

DIMENSIONS SHOWN ARE IMPERIAL
UNITS SHOWN IN BRACKETS

TOLERANCES (UNLESS OTHERWISE NOTED)
DIMENSIONS:
IMPERIAL (in.) METRIC (mm)
.X ± .1 .X ± 2
.XX ±.03 .XX ± 1.0
.XXX ±.010 .XX ± .50
ANGULAR ± 1°

MATERIAL	SEE CHART - ASTM A653 SQ GR50 G115 OIL
BLANK SIZE	46.6x116.5 (2 pcs)
SURFACE AREA	
WEIGHT (LBS.)	49.4
DESN.	RM
DWN.	RM
CHKD.	YS
APPD.	RM
CUSTOMER	
PRINTING DATE	
SCALE	nts
DWN. CYMD	98.08.13
LOCATION	WINNIPEG
E.C.R.	A 6428
E.P. NO.	98-197
TYPE	ACAD14
DRAWING TITLE	CONTAINMENT RING 22" WALL PANEL
SIZE	B
DRAWING NO.	C10514
REV. NO.	1



INSTALLATION INSTRUCTIONS & SITE REQUIREMENTS

1. EXCAVATE AS PER ABOVE
2. FOR BEST RESULTS, BACKFILL WITH CLEAN PEA GRAVEL (OR EQUIVALENT FREE FLOWING MATERIAL) EVENLY AROUND THE STRUCTURE, TAKING CARE NOT TO FILL IN ANY ONE AREA VERY HIGH RELATIVE TO OTHER AREAS, SO AS TO MAINTAIN THE STRUCTURE AS ROUND. WORKING AROUND THE STRUCTURE IN APPROXIMATELY 6" LIFTS IS RECOMMENDED. (NOTE: ALTERNATIVE MATERIALS CAN BE USED BUT CARE MUST BE TAKEN TO INSURE THAT THE EXTERNAL PRESSURES ACTING ON THE STRUCTURE REMAIN UNIFORM. IF NATIVE SOIL IS USED AS A BACKFILL MATERIAL, IT SHOULD BE UNIFORM IN CONSISTENCY, AND BE FREE OF LARGE ROCKS OR UNBROKEN CLUMPS, WHICH COULD RESULT IN UNEVEN LOADING).
3. THE COMPLETED STRUCTURE SHOULD EXTEND APPROXIMATELY 8" ABOVE GRADE
4. TO INSURE STRUCTURAL INTEGRITY, UNEVEN EXTERNAL WALL PRESSURE IS TO BE AVOIDED. NO VEHICLES OR OTHER SOURCES OF POINT LOADING SHOULD BE PERMITTED WITHIN THE EFFECTIVE ZONE (AS ILLUSTRATED).
5. WESTEEL IS NOT LIABLE FOR ANY DAMAGES OR INJURIES RESULTING FROM ANY FAILURE DUE TO IMPROPER INSTALLATION, IMPROPER SITE CONDITIONS, OR INADEQUATE MAINTENANCE OF THE SITE.

NOTE: THIS SYSTEM IS NOT DESIGNED FOR THE SECONDARY CONTAINMENT OF LIQUIDS, RATHER, TO ALLOW FOR INSPECTION OF THE TANK.

DURA•SKRIM® J30, J36 & J45 BB

PRODUCT DESCRIPTION

DURA•SKRIM J30, J36 and **J45** are Linear Low Density Polyethylene geomembranes reinforced with a heavy encapsulated 1300 Denier polyester reinforcement. In addition to excellent dimensional stability the tri-directional reinforcement provides exceptional tear and tensile strength.

DURA•SKRIM J-Series membranes are formulated with thermal and UV stabilizers to assure a long service life. Custom colors are available based on minimum volume requirements.

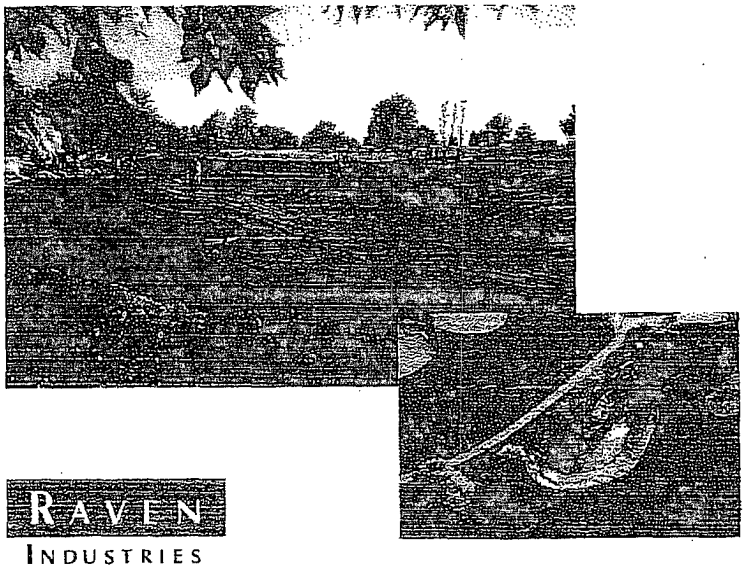
PRODUCT USE

DURA•SKRIM J30, J36 and **J45** are used in applications that require exceptional outdoor life and demand high tear strength and resistance to thermal expansion.

DURA•SKRIM J30, J36 and **J45** are manufactured from a very chemical-resistant, Linear Low Density Polyethylene with excellent cold crack performance.

SIZE & PACKAGING

DURA•SKRIM J30, J36 and **J45** are available in a variety of widths and lengths to meet the project requirements. Large diameter mill rolls are available to assure an efficient seaming process. Factory welded panels are accordion folded and tightly rolled on a heavy-duty core for ease of handling and time saving installation.



RAVEN INDUSTRIES
Engineered Films Division

PRODUCT	PART NUMBER
DURA•SKRIM J30	J30BB
DURA•SKRIM J36	J36BB
DURA•SKRIM J45	J45BB

COMMON APPLICATIONS

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

DURA-SKRIM®

DURA-SKRIM® J30, J36 & J45 BB

PROPERTIES	TEST METHOD	DURA-SKRIM J30BB		DURA-SKRIM J36BB		DURA-SKRIM J45BB	
		Min. Roll Averages	Typical Roll Averages	Min. Roll Averages	Typical Roll Averages	Min. Roll Averages	Typical Roll Averages
APPEARANCE		Black/Black		Black/Black		Black/Black	
THICKNESS, NOMINAL	ASTM D5199	27 mil	30 mil	32 mil	36 mil	40 mil	45 mil
WEIGHT lbs/MSF (oz/yd²)	ASTM D5261	126 lbs (18.14)	140 lbs (20.16)	151 lbs (21.74)	168 lbs (24.19)	189 lbs (27.21)	210 lbs (30.24)
CONSTRUCTION		**Extrusion laminated with encapsulated tri-directional scrim reinforcement					
PLY ADHESION	ASTM D413	16 lbs	20 lbs	19 lbs	27 lbs	25 lbs	33 lbs
1" TENSILE STRENGTH	ASTM D7003	88 lbf MD 63 lbf DD	110 lbf MD 79 lbf DD	90 lbf MD 70 lbf DD	113 lbf MD 87 lbf DD	110 lbf MD 84 lbf DD	138 lbf MD 105 lbf DD
1" TENSILE ELONGATION @ BREAK % (FILM BREAK)	ASTM D7003	550 MD 550 DD	750 MD 750 DD	550 MD 550 DD	750 MD 750 DD	550 MD 550 DD	750 MD 750 DD
1" TENSILE ELONGATION @ PEAK % (SCRIM BREAK)	ASTM D7003	20 MD 20 DD	33 MD 33 DD	20 MD 20 DD	30 MD 31 DD	20 MD 20 DD	36 MD 36 DD
TONGUE TEAR STRENGTH	ASTM D5884	75 lbf MD 75 lbf DD	97 lbf MD 90 lbf DD	75 lbf MD 75 lbf DD	114 lbf MD 107 lbf DD	100 lbf MD 100 lbf DD	125 lbf MD 127 lbf DD
GRAB TENSILE	ASTM D7004	180 lbf MD 180 lbf DD	218 lbf MD 210 lbf DD	180 lbf MD 180 lbf DD	295 lbf MD 294 lbf DD	220 lbf MD 220 lbf DD	341 lbf MD 337 lbf DD
TRAPEZOID TEAR	ASTM D4533	120 lbf MD 120 lbf DD	146 lbf MD 141 lbf DD	130 lbf MD 130 lbf DD	189 lbf MD 172 lbf DD	160 lbf MD 160 lbf DD	193 lbf MD 191 lbf DD
*DIMENSIONAL STABILITY	ASTM D1204	<1	<0.5	<1	<0.5	<1	<0.5
PUNCTURE RESISTANCE	ASTM D4833	50 lbf	64 lbf	65 lbf	83 lbf	80 lbf	99 lbf
MAXIMUM USE TEMPERATURE		180°F	180°F	180°F	180°F	180°F	180°F
MINIMUM USE TEMPERATURE		-70°F	-70°F	-70°F	-70°F	-70°F	-70°F

MD = Machine Direction
DD = Diagonal Directions

Note: Minimum Roll Averages are set to take into account product variability in addition to testing variability between laboratories.

*Dimensional Stability Maximum Value

**DURA-SKRIM J30BB, J36BB and J45BB are a four layer reinforced laminate. The outer layers consist of a high strength polyethylene film manufactured using virgin grade resins and stabilizers for UV resistance in exposed applications.

DURA-SKRIM J30BB, J36BB and J45BB are reinforced with a 1300 denier tri-directional scrim reinforcement.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. NO WARRANTIES ARE MADE AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage.

RAVEN INDUSTRIES

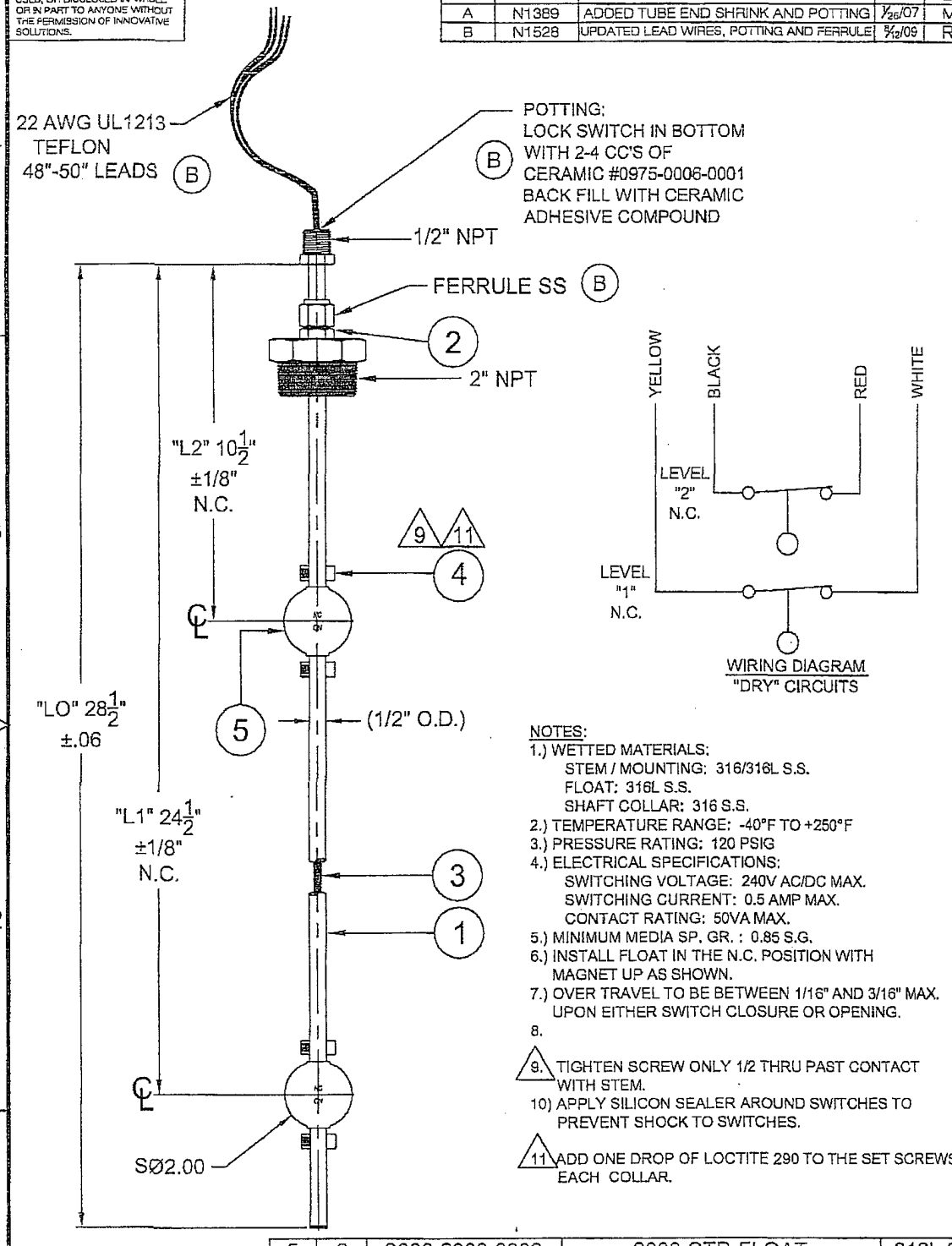
RAVEN INDUSTRIES, INC. / Engineered Films Division
P.O. Box 5107 • Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333
Toll Free: 800-635-3456

ISO 9001:2000 CERTIFIED MANAGEMENT SYSTEM

www.ravengeo.com

6/09 EFD 1126

REVISION BLOCK				
REV.	E.C.N. NO.	DESCRIPTION	DATE	APPRV'D.
00		INITIAL RELEASE	6/27/06	D.T.
A	N1389	ADDED TUBE END SHRINK AND POTTING	1/26/07	MJR
B	N1528	UPDATED LEAD WIRES, POTTING AND FERRULE	3/12/09	R.B.



NOTES:
1.) WETTED MATERIALS:
STEM / MOUNTING: 316/316L S.S.
FLOAT: 316L S.S.
SHAFT COLLAR: 316 S.S.
2.) TEMPERATURE RANGE: -40°F TO +250°F
3.) PRESSURE RATING: 120 PSIG
4.) ELECTRICAL SPECIFICATIONS:
SWITCHING VOLTAGE: 240V AC/DC MAX.
SWITCHING CURRENT: 0.5 AMP MAX.
CONTACT RATING: 50VA MAX.
5.) MINIMUM MEDIA SP. GR. : 0.85 S.G.
6.) INSTALL FLOAT IN THE N.C. POSITION WITH MAGNET UP AS SHOWN.
7.) OVER TRAVEL TO BE BETWEEN 1/16" AND 3/16" MAX. UPON EITHER SWITCH CLOSURE OR OPENING.
8.
9. TIGHTEN SCREW ONLY 1/2 THRU PAST CONTACT WITH STEM.
10) APPLY SILICON SEALER AROUND SWITCHES TO PREVENT SHOCK TO SWITCHES.
11 ADD ONE DROP OF LOCTITE 290 TO THE SET SCREWS OF EACH COLLAR.

ITEM	QTY	PART NUMBER	DESCRIPTION, CATALOG NO. OR FINISHED SIZE	MAT'L
5	2	2000-2000-0006	2000-STD FLOAT	316L S.S.
4	4	0610-0500-0008	1/2" SHAFT COLLAR	316 S.S.
3	1	3000C3890-0001	SWITCH ASSEMBLY	
2	1	0199-0908-0500	AJUSTABLE MOUNTING	316/316L
1	1	5000C3890-0001	STEM/MTG. SUB-ASSEMBLY	316/316L

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES, [ ] ARE IN MM (MILLIMETERS)
TOLERANCES: X±.1 .XX±.01 .XXX±.005
FRACTIONS ±1/64, ANGLES±30'
MACHINED SURFACES: 63 µ RMS
REMOVE ALL BURRS AND SHARP EDGES
NEXT ASS'Y.
MAT'L: AS NOTED
DRAWN BY: MJR DATE: 6/26/06
CHKD. BY: D.T. DATE: 6/27/06
APPVD. BY: D.T. DATE: 6/27/06

INNOVATIVE SOLUTIONS, LLC
60 GREAT HILL ROAD, NAUGATUCK, CT 06770 USA
TITLE: 2 LEVEL S.S. / S.S. FLOAT L500 LEVEL SENSOR
SIZE: B | FSCM NO. | DWG. NO. L500C3890-0001 | REV. B
SCALE 25 | SHEET 1 OF

Exhibit 2.4

Section III

Operation & Maintenance Plan

EnerVest Operating, LLC (EV)

BELOW-GRADE TANK
OPERATIONAL REQUIREMENTS

Rule 19.15.17.12

A. EV will operate and maintain Below-Grade Tanks to insure the integrity of the below-grade tank, liner, liner system or berms to prevent contamination of fresh water and protect public health and the environment.

EV will not discharge or store any hazardous waste material of any kind in any Below-Grade Tank.

Any penetration of the below-grade below the liquid's surface that may occur, EV shall remove all liquid above the damage or leak line within 48 hours of the discovery. EV shall notify the appropriate district office within 48 hours of the discovery and repair the damage or replace the liner or below-grade tank.

EV will insure the metal retaining walls of the below-grade system around each tank will extend at least 6" above ground level or be equipped with a 6" earthen berm in an effort to divert run-on water around the below-grade system.

D. EV will insure that a below-grade tank constructed and installed prior to June 16, 2008 that does not meet the requirements of 19.15.17.11 NMAC and does not demonstrate integrity or that the below-grade tank develops any conditions as identified in 19.15.17.12 NMAC shall close the existing below-grade tank pursuant to the closure requirements of 19.15.17.13 NMAC and install a below-grade tank that is in full compliance with our approved design. Please see below-grade system diagram in Appendix 8 for details.

EV will insure all Below-grade tanks will be equipped with automatic high-level alarm which sounds at 24" and than shut off devise to insure that flow will shut off at the freeboard height of 10 1/2 inches.

The majority of our below-grade tanks are within the berm around our tank battery and as so are protected from run-on water. Those outside this berm will be protected with an earthen berm which will extend at least 6" above surface ground level to divert run-on around the tank.

EV will remove any visible or measurable layer of oil from the fluid surface of a below-grade tank.

With any below-grade tank, installed before June 16, 2008, that is retrofitted or replaced with another tank, EV will insure that the soil beneath the removed soil is inspected for wet, discolored, or any other evidence of release, with photographic evidence. EV will report the results of all testing to the division on form C-141 and demonstrate to the division whether the evidence of contamination indicates at an imminent threat to fresh water, public health, safety of the environmental exists. If the division determines that the contamination does not pose an imminent threat to fresh water, public health, safety or the environment, EV shall complete the retrofit or the replacement of the below-grade tank as per our approved design program as indicated in Appendix 8. If EV or the division determines that the contamination poses an imminent threat to fresh water, public health, safety or the environment, then EV shall close the existing below-grade tank pursuant to the closure requirements of 19.17.15.13 NMAC prior to initiating the retrofit or replacement.

Table 1.1 - GSE HD Smooth Geomembrane

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE VALUE 30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, (minimum average) mil (mm) Lowest individual reading (-10%)	ASTM D 5199	every roll	30 (0.75) 27 (0.69)	40 (1.00) 36 (0.91)	60 (1.50) 54 (1.40)	80 (2.00) 72 (1.80)	100 (2.50) 90 (2.30)
Density, g/cm^3	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction) Strength at Break, lb/in-width (N/mm) Strength at Yield, lb/in-width (N/mm) Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbell, 2 ipm G.L. 2.0 in (51 mm) G.L. 1.3 in (33 mm)	20,000 lb	 120 (21) 66 (11) 700 13	 152 (26) 84 (14) 700 13	 243 (42) 132 (23) 700 13	 327 (57) 177 (30) 700 13	 410 (71) 212 (37) 700 13
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (124)	42 (186)	58 (257)	73 (324)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	65 (289)	85 (378)	125 (556)	160 (711)	195 (867)
Carbon Black Content, % (Range)	ASTM D 1 603*/421 8	20,000 lb	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	Note[1]	Note[1]	Note[1]	Note[1]	Note[1]
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	1000	1000	1000	1000	1000
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lb	>140	>140	>140	>140	>140
TYPICAL ROLL DIMENSIONS							
Roll Length[2], ft (m)			1,120 (341)	870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[2], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft^2 (m^2)			25,200 (2,341)	19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

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 HD 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.

O.R.E. SYSTEMS
P.O. Box 3677
Farmington, NM 87499
(505) 327-2161

Section IV

Closure Plan

EnerVest Operating, LLC (EV)

BELOW-GRADE TANK
CLOSURE REQUIREMENTS

Rule 19.15.17.13

Before June 15, 2013, EV shall close, retrofit, or replace an existing below-grade tank that has not demonstrated integrity.

EV shall close a below-grade tank within the time periods provided in 19.15.17.13 NMAC, or by an earlier date that the division requires because of imminent danger to fresh water, public health or the environment.

A. EV shall close an existing below-grade tank that does not meet the requirements of Subsection I, paragraphs (1) through (4), of 19.15.17.11 NMAC if not retrofitted to comply with said requirements prior to any sale or change of operator to 19.15.9.9 NMAC.

Any below-grade tank installed prior to June 16, 2008 that is single walled and where any portion of the tank sidewall is below the ground surface and not visible shall equip or retrofit the below-grade tank to comply with paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC, or close it, within 5 years after June 16, 2008.

Within 60 days of cessation of the permitted below-grade tanks operation or as required by Subsection B of 19.15.17.17 NMAC, EV shall close the below-grade tank in accordance with a closure plan that the appropriate division district office approves.

J. Prior to implementing any closure operations EV shall research county tax records to determine the name and address of the surface owner of the properties involved. EV shall notify this surface owner via Certified U.S. Mail, return receipt requested, of their intent to close said below-grade tank.

Upon determination, EV will notify the appropriate district office prior to any closure operations beginning. Such notification shall be at least 72 hours, via U.S. Mail, prior to beginning work but not more than one week prior to beginning work. Such notice shall contain at a minimum the following:

Operators Name
Unit letter, Section, Township, & Range of well
Well name and well number
API Number of well

E. .All free standing liquids and sludge will be removed at the start of the below-grade tank closure process from the below-grade tank and disposed of in one of the below division-approved facility as indicated below:

TNT Land Farm	Permit # NM-01-0008	Liquids & Sludge
Environtech Land Farm	Permit # NM-01-0011	Solids
AguaMoss	Permit # 247130	Liquids

EV will obtain prior approval from the division to dispose, recycle, reuse, or reclaim the below-grade tanks and provide documentation of the final disposition of the below-grade tank in the closure report.

Existing liners that are removed as a result of closure will be wiped cleaned and disposed of at a solid waste facility listed below in compliance with Subparagraph (M) of Paragraph (I) of Subsection C 19.15.35.8 NMAC..

San Juan Regional Landfill	Permit # SWM 052426 or
"	Special Waster Permit # SWM052433 "sp"

If there is any on-site equipment associated with a below0grade tank, EV shall remove the equipment, unless the equipment is required for some other purpose .

Upon removal of the below-grade tank, EV will take, at a minimum, a five point composite sample from where the tank was sitting. EV shall collect individual grab samples will be taken from any area that is wet, discolored or showing other evidence of a release. All samples will be analyzed for the following:

Components	Test Method	Limits (mg/Kg)
Benzene	EPA SW-846 8021B or 8260B	0.2
BTEX	EPA SW-846 8021B or 8260B	50
TPH	EPA SW-846 418.1	100
Chlorides	EPA 300.1	250 or background, whichever is greater

EV will insure that the results of all sampling shall be reported to the division on approved form C-141. EV understands that the division may require additional delineation upon review of the results.

If sampling demonstrates that concentrations specified above have NOT been exceeded, or that a release has NOT occurred, EV will backfill the excavation with compacted, non-waste containing, earthen material, construct a division prescribed soil cover, and recontour and re-vegetate the site. The division prescribed soil cover, recontouring, and re-vegetation shall comply with 19.15.17.13.

If EV or the division determines that a release has occurred, EV shall fully comply with 19.15.29 NMAC and 19.15.30 NMAC as appropriate.

G. Once EV has closed a below-grade tank, we shall reclaim the site to a safe and stable condition that blends with the surrounding undisturbed area. When possible, EV will restore the impacted surface area to the condition that existed prior to oil and gas operations by the placement of soil cover.

If the closed area is within the confines of the pad location EV will blend the site to match the pad location as much as possible. Such activities shall prevent erosion, protect fresh water, human health and the environment. EV will obtain written agreement from the surface owner for any alternate re-vegetation proposals and submit to the division for final approval.

H. The soil cover design will be consistent with the requirements of 19.15.17.13(H)(1)and (3). The soil cover will consist of the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater. The soil cover will be constructed to the site's existing grade and prevent ponding of water and erosion of the cover material.

I. EV will seed the disturbed areas the first growing season after closing the below grade tank. Seeding will be accomplished via drilling on the contour whenever practical or by other division-approved methods. BLM or Forest Service stipulated seed mixes will used on federal lands. Vegetative cover will equal 70% of the native perennial vegetative cover (un-impacted) consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintain that cover through two successive growing seasons. Repeat seeding or planting will be continued until successful vegetative growth occurs. During the two growing seasons that prove viability, there shall be no artificial irrigation of the vegetation.

EV shall notify the division when it has seeded or planted and when it successfully achieves re-vegetation by U.S. Mail.

K. Within 60 days of completion of closure operations, EV will file Form C-144, with attachments, outlining the detailed operations of the closing operations. Such attachments shall include, but not limited to, proof of surface owner and division notifications, confirmation of sampling analysis, disposal facility names and permit numbers, soil backfilling and cover installation, re-vegetation application rates and seeding techniques, and photo documentations.

Section V

Hydrogeology Report

Site Specific Hydro Geologic Analysis

Jicarilla Apache 102 #11M
API 30-039-29912

The above referenced well is located at UL L, Sec 10, 26N, 04W at an elevation of 6,884'. Surface casing is planned to be set at 250' or at a depth of 6,634'.

According to the Office of State Engineer, the closest water well drilled was SJ 01205 about 2 miles NE of our location. Drilled to 3054 feet at an unknown elevation, it shows water encountered at 750 feet.

In 1980, Amoco Production drilled their Jicarilla Apache 102 #11E (30-039-22459) about 900 feet SE of our location. It was at an elevation of 6,839 with no indication of water being encountered. Surface casing was set at 296 feet which would be at 6,543. This would be 91 feet above than our well.

In 1978, Amoco Production drilled their Jicarilla Apache 102 #31 (30-039-21852) about 900 feet SE of our location. It was at an elevation of 6,839 with no indication of water being encountered. Surface casing was set at 298 feet which would be at 6,541. This would be 93 feet above than our well

The groundwater at our well site would be about 90 feet at a minimum. This should allow ample protection for any groundwater in the area.

Regional Hydrogeology Report

The San Jose Formation of Eocene age occurs in New Mexico and Colorado, and its outcrop forms the land surface over much of the eastern half of the central San Juan Basin. It overlies the Nacimiento Formation in the area generally sourth of the Colorado-New Mexico state line and overlies the Animas Formation in the area generally north of the State line.

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

Ground water is associated with alluvial and fluvial sandstone aquifers. Therefore the occurrence of ground water is mainly controlled by the distribution of sandstone in the formation. The distribution of such sandstone is the results of original depositional extend plus any post-depositional modifications, namely erosion and structural deformation.

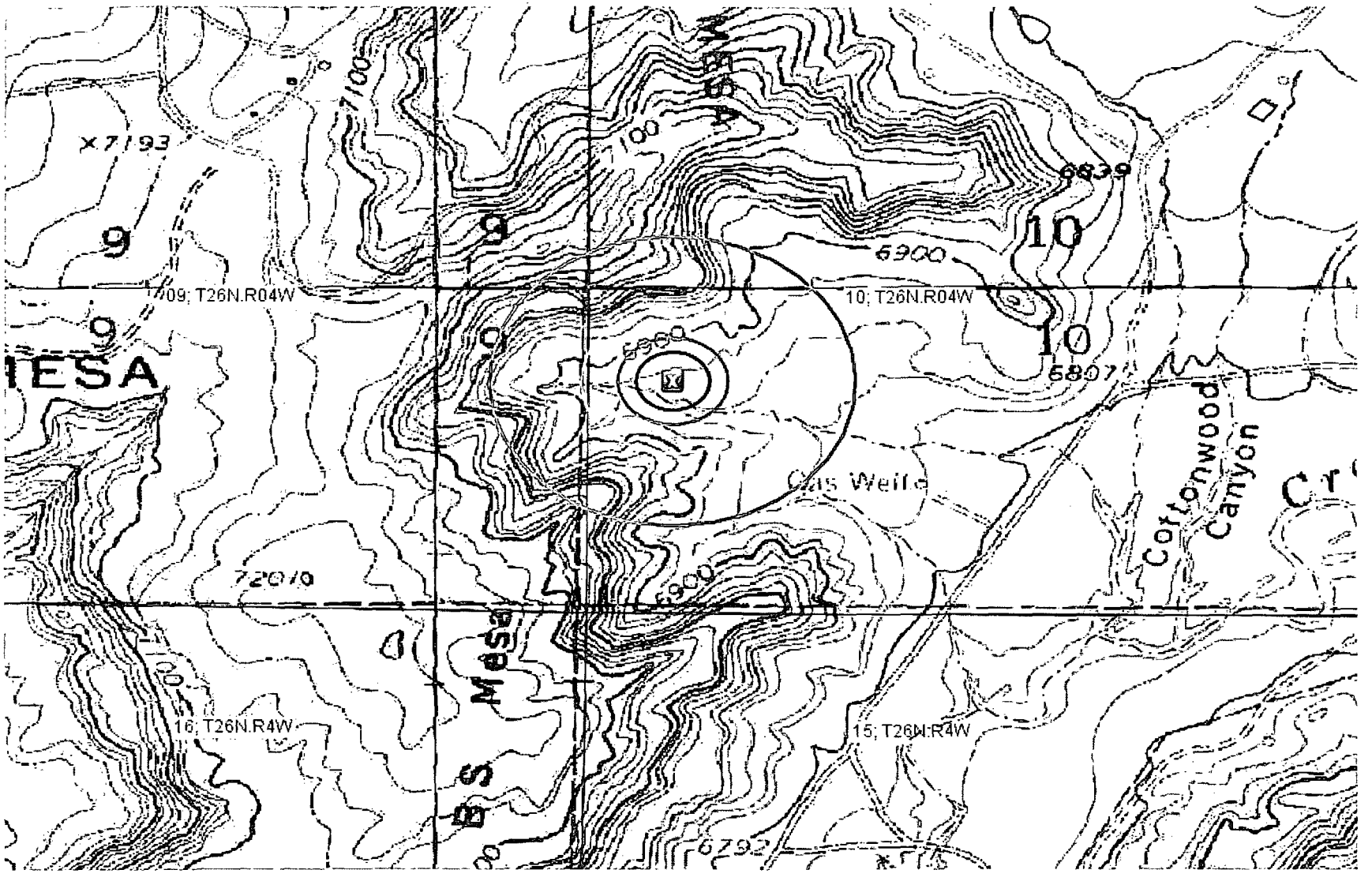
Transmissivity data for the San Jose Formation are minimal. Values of 40 and 120 feet squared per day were determined from two aquifer tests (Stone et al, 1983. table 5). The reported or measured discharge from 46 water wells completed in San Jose Formation ranges from 0.15 to 61 gallons per minute and the median is 5 gallons per minute. Most of the wells provide water for livestock and domestic use.

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

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

Appendix 01

U.S. 7.5 Minute TOPO Map

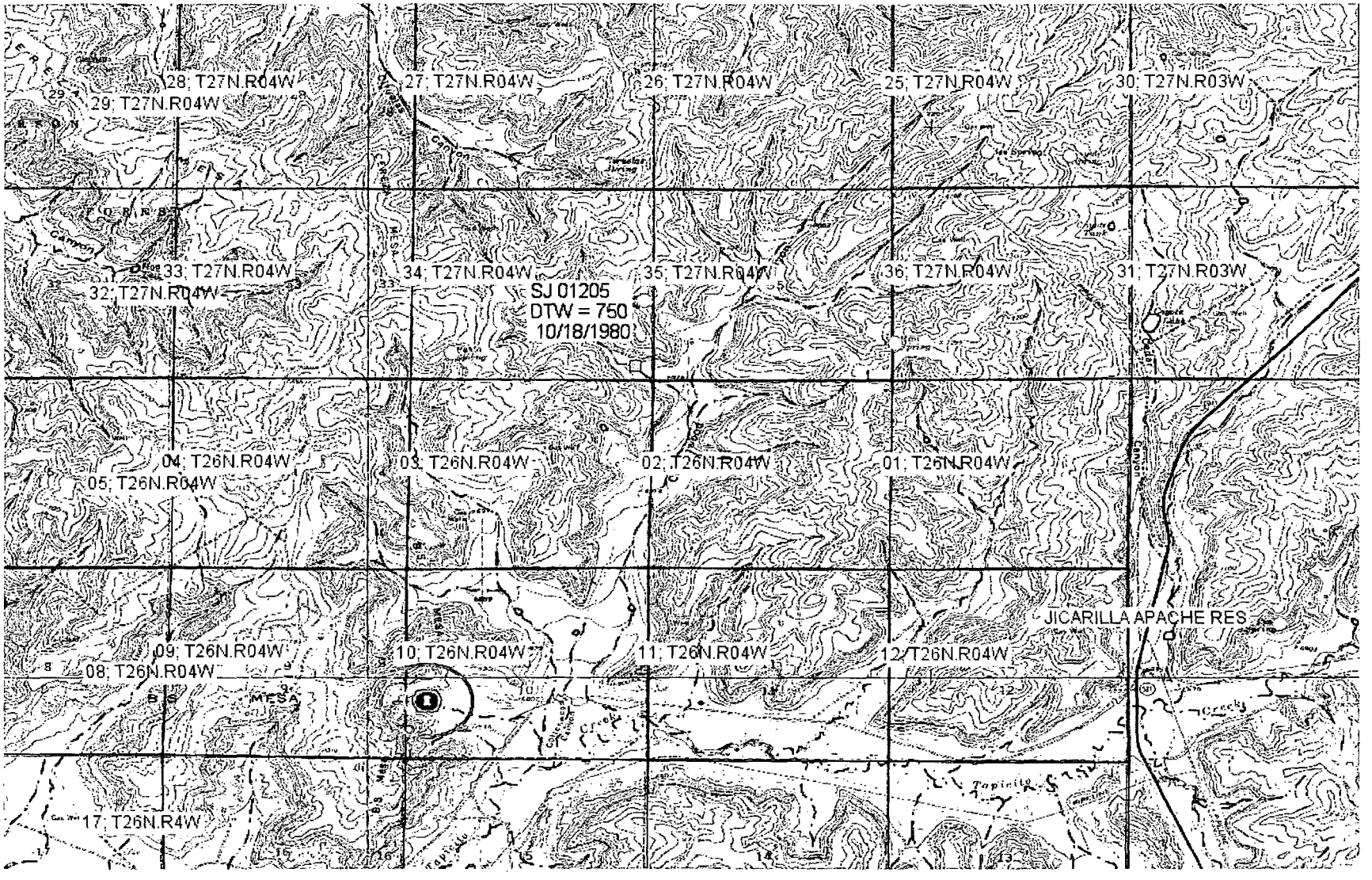


Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - TOPO	Figure: #01
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

Appendix 02

Ground Water Depth



Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - OSE Water Wells	Figure: #02
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

New Mexico Office of the State Engineer
Point of Diversion Summary

	(quarters are 1=NW 2=NE 3=SW 4=SE) (quarters are smallest to largest)						(NAD83 UTM in meters)	
POD Number	**Q64**	**Q16**	**Q4**	**Sec**	**Tws**	**Rng**	**X**	**Y**
SJ 01205	4	4	4	34	27N	04W	300255	4044335*

Driller License: AZTEC WELL SERVICING CO. INC.

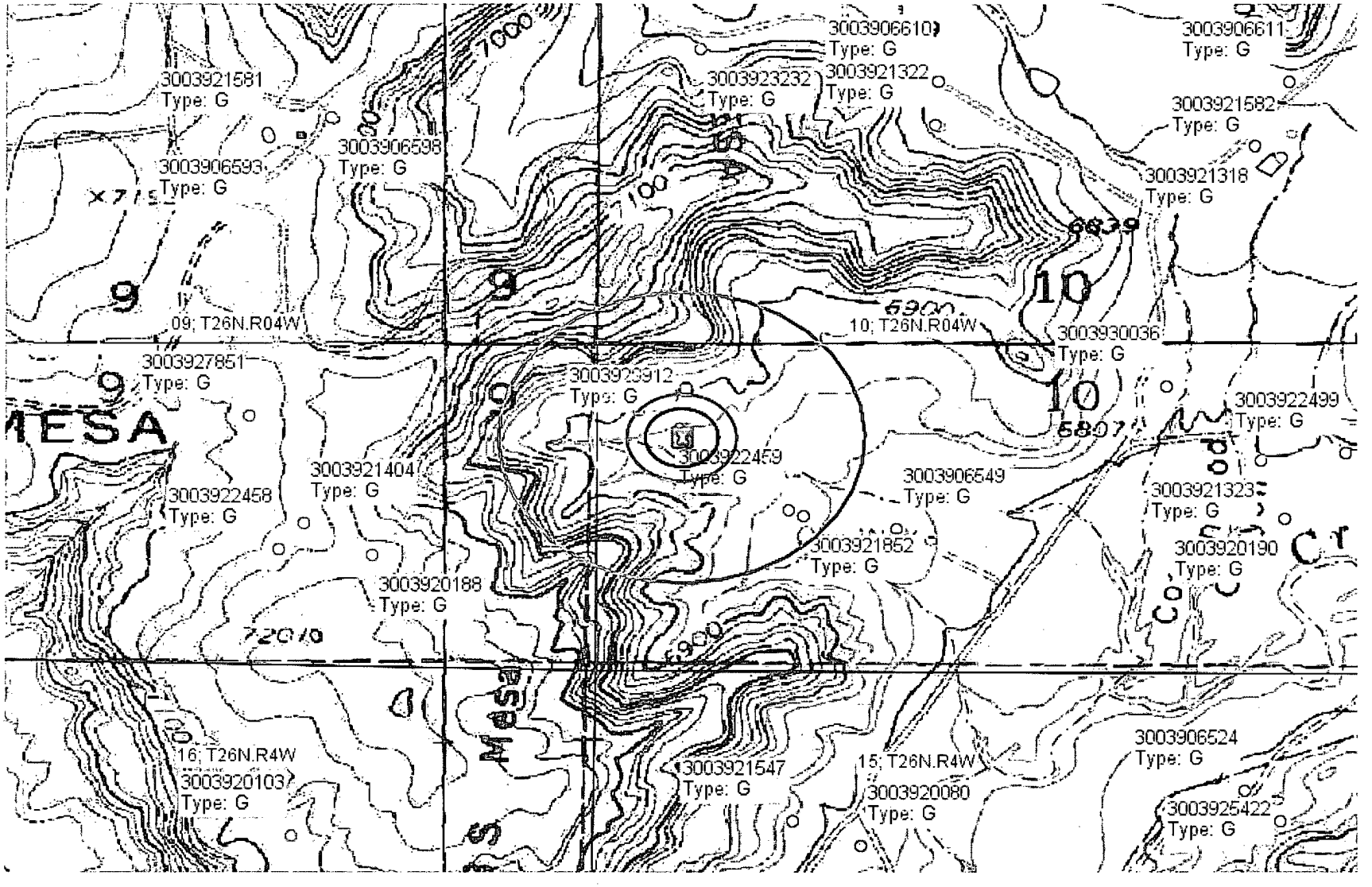
Driller Name: SANDEL, JERRY

Drill Start Date:	10/18/1980	**Drill Finish Date:**	10/25/1980	**Plug Date:**	
Log File Date:	11/20/1980	**PCW Rcv Date:**	12/22/1980	**Source:**	Artesian
Pump Type:	SUBMER	**Pipe Discharge Size:**	2	**Estimated Yield:**	
Casing Size:	7.63	**Depth Well:**	3054 feet	**Depth Water:**	750 feet

Water Bearing Stratifications:	**Top**	**Bottom**	**Description**
	892	3004	Sandstone/Gravel/Conglomerate

Casing Perforations:	**Top**	**Bottom**
	792	3004

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



Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - Offset Wells	Figure: #02A
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

Form 9-331
Dec. 1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR
AMOCO PRODUCTION COMPANY

3. ADDRESS OF OPERATOR
501 Airport Drive, Farmington, NM 87401

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 1110' FSL x 1065' FWL
AT TOP PROD. INTERVAL: Same
AT TOTAL DEPTH: Same

5. LEASE
Jicarilla Apache 102

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Jicarilla Apache

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
Jicarilla Apache 102

9. WELL NO.
11E

10. FIELD OR WILDCAT NAME
Basin Dakota

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA SW¼, SW¼
Section 10, T26N, R4W

12. COUNTY OR PARISH
Rio Arriba

13. STATE
NM

14. API NO.
30-039-22459

15. ELEVATIONS (SHOW DF, KDB, AND WD)
6839' GL

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Spud and set casing			

(NOTE: Report results of multiple completion or zone change on Form 9-330.)

RECEIVED
SEP 15 1980
U. S. GEOLOGICAL SURVEY
FARMINGTON, N. MEX.
OIL CON. COM.
DIST. 3

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Spuded a 13 1/2" hole on 8-4-80, and drilled to 296'. Set 9 5/8" 32.3# surface casing at 290' on 8-5-80, and cemented with 315 sx of class "B" neat cement containing 2% CaCl2. Good cement was circulated to the surface. Drilled a 8 3/4" hole to a depth of 3850'. Set 7" 20.0# intermediate casing on 8-8-80 at 3850', and cemented with 610 sx of class "B" cement containing 50:50 POZ, 6% gel, 2# medium tuf plug per sack, and .8% fluid loss additive. This was tailed in with 100 sx of class "B" neat cement. Good cement was circulated to the surface. Drilled a 6 1/4" hole to a TD of 7982'. Set a 4 1/2" production casing at 7975' on 8-17-80, and cemented with 400 sx of class "B" cement containing 50:50 POZ, 6% gel, 2# medium tuf per sack, and .8% fluid loss additive. This was tailed in with 175 sx of class "B" neat cement. Good cement was circulated to the surface. The rig was released on 8-17-80.

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED E. E. SVOBODA TITLE Dist. Adm. Supvr. DATE 9-10-80

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

ACCEPTED FOR RECORD
SEP 15 1980
FARMINGTON DISTRICT
BY _____

NMOCC

*See Instructions on Reverse Side

Form 9-331
Dec. 1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR
AMOCO PRODUCTION COMPANY

3. ADDRESS OF OPERATOR
501 Airport Drive Farmington, NM 87401

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.) 1070' FSL x 1150 FWL, Section 10,
AT SURFACE: T-26-N, R-4-W
AT TOP PROD. INTERVAL: Same
AT TOTAL DEPTH: Same

5. LEASE
Jicarilla Apache 102

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Jicarilla Apache

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
Jicarilla Apache 102

9. WELL NO.
31

10. FIELD OR WILDCAT NAME
B. S. Mesa Gallup

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA SW/4 SW/4 Section 10, T-26-N, R-4-W

12. COUNTY OR PARISH: Rio Arriba
13. STATE: NM

14. API NO.
30-039-21852

15. ELEVATIONS (SHOW DF, KDB, AND WD)
6839' GL, 6852' KB

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Drill & Set Casing			

(NOTE: Report results of multiple completion or zone change on Form 9-330.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Spudded 13-3/4" hole on 10/11/78. Drilled to 298'. Ran 9-5/8", H-40, 32# casing. Set at 294'. Cemented with 270 sx Class "B", 2% $CaCl_2$. Circulated good cement. Pressure tested to 800 psi. Reduced hole to 8-3/4" and drilled to 3800'. Ran 7", K-55, 23# casing. Set at 3800'. Cemented with 500 sx Class "B" 50:50 Poz, 6% gel, 2# Tuf Plug per sx. Followed with 100 sx Class "B" Neat. Pressure tested to 1000 psi. Reduced hole to 6-1/4". Drilled to 7397'. Ran 4-1/2", 11.6#, P-110 casing. Landed at 7397'. Cemented with 740 sx Class "B" 50:50 Poz, 6% gel, 2# Tuf Plug per sx. Followed with 100 sx Class "B" Neat. Partial returns.

Rig released on 10/21/78.

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED _____ TITLE Dist. Adm. Supvr. DATE 10/23/78

(This space for Federal or State office use)

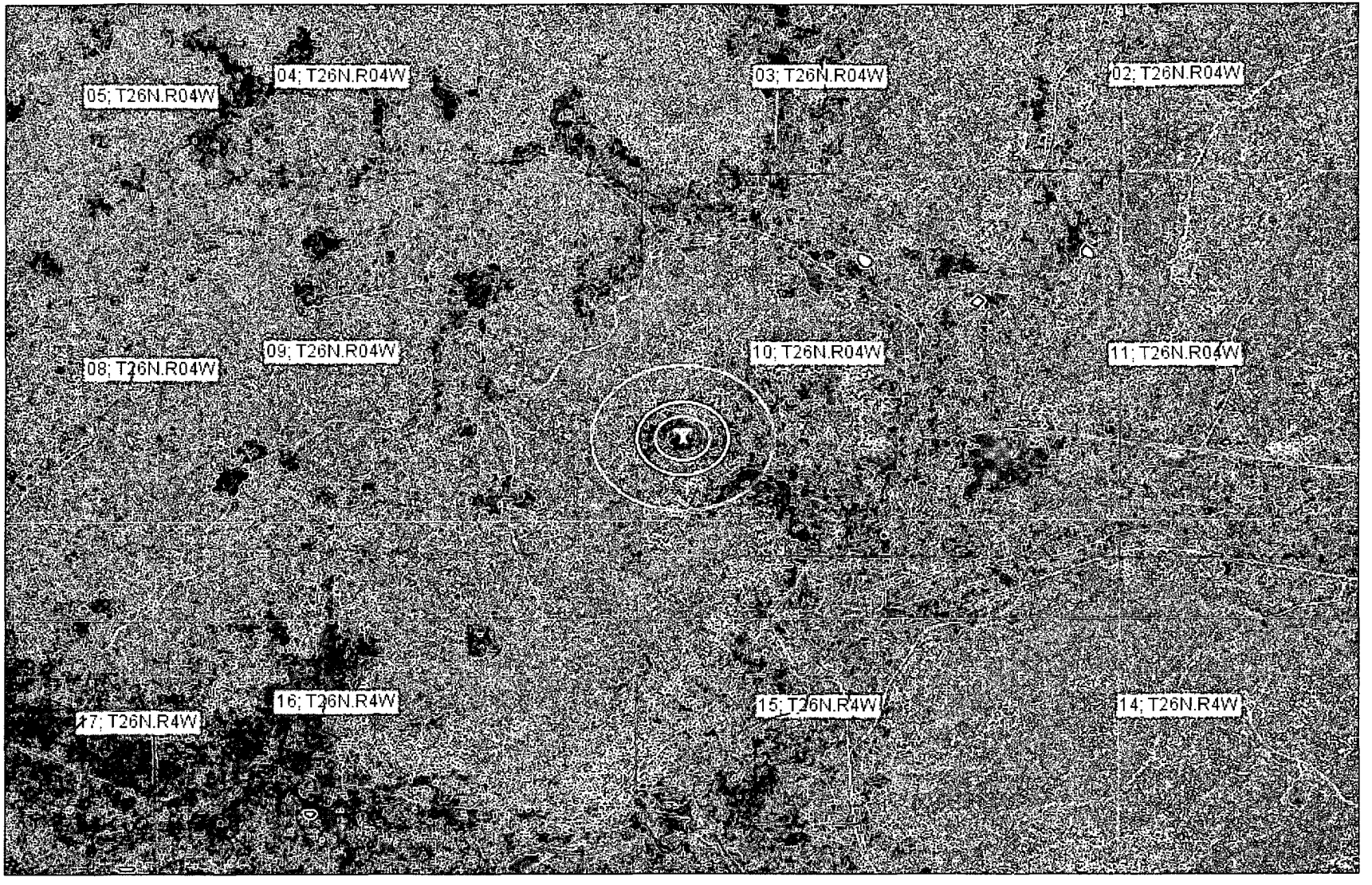
APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

RECEIVED
OCT 24 1978
U. S. GEOLOGICAL SURVEY

*See Instructions on Reverse Side

Appendix 03

Aerial Photo

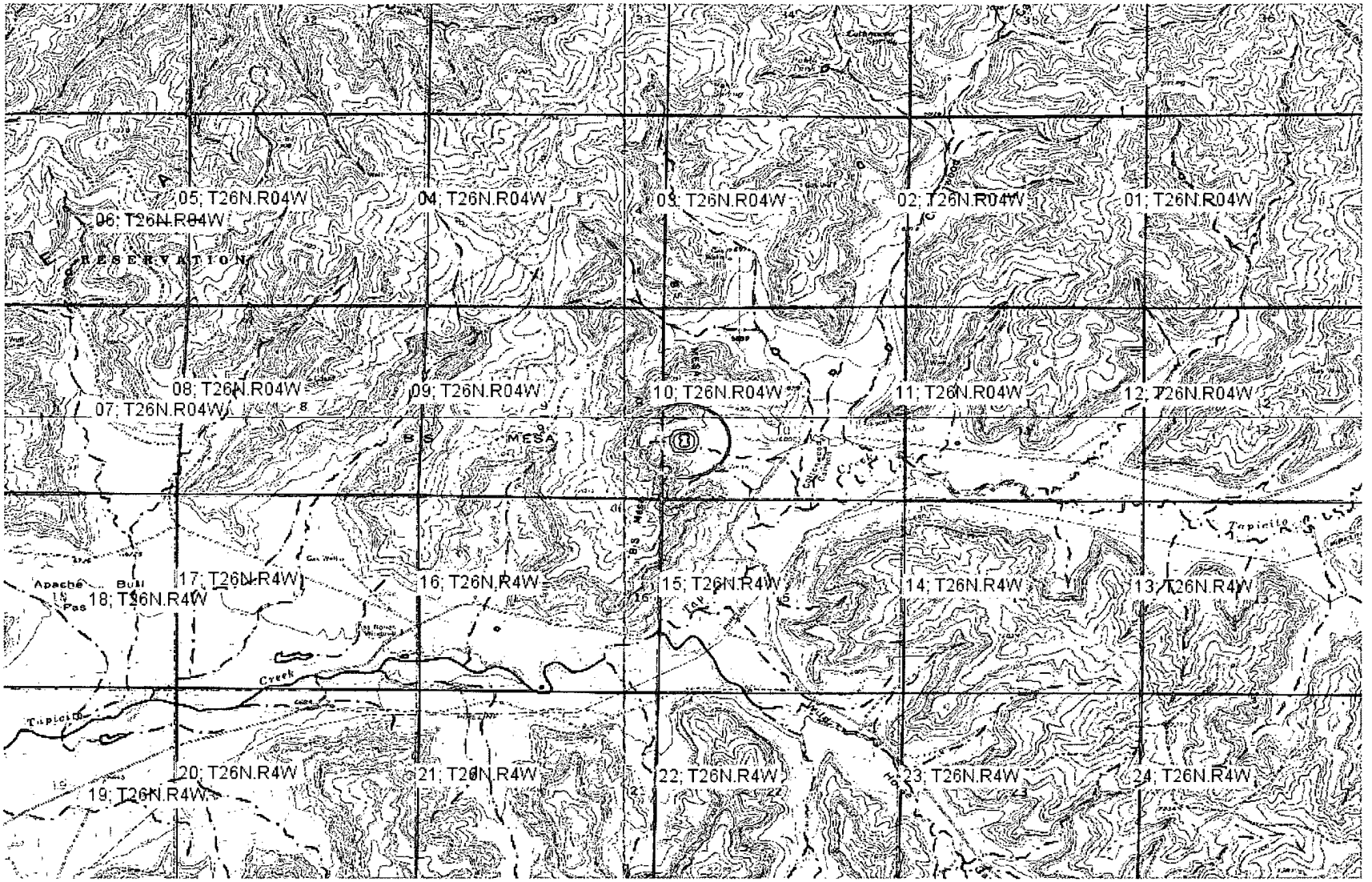


Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - Aerial View	Figure: #03
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

Appendix 04

Municipality Boundary Map



Distance (ft): 200 300 500 1000

0 2000 4000ft

N W E S

Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - Municipalities	Figure: #04
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

Appendix 05

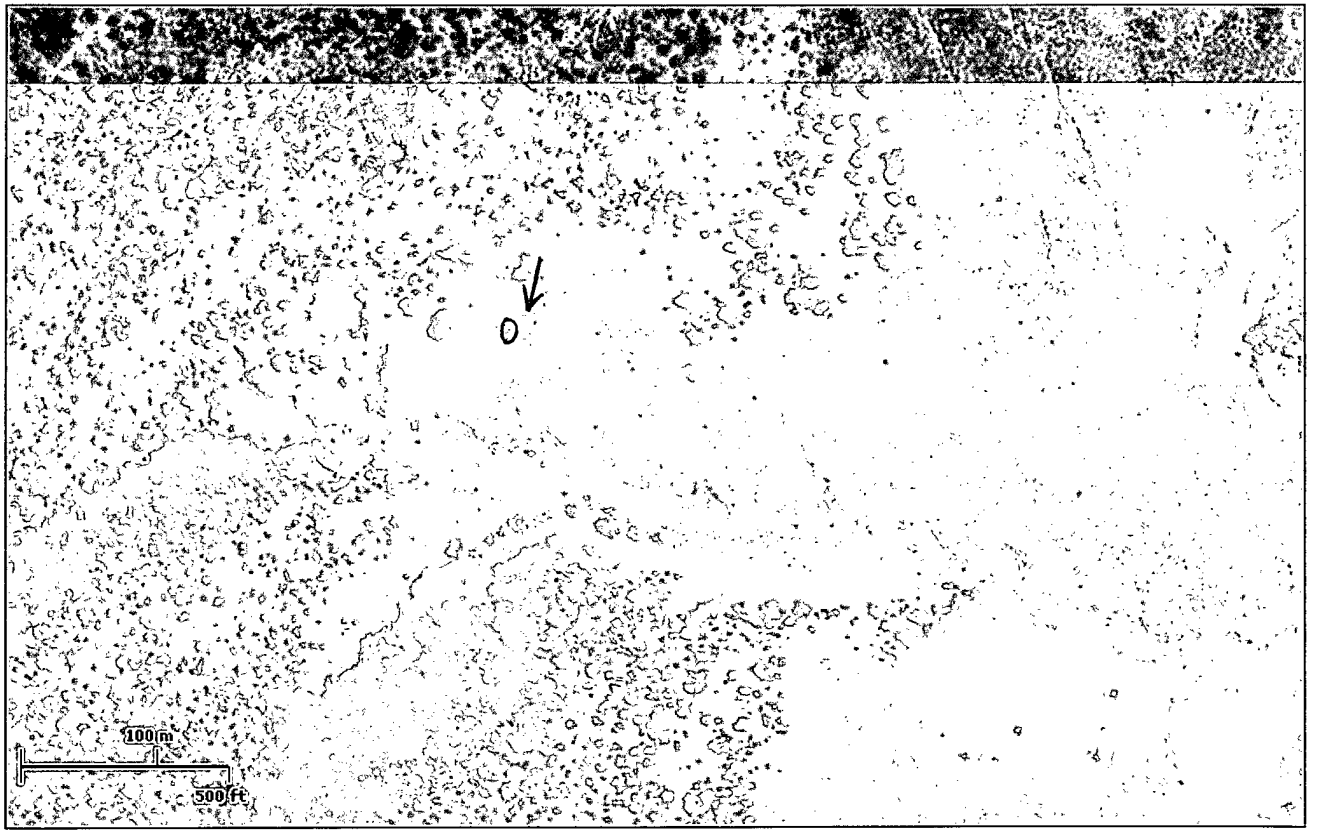
U.S. Fish & Wildlife Wetland Identification Map

U.S. Fish and Wildlife Service

National Wetlands Inventory

Jicarilla 102 #11M

Mar 24, 2011



Wetlands

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

Status

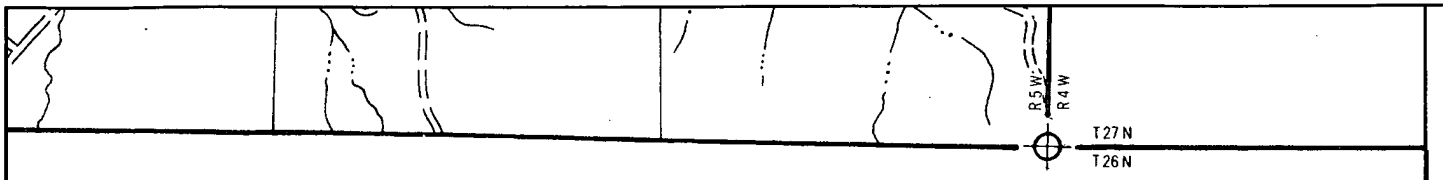
- Digital
- Scan
- Non-Digital
- No Data

User Remarks:

36.498200, -107.246211

Appendix 06

FEMA 100-year Floodplain Map



Jicarilla Apache 102 Lease
Floodplain maps not available

Jicarilla Apache Indian Reservation

UNSTUDIED AREA

N

APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

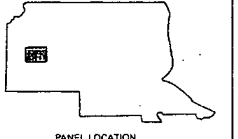
FLOOD INSURANCE RATE MAP

RIO ARRIBA COUNTY, NEW MEXICO

UNINCORPORATED AREAS

PANEL 550 OF 1325

(SEE MAP INDEX FOR PANELS NOT PRINTED)



PANEL LOCATION

COMMUNITY-PANEL NUMBER

350049 0550 B

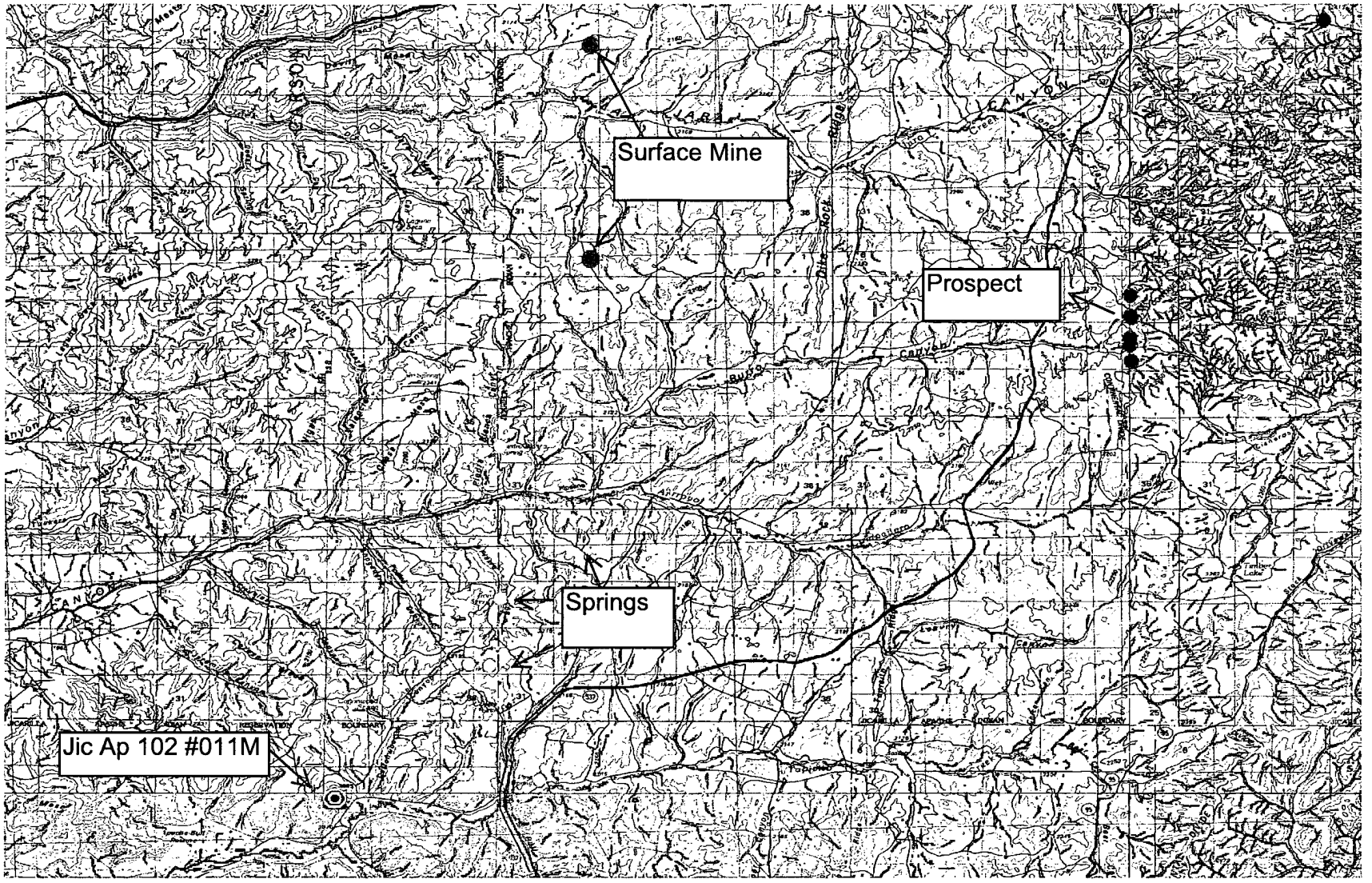
EFFECTIVE DATE:

JANUARY 5, 1989

Federal Emergency Management Agency

Appendix 07

Mines, Mills, & Quarires Map



Distance (ft): 200 300 500 1000

0 2 4mi

N W E S

Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - Mines, Mills, Quarries	Figure: #07
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

Appendix 08

C-203 Location Plat
Site Physical Inspection Sheet

ENERVEST OPERATING LLC

Below Grade Tank
Observed Sitting Requirements

Lease Name & Well Number: 102 11 Y1

API No.:

Observed by: LEE GARDNER

Date Observed: 3-17-11

Latitude: 36.498200

Longitude: 107.346211 EL 6886

MEASURED FROM THE BELOW-GRADE TANK:	Yes	No	If not within limits, explain:
Continiously flowing water course > 300 ft.	X		
Significant Watercourse, lakebed, sinkhole or playa lake > 200 feet	X		
Permanent Residence > 200 feet	X		
School > 200 feet	X		
Hospital > 200'	X		
Institution or Church > 200'	X		
Private, domestic fresh water well or spring > 500 feet	X		
Any other fresh water well or spring > 1000 feet	X		
Within incorporated municipal boundary of defined municipal fresh water field		X	
Wetland area > 500 feet	X		
Overlying a subsurface mine		X	

Distance to watercourse or dry wash should be to nearest edge

Please include distance & direction to all waterwells and/or wetland areas

Each Below-Grade Tank needing to be permitted, needs a visual inspection of the above Criteria as per Rule 19.15.17.10

RCVD FEB28'07
OIL CONS. DIV.
DIST. 3

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240

DISTRICT II
1301 W. Grand Ave., Artesia, N.M. 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410

DISTRICT IV
1220 South St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

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

RECEIVED
070 FARMINGTON NM

Form C-102
Revised June 10, 2003
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
30-039- 29912	72319/71599	Blanco Mesaverde/Basin Dakota

[4] Property Code	[5] Property Name	[6] Well Number
33455	JICARILLA Apache 102	11M

[7] OGRID No.	[8] Operator Name	[9] Elevation
222374	CDX RIO, LLC	6884

[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
L	10	26-N	4-W		1668	SOUTH	468	WEST	RIO ARRIBA

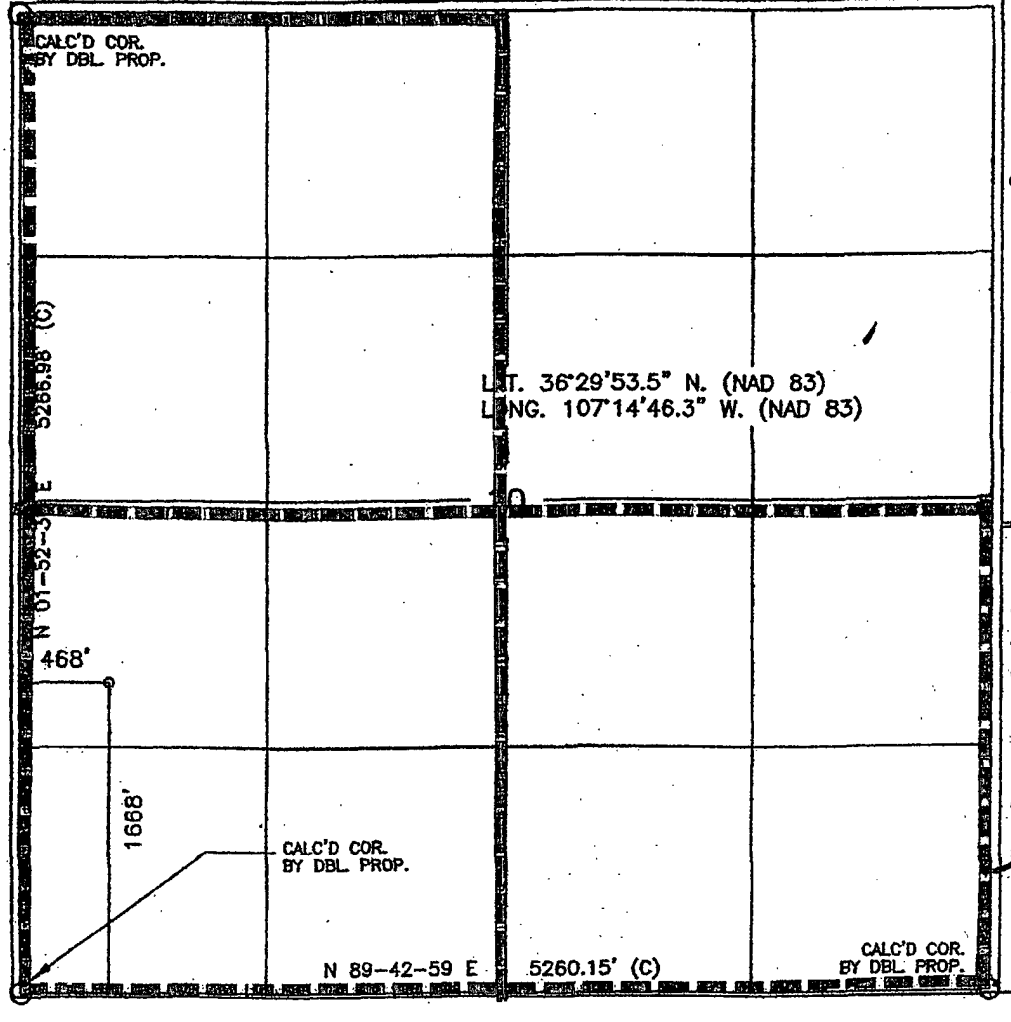
[11] Bottom Hole Location If Different From Surface

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.
MV – S/320 DK – W/320	Y		NSL-5396

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]



[17] OPERATOR CERTIFICATION

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

Richard Corcoran
Signature

Richard Corcoran
Printed Name

Land Manager rich.corcoran@cdxgas.com
Title

5-15-06
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.

SEPTEMBER 11, 2005
Date of Survey

Signature and Seal of Professional Surveyor:

JOHN A. VUKONICH
NEW MEXICO
14831
REGISTERED PROFESSIONAL SURVEYOR

14831
Certificate Number

4. CASING AND CEMENTING DESIGN:

Casing Program:

Hole Size	Depth	Casing Size
12 ¼"	250'	9 5/8"
8 ¾"	3967' +/- Lewis seat	7"
6 ¼"	8000'	4 1/2"

Csg Size	Casing Type	Top (MD)	Bottom (MD)	Wt. (lb./ ft)	Grade	Thread	Condition
9-5/8"	Surface	0'	250'	36.0	J55	STC	New
7"	Intermediate	0'	3967' +/-	23.0	N80	LTC	New
4 ½"	Prod Liner	3847'	8000'	11.6	N80	LTC	New

Casing Data				Collapse (psi)	Burst (psi)	Min. Tensile (Lbs.)
OD	Wt/Ft	Grade	Thread			
9-5/8"	36.0 lbs.	J55	STC	2,020	3,520	394,000
7"	23.0 lbs.	N80	LTC	3,830	6,340	442,000
4 1/2"	11.6 lbs.	N80	LTC	6,350	7,780	223,000

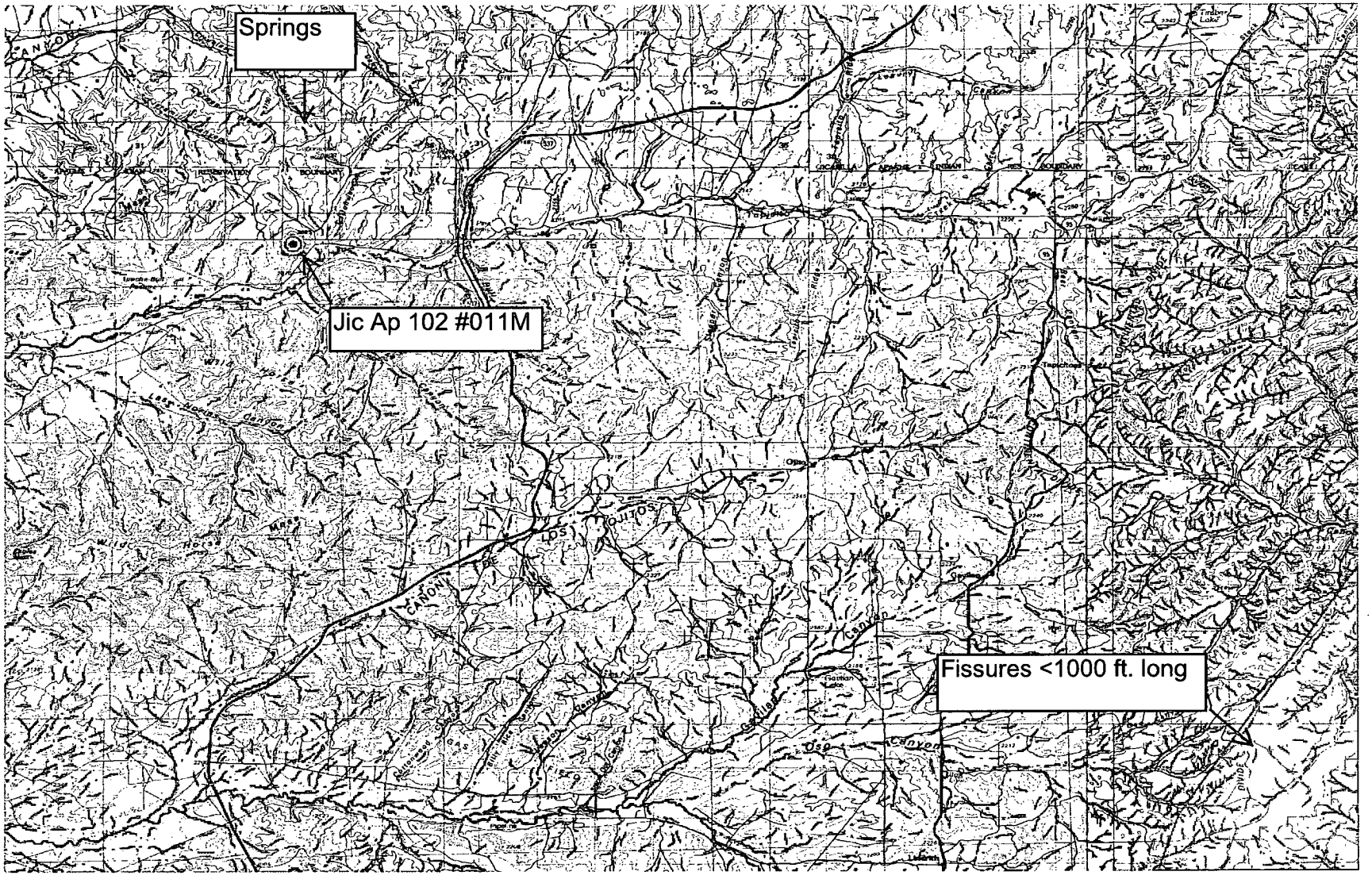
MINIMUM CASING DESIGN FACTORS:

COLLAPSE: 1.125
BURST: 1.00
TENSION: 1.80

Area Fracture Gradient Range:	0.7 – 0.8 psi/foot
Maximum anticipated reservoir pressure:	2,500 psi
Maximum anticipated mud weight:	9.0 ppg
Maximum surface treating pressure:	3,500 - 3,750 psi

Appendix 09

Karst Map



Petroleum Recovery Research Center	Jicarilla Apache 102 #011M - Karst	Figure: #09
	UL L, Sec. 10, 26N, 04W	Mar 21, 2011

API 30-039-29912

REFERENCES

Wetland Map:
U. S. Fish and Wildlife Service
National Wetlands Inventory
Wetlands Mapper
www.fws/gov/wetlands/data/mapper

Floodplains map:
Federal Emergency Management Agency
National Flood Insurance Program
FIRM (Flood Insurance Rate Map)
Map Service Center
http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1

Depth to Ground Water: Individual water well documentation.
State of New Mexico
Office of the State Engineer
New Mexico Water Rights Reporting System
http://www.ose.state.nm.us/waters_db_index.html

Subsurface Mines:
EMNRD
Mining & Minerals Division
Mines, Mills & Quarries Commodity Group
http://www.emnrd.state.nm.us/MMD/index.htm

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

Base Maps:
Petroleum Recovery Research Center
PRRC PitRule Web Mapping Portal
USGS Topo
TerraServer – US
www.pitrule.source3.com

Section VI

Temporary Drill Pit

Design & Construction Plan

ENERVEST OPERATING, LLC (EV)

TEMPORARY PIT
Design and Construction Specifications

Rule 19.15.17.11 NMAC

In accordance with the above mentioned rule, EV submits this design and construction program for all EV locations where a Temporary Pit is required. This will be our plan for all Temporary Pits unless a special condition warrants. In that case another plan will be submitted for that particular Temporary Pit.

1. EV will design and construct an approved Temporary Pit to fit the particular well it is designed to accommodate. It will contain liquids and solids from the drilling of that particular well only and should prevent contamination of fresh water and protect public health, and the environment.

2. Any topsoil disturbed in the building of the location pad will be stockpiled on location for later use in restoring the site.

3. All Temporary Pits will be located on pad sites for drilling wells and EV will insure signage on location is in full compliance with 19.15.16.8 NMAC.

4. EV is requesting permission to use the same fencing diagram as approved for our below-grade tanks. This is a 4' hog wire fence with 2 strands barbed-wire on top in lieu of the required 4 strand barbed-wire fence. This will be supported by iron posting at the corners and 10 – 12 feet apart. It is our belief this will offer better protection for wildlife around these pits. Temporary Pits will be fenced at all times excluding drilling or workover operations, when the front side will be temporarily removed for operational purposes.

5. EV will construct the Temporary Pit to insure the foundation and interior slopes are firm and free of rocks, debris, sharp objects to prevent liner failure.

6. EV will construct the Temporary Pit so that the slopes are no steeper than two horizontal feet to one vertical foot (2H:1V).

7. The walls of the Temporary Pit will be walked down by a crawler type tractor following construction to insure proper solidity.

8. All Temporary Pits will be lined with a 20-mil, reinforced LLDPE liner, or equivalent liner material that the division district office approves, complying with EPA SW-846 method 9090A requirements. The liner shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions, and shall be resistant to ultraviolet light.

9. Geotextile will be installed beneath the liner where rocks, debris, sharp objects cannot be avoided.

10. All liners will be anchored in the bottom of a compacted earth-filled trench at least 18 inches deep.

11. EV will minimize liner seams and orient them up and down, not across a slope. EV will use factory welded seams where possible, but where field seaming is required we shall overlap liners four to six inches and orient seams parallel to the liner of maximum slope and use qualified personnel to perform field seaming. EV will minimize the number of field seams in corners and irregularly shaped areas.

12. The liner shall be protected from any fluid force or mechanical damage through the use of mud pit slides, or a manifold system.

13. The Temporary Pit shall be protected from run-off by constructing and maintaining diversion ditches or berms around the location or around the perimeter of the pit, if necessary.

14. The volume of the Temporary Pit shall not exceed 10-acre-feet, including freeboard.

15. Temporary blow pits will be constructed to allow gravity flow to discharge into lined drill pit.

16. The lower half of the blow pit (nearest lined pit) will be lined with a 20-mil, string reinforced, LLDPE liner. The upper half of the blow pit will remain unlined as allowed in Rule 19.15.17.11.F.11.

17. EV will not allow freestanding liquids to remain on the unlined portion of a Temporary Pit used to vent or flare gas.

Section VII

Temporary Drill Pit

Operation & Maintenance Plan

ENERVEST OPERATING, LLC (EV)

TEMPORARY PIT
Maintenance and Operation Specifications

Rule 19.15.17.12 NMAC

In accordance with the above mentioned rule, EV submits this maintenance and operation program for all EV locations where a Temporary Pit is required. This will be our plan for all Temporary Pits unless a special condition warrants. In that case another plan will be submitted for that particular Temporary Pit.

1. EV will operate and maintain a Temporary Pit to contain liquids and solids and maintain the integrity of the liner and liner system to prevent contamination of fresh water and protect public health and the environment.

2. EV will conserve drilling fluids by transferring liquids to pits ahead of the rigs whenever possible. All other drilling fluids will be disposed of at:

TNT Land Farm	Permit #NM-01-0008
Aqua Moss	Permit #247130

3. EV will not discharge or store any hazardous waste in any Temporary Pit.

4. If any pit liner's integrity is compromised, or if any penetration of the liner occurs above the liquids surface, EV will notify the appropriate division district office by phone or e-mail within 48 hours of the discovery. EV will repair the damage or replace the liner.

5. If a leak develops below the liquid's level, EV shall remove all liquids above said leak within 48 hours and repair the damage or replace the liner. EV shall notify the appropriate district office by phone or e-mail within 48 hours of the discovery for leaks less than 25 barrels. EV shall notify the appropriate district office as required as per Subsection B of 19.15.3.116 NMAC shall be reported within 24 hours of discovery of leaks greater than 25 barrels. In addition, immediate verbal notification as per 19.15.3.116 B (1) (d) shall be reported to the division's Environmental Bureau Chief.

6. The liner shall be protected from any fluid force or mechanical damage through the use of mud pit slides, or a manifold system.

7. The Temporary Pit shall be protected from run-off by constructing and maintaining diversion ditches around the location or around the perimeter of the pit in some cases.

8. EV will immediately remove any visible layer of oil from the surface of the Temporary Pit after cessation of a drilling or workover operation. Oil absorbent booms will be stored on-site until closure of Temporary Pit for this purpose.

9. Only fluids generated during the drilling or workover process may be discharged into a Temporary Pit.

10. EV will maintain the Temporary Pit free of miscellaneous solid waste or debris.

11. EV shall inspect the Temporary Pit at least daily while the drilling or workover rig is on site. Thereafter, EV shall inspect the Temporary Pit weekly, so long as liquids remain in the Temporary Pit. EV shall maintain a log of all inspections and file a copy of this log with the appropriate division district office when the Temporary Pit is closed.

12. EV will maintain at least two feet of freeboard for a Temporary Pit.

13. EV shall remove all free liquids from a Temporary Pit within 30 days from the date the operator releases the drilling rig.

14. EV shall remove all free liquids from a Cavitation Pit within 48 hours after completing cavitation. EV may request additional time to remove liquids from the appropriate division district office if it is not feasible to remove liquids within 48 hours.

ENERVEST OPERATING, LLC (EV)

TEMPORARY PIT
Closure Specifications

Rule 19.15.17.13 NMAC

In accordance with the above mentioned rule, EV submits this closure program for all EV locations where a Temporary Pit is required. This will be our plan for all Temporary Pits unless a special condition warrants. In that case another plan will be submitted for that particular Temporary Pit.

All closure activities will include proper documentation and be available for review upon request and will be submitted to the appropriate division district office within 60 days of closure of all Temporary Pits. Closure report will be filed on OCD Form C-144 and will include the following:

- Details on Capping and Covering, where applicable
- Plat Plan (Pit Diagram)
- Inspection Reports
- Sampling Results
- OCD Form C-105
- Copy of Deed Notice filed with County Clerk, where applicable

1. EV shall notify the surface owner by certified mail, return receipt requested that we plan to close a Temporary Pit. Evidence of mailing of this notice to the surface owner shall be as in the county tax records.

2. EV shall notify the appropriate division district office verbally or by other means at least 72 hours, but not more than one week, prior to closing a Temporary Pit. Such notice will include the location to be closed by unit letter, section, township and range, well name and number, and appropriate API number of the well on which the Temporary Pit exists.

3. EV shall remove all free standing liquids at the start of the closure process for all division approved Temporary Pits. Such liquids will be disposed of in an approved facility or they shall be reclaimed in a manner that the appropriate division office approves. The facilities to be used will be:

   TNT Land Farm Permit #NM-01-0008
   Aqua Moss Permit #247130

4. Within 6 months of the date the rig is released, EV will ensure that the associated temporary pit is closed, re-contoured, and reseeded.

5. Liner of Temporary Pits shall be removed above "mud Level" after stabilization. Removal of liner will consist of manually or mechanically cutting liner at mud level and removing all remaining liner. Care will be taken to remove all of liner. All, if any, excessive liner will be disposed of at:

   San Juan Regional Landfill Permit #SWM 052426

6. Pit contents shall be mixed with non-waste containing, earthen material in order to achieve of natural drying and mechanically mixing. Pit contents will be mixed with non-waste, earthen material to a consistency that is deemed a safe and stable. The mixing ratio shall not exceed 3 parts clean soil to 1 part pit contents.

7. A five point composite sample will be taken of the pit using sampling tools and all samples tested per 19.15.17.13(B)(1)(b) NMAC. In the event that the criteria are not met, all contents will be handled per 19.15.17.13 (B)(1)(a).

Sample	Determined By:	Maximum Limit
Benzene	EPA SW-846 method 8021B or 8260B	0.2 mg/kg
BTEX	EPA SW-846 method 8021B or 8260B	50 mg/kg
TPH	EPA SW-846 method 418.1 *	2500 mg/kg
GRO & DRO combined	EPA SW-846 method 8015M	500 mg/kg
chlorides	EPA method 300.1	500 mg/kg **

* or other EPA method that the division approves
** or the background concentration, whichever is greater

8. Upon completion of solidification and testing standards being passed, the pit area will be backfilled with compacted, non-waste containing, earthen material. A minimum of four feet of fill at the site to include one foot of topsoil, or the background thickness of topsoil, whichever is greater. If standard testing fails, EV will dig and haul all contents as per 19.15.17.13. After doing such, confirmation sampling will be conducted to ensure a release has not occurred.

9. During the stabilization process, if the liner is ripped by equipment the appropriate district office will be notified within 48 hours and the liner will be repaired if possible. If the liner cannot be repaired, then all contents will be excavated and removed.

10. Dig and Haul Material will be transported to:

TNT Land Farm	Permit # NM-01-0008
Environtech Land Farm	Permit # NM-01-0011
Aqua Moss	Permit # 247130

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

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

13. EV shall seed the disturbed areas the first growing season after the operator closes the pit. Seeding will be accomplished via drilling on the contour whenever practical or by other federal lands. Vegetative cover will equal 70% of the native perennial vegetative cover (unimpacted) consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintain that cover through two successive growing seasons. Repeat seeding or planting will be contoured until successful vegetative grown occurs.

TYPE	VARIETY OR CULTIVATOR	PLS/A
Western Wheatgrass	Arriba	3.0
Indian Ricegrass	Paloma or Rimrock	3.0
Slender Wheatgrass	San Luis	2.0
Crested Wheatgrass	Hy-Crest	3.0
Bottlebrush Squirreltail	Unknown	2.0
Four-wing Saltbrush	Delar	0.25

Species shall be planted in pounds of pure live seek per acre:
Present Pure Live Seed (PLS) = Purity x Germination/100
Two lots of seed can be compared on the basis of PLS:

	Source 1	Source 2	
	(poor quality	(Better quality)	
Purity	50 %	80%	
Germination	40%	63%	
Percent PLS	20%	50%	

14. The Temporary Pit will be located with a steel marker, no less than four inches in diameter, cemented in a hole three feet deep in the center of the onsite burial upon the abandonment of all the wells on the pad. The marker will be flush with the ground to allow access of the active well pad for safety concerns. The marker will include a threaded collar to be used for future abandonment. The top of the marker will contain a welded steel 12" square plate that indicates the onsite burial of the temporary pad. The plate will be easily removed and a four foot tall riser will be threaded into the top of the collar marker and welded around the base with the operators information at the time of all wells on the pad are abandoned. The operator's information will include the following: Operator Name, Lease Name, Well Name, and number, Unit Number, Section, Township, Range and an indicator that the marker is an onsite burial location.

Appendix 10

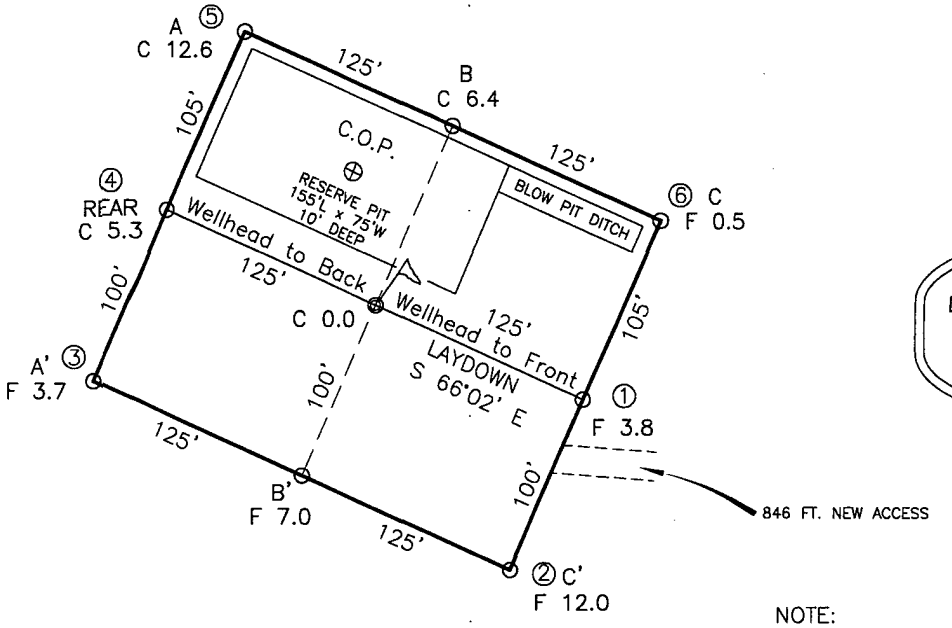
Temporary Drill Pit

Design Plat

ENERVEST OPERATING, L.L.C.
JICARILLA 102 No. 11M, 1668 FSL 468 FWL
SECTION 10, T26N, R4W, N.M.P.M., RIO ARRIBA COUNTY, N.M.
GROUND ELEVATION: 6884', DATE: SEPTEMBER 13, 2005

WELL FLAG

NAD 83
LAT. = 36.49820° N
LONG. = 107.24619° W
NAD 27
LAT. = 36°29'53.48" N
LONG. = 107°14'44.13" W

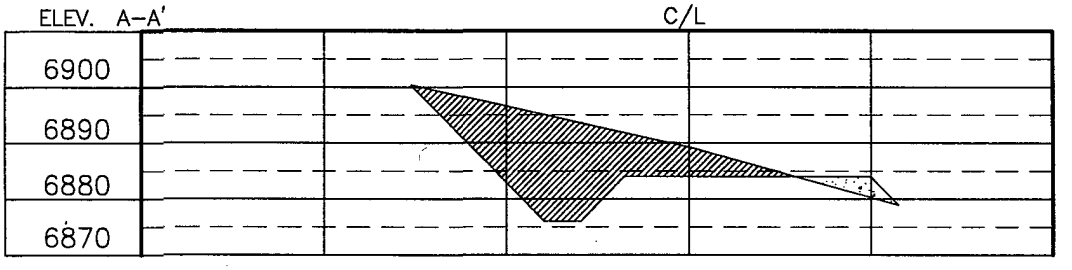


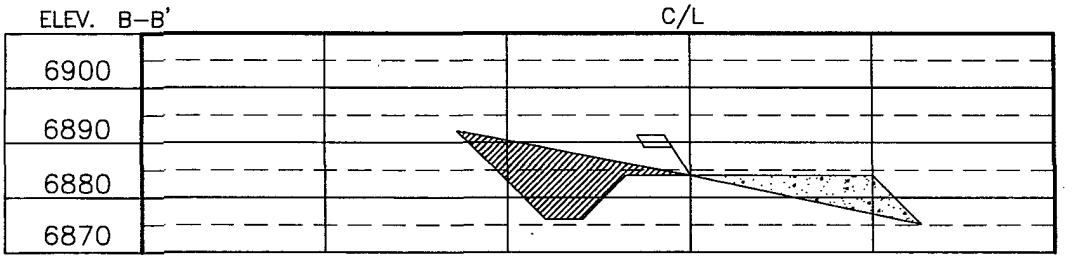
CENTER OF PIT

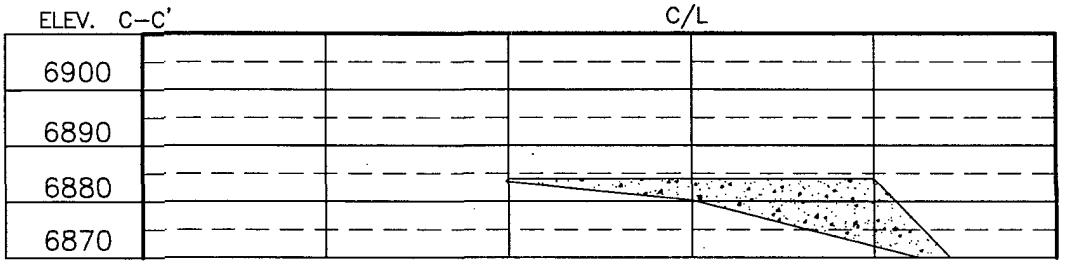
NAD 83
LAT. = 36.49839° N
LONG. = 107.24623° W
NAD 27
LAT. = 36°29'54.15" N
LONG. = 107°14'44.26" W

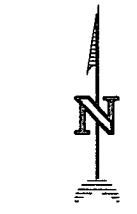
NOTE:

DAGGETT ENTERPRISES, INC. IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES. NEW MEXICO ONE CALL TO BE NOTIFIED 48 HOURS PRIOR TO EXCAVATION OR CONSTRUCTION.









0 50 100
SCALE: 1"=100'

NOTE: CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED BURIED PIPELINES OR CABLES ON WELL PAD AND OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

REVISION: OPERATOR NAME CHANGE & CADFILE NAME CHANGE
DATE: 03/28/11
REVISED BY: G.V.

Daggett Enterprises, Inc.
Surveying and Oil Field Services
P. O. Box 510 -Farmington, NM 87499
Phone (505) 326-1772 - Fax (505) 326-6019
NEW MEXICO L.S. No. 8894

DRAWN BY: A.G.
CADFILE: EV085_CF8
DATE: 11/07/05
ROW#: EV085