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

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	1RP-5090
Facility ID	
Application ID	

INFORMATION ONLY

Release Notification

Responsible Party

Responsible Party Armstrong Energy Corporation	OGRID
Contact Name Kyle Alpers	Contact Telephone 575-623-2999
Contact email kalpers@aecnm.com	Incident # *(assigned by OCD)*
Contact mailing address PO Box 1973, Roswell NM 88202	

Location of Release Source

Latitude 32.622519 Longitude -103.475553

(NAD 83 in decimal degrees to 5 decimal places)

Site Name West Pearl Queen	Site Type abandoned
Date Release Discovered unknown	API# *(if applicable)*

Unit Letter	Section	Township	Range	County
B	32	19S	35E	Lea

Surface Owner: ☒ State ☐ Federal ☐ Tribal ☐ Private (*Name:*)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☒ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☒ Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☒ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release		

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	1RP-5090
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☒ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release? Unknown amount of fluid released, most likely more than 25 bbls released
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? No, this was a historical spill that was acquired by Armstrong	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☒ The source of the release has been stopped.

☒ The impacted area has been secured to protect human health and the environment.

☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.

☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Ronald D Hillman_____ Title: Vice President_____

Signature: _____ Date: 6/12/2018_____

email: rhillman@aecnm.com_____ Telephone: 505-625-2222_____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	1RP-5090
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	>100 (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☒ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
☒ Field data
☒ Data table of soil contaminant concentration data
☒ Depth to water determination
☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
☐ Boring or excavation logs
☐ Photographs including date and GIS information
☒ Topographic/Aerial maps
☒ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	1RP-5090
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Jennifer Knowlton Title: Regional Manager – Permian

Signature: Jennifer Knowlton Date: 10/31/2018

email: jknowlton@hrlcomp.com Telephone: 505-238-3588

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	1RP-5090
Facility ID	
Application ID	

Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

☒ Detailed description of proposed remediation technique
☒ Scaled sitemap with GPS coordinates showing delineation points
☒ Estimated volume of material to be remediated
☒ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
☒ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.

☐ Extents of contamination must be fully delineated.

☒ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Jennifer Knowlton Title: Regional Manager – Permian

Signature: Jennifer Knowlton Date: 10/31/2018

email: jknowlton@hrlcomp.com Telephone: 505-238-3588

OCD Only

Received by: _____ Date: _____

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	1RP-5090
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☐ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☐ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date**:** _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date**:** _____

Printed Name: _____ Title: _____

HRL COMPLIANCE SOLUTIONS
P.O. Box 1708 • Artesia, NM 88211
www.hrlcomp.com

1RP-5090

SUBJECT: REMEDIATION PLAN FOR THE West Pearl Queen Injection Site, LEA COUNTY, NEW MEXICO

On behalf of Armstrong Energy Corporation, HRL Compliance Solutions, Inc (HRL) has prepared this remediation plan that describes the assessment, characterization, and proposed remediation for a release associated with the West Pearl Queen Injection Site. The site is in Unit B, SECTION 32, TOWNSHIP 19S, RANGE 35E, NMPM, Lea County, New Mexico, on State land.

Site Assessment/Characterization

An assessment of surrounding water well information identifies no water wells within the same section as the West Pearl Queen Injection Site. Given the variability of the water wells located nearest the location, HRL contracted with Atkins Engineering to provide a more robust depth to groundwater determination. Depth to groundwater at this site is estimated to be greater than 100 feet at the location. This information is illustrated in Attachment A: Depth to Water Map and Report - Atkins Engineering Report. Attachment E to the Atkins Report is a very large file and is available upon request.

As illustrated in Attachment B site maps, there are no features of concern identified within proximity of the site. There is no flowing watercourse or significant watercourse within 300 feet of this location. There is no lakebed, sinkhole, or playa lake within 200 feet of this location. This location is not within 300 feet of an occupied permanent residence, school, hospital, institution, or church. This location is not within 500 feet of a spring or domestic freshwater well. This facility is not within incorporated municipal boundaries or within a defined municipal freshwater well field.

A desktop assessment of wetlands and springs was performed using USGS National Water Information System and verified utilizing a 7.5-minute topographical map. There are no identified wetlands within 300 feet of this location. There are no identified springs within 1000 feet of this location. This map is in Attachment B.

This facility is not within a 100-year floodplain as per FEMA. The applicable portion of the FEMA map is in Attachment B.

This location is not in an area identified as an unstable karst geology area. An area map generated with data from the USGS showing geologic units and structural features is in Attachment B.

Upon receiving clearance from the underground utility locate (811) on October 22, 2018, HRL field personnel assessed the impacted area. Samples were collected on 10/23/2018 to characterize the extent of impacts and calculate a volume of soil to be excavated for disposal with mechanical equipment. All samples were collected and analyzed at a National Environmental Laboratory Accreditation Program (NELAP) laboratory and in accordance with NMOCD soil sampling procedures. The samples were submitted to Cardinal Laboratory for analyses including chlorides by Method 4500, volatile organics (BTEX) by Method 8021B, and MRO, DRO, and GRO by EPA Method 8015M. Sample locations are depicted in Attachment C. All laboratory results are summarized in Table 1 with raw analytical reports included in Attachment D.

Table 1: Analytical Results Summary

West Pearl Queen								
Sample ID	Date	Chloride mg/Kg	Benzene mg/Kg	BTEX mg/Kg	GRO mg/kg	DRO mg/kg	MRO mg/kg	TPH mg/Kg
S1-10'	10/23/2018	128	ND	ND	ND	401	174	575
S2-10'	10/23/2018	1,170	ND	ND	ND	17.6	ND	17.6
S3-10'	10/23/2018	3,000	ND	ND	ND	ND	ND	ND
S4-10'	10/23/2018	608	ND	ND	ND	ND	ND	ND
E1-10'	8/23/2018	10,800	ND	ND	ND	105	18	123
E2-10'	8/23/2018	6,800	ND	ND	ND	178	43.7	221.7
E3-5'	8/23/2018	144	ND	ND	ND	ND	ND	ND
E3-7'	8/23/2018	288	ND	ND	ND	ND	ND	ND
E3-10'	8/23/2018	176	ND	ND	ND	ND	ND	ND
Center - 10'	8/23/2018	2,400	ND	ND	ND	ND	ND	ND
W1-10'	8/23/2018	2,640	ND	ND	ND	ND	ND	ND
W2-10'	8/23/2018	1600	ND	ND	ND	ND	ND	ND
W3-5'	8/23/2018	304	ND	ND	ND	55.9	ND	55.9
W3-7'	8/23/2018	720	ND	ND	ND	ND	ND	ND
W3-10'	8/23/2018	848	ND	ND	ND	ND	ND	ND
N-5'	8/23/2018	272	ND	ND	ND	ND	ND	ND

Closure Criteria Assessment

Closure Criteria		
Depth to Ground Water	**Constituent**	**Limit**
> 100 feet	Chloride	20,000 mg/kg
	TPH (GRO+DRO+MRO)	2,500 mg/kg
	BTEX	50 mg/kg
	Benzene	10 mg/kg

Deferral Request

This is a large, abandoned site with different types of contamination and thus different types of remediation are required. Armstrong is requesting to defer remediation of the remainder of the site except for the building sump which is addressed by this plan. Armstrong is pursuing alternative funding sources from the Oil Conservation Division and the State Land Office for financial assistance. Once resolution is obtained, Armstrong will submit an additional characterization/remediation plan and proceed with remediation and reclamation for the remainder of the location.

Remediation/Closure Plan

All analytical results from characterization samples collected are below the closure criteria in Table 1 indicating the area does not require further remediation. There are two concrete pylons in this sump. Per communication with the State Land Office, Armstrong can bury clean concrete with four feet of clean top soil. The pylons will be removed and broken up. Some of the concrete will be disposed of in an appropriate land fill. The remainder of the clean concrete will be buried in the excavated sump and covered with a minimum of four feet of clean soil. Composite confirmation samples will be collected and analyzed from the side walls and bottom of the excavated area after the pylons are removed. If these results are below closure criteria, the sump area will be backfilled.

Deferral of Reclamation

Armstrong is requesting deferral of reclamation of this portion of the site until the entire site can be reclaimed per State Land Office regulation.

If there are any questions regarding this report, please contact Jennifer Knowlton at 505-238-3588.

Submitted by:
HRL Compliance Solutions, Inc

Jennifer Knowlton
Regional Manager - Permian

Attachments:

Attachment A: NMOSE Depth to Water Map and Report
Atkins Engineering Report
Attachment B: Site Location Map
Wetlands Map
Floodplain Map
Karst Area Map
Attachment C: Sample Location Map
Attachment D: Laboratory Analytical Reports

Attachment A:

NMOSE Depth to Water Map and Report

West Pearl Queen Groundwater Report

Unit B of Section 32, Township 19 South, Range 35 East NMPM

Prepared for: HRL Compliance Solutions, Inc.

112 S. 6th Street

Artesia, NM 88210

September 5, 2018

Atkins ENGINEERING ASSOCIATES

Contents

Introduction 4

General Site Information 4

Triassic Redbed Mapping 5

Office of the State Engineering Records 7

NMWRRS Records 7

NMWRRS 19S 35E Section 28 7

NMWRRS 19S 35E Section 29 7

NMWRRS 19S 35E Section 30 7

NMWRRS 19S 35E Section 31 7

NMWRRS 19S 35E Section 32 7

NMWRRS 19S 35E Section 33 7

NMWRRS 20S 34E Section 01 7

NMWRRS 20S 34E Section 12 7

NMWRRS 20S 35E Section 04 7

NMWRRS 20S 35E Section 05 7

NMWRRS 20S 35E Section 06 8

NMWRRS 20S 35E Section 07 8

OSE Field Schedules 8

USGS Groundwater Records 8

OSE/USGS Record Discussion 10

20S 35E Section 04 10

20S 35E Section 05 10

20S 35E Section 06 10

Groundwater Analysis 11

Conclusions 12

References 13

Appendix A: Figures and Tables

Appendix B: NMWRRS Section Reports

Appendix C: OSE Well Records

Appendix D: OSE Field Schedules

Appendix E: Seismic Shothole Records by Section

Table 1: AOI PLSS Descriptions 4
Table 2: USGS Query 20S 34E 8
Table 3: USGS Query 19S 35E Sections 24- 9
Table 4: USGS Query 20S 35E Sections 1-7 9

Figure 1: Triassic RedBed Contours 5
Figure 2: Triassic Red Bed Elevation 6
Figure 3: Triassic Redbed Side View 6
Figure 4: Triassic Redbed versus Shothole LandSurface 6
Figure 5: Triassic Red Bed vs 1986 Water Level Elevation 11

Appendix A

Figure A1 Site and Area of Interest

Figure A2 AOI and Shothole Record Control

Figure A3 Site with Triassic RedBed Contours

Figure A4 Site and AOI versus Nicholson and Clebsch Mapping

Figure A5 Site with USGS Wells

Table A1 USGS Recording Well Data

Introduction

Atkins Engineering Associates, Inc (AEA) is pleased to submit this report on the groundwater conditions in support of HRL Compliance Solutions, Inc. (HRL) environmental efforts at the West Pearl Queen Site.

Shallow groundwater <100 feet is not expected to be encountered at the site. The first apparent water bearing strata will be the derived from the Triassic formation at depth. The alluvial thickness immediately under the site does not appear to be thick enough to support an aquifer. The nearest shallow alluvial water -bearing aquifer appears to be located above deeper eroded Triassic Red bed draws /troughs located approximately 1-1.5 miles south of the site.

General Site Information

The West Pearl Queen Site (site) is in the NE/4NW/4NE/4 (Unit B) of Section 32, Township 19 South, Range 35 East NMPM with a general coordinate of 32.622643°, -103.475816°. The general land surface elevation of the site is 3736 feet above mean sea level from the USGS topographic map.

The site falls in the Pearl Oil Field southwest of the Mescalero Escarpment or Ridge in what Nicholson Jr and Clebsch Jr (1961) call the Laguna Valley. This area is "covered entirely by dune sand which is stable or semi-stable over most of the area, but which locally drifts…The sand is generally underlain by Recent alluvium but in several places the sand forms topographic highs where it is underlain by a caliche surface." Underlying these quaternary age deposits, are tertiary Ogallala units and below that are Triassic red beds–Chinle followed by Santa Rosa Sandstone. These red-beds are eroded surfaces forming troughs with increasing thicknesses of alluvial fill.

To review the site conditions, AEA generated an area of interest (AOI) of a 3x3 mile grid centered on the Site section. After the preliminary review of shothole and well records, the AOI was expanded to include the E/2 of Section 1 and the NE/4 of Section 12 both in Township 20S, Range 34 East and the N/2 of Section 7, Township 20S, Range 35E, NMPM. This expansion helped refine the apparent red bed trough and water bearing alluvial area to the south and west of the original AOI. The following table summarizes the PLSS descriptions of the expanded AOI. See Figure A1.

Table 1: AOI PLSS Descriptions

Subdivision	Section
All	19S 35E 028
All	19S 35E 029
All	19S 35E 030
All	19S 35E 031
All	**19S 35E 032**
All	19S 35E 033
E/2	20S 34E 001
NE/4	20S 34E 012
All	20S 35E 004
ALL	20S 35E 005
ALL	20S 35E 006
N/2	20S 35E 007

Triassic Redbed Mapping

AEA researched seismic shothole records stored at the District II Office of the State Engineer (OSE). These legacy oil field exploration records were used by the OSE to generate red bed mapping throughout Southeastern New Mexico.

Using the PLSS descriptions AEA plotted the approximate location of the shotholes. Duplicate records in comparable PLSS locations were averaged with regards to land surface and Triassic red bed elevations. A total of 198 shotholes were plotted in the AOI (Figure A2). Coordinate geometry was generated from ARCGIS and together with the tabulated land surface and Triassic red bed elevations, a grid using kriging methods was generated.

This grid was converted to contours which are shown in the Figure below. Additionally, these contours were exported to ESRI shapefiles and plotted in ARCGIS. Figure A3 (Appendix A) shows the shothole points, and contours of the Triassic redbed in the AOI.

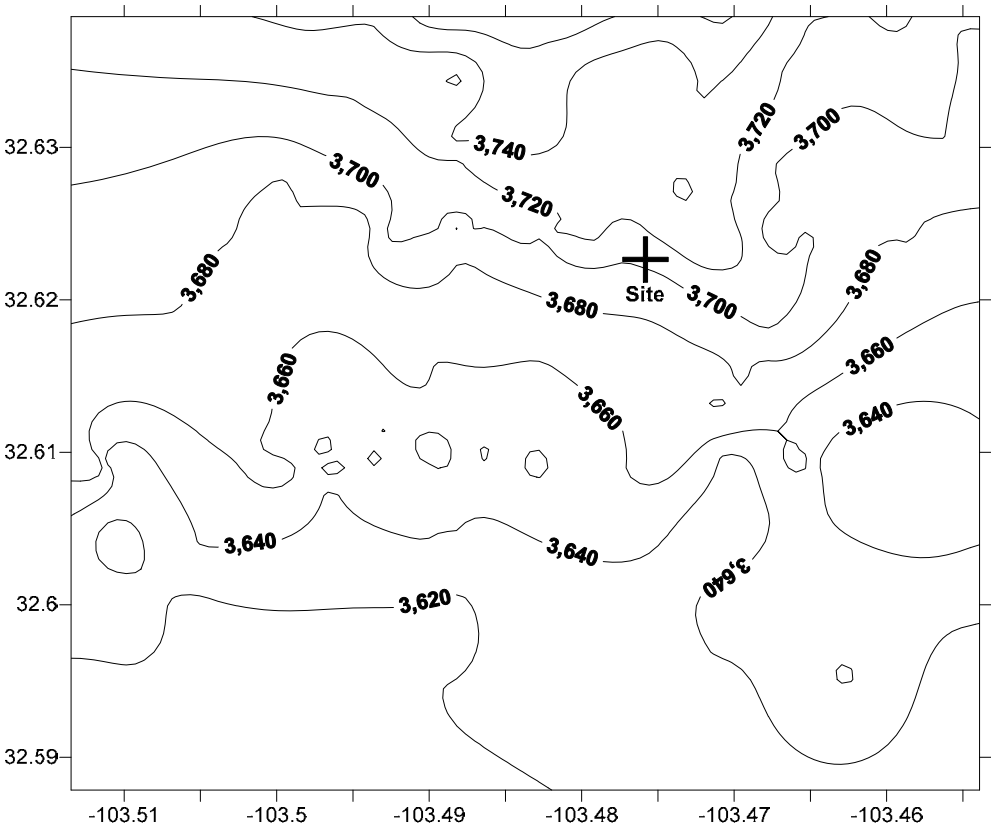


Figure 1: Triassic RedBed Contours

The nearest shothole record labeled 94 and 95 on Figure A2 show depths to the clay at 35 and 25 feet respectively. These are both located north of the site at slightly higher land surface elevations being 3739 and 3737 feet respectively. Shothole records are found in Appendix E.

Three dimensional models of the contoured data are provided in the following figures.

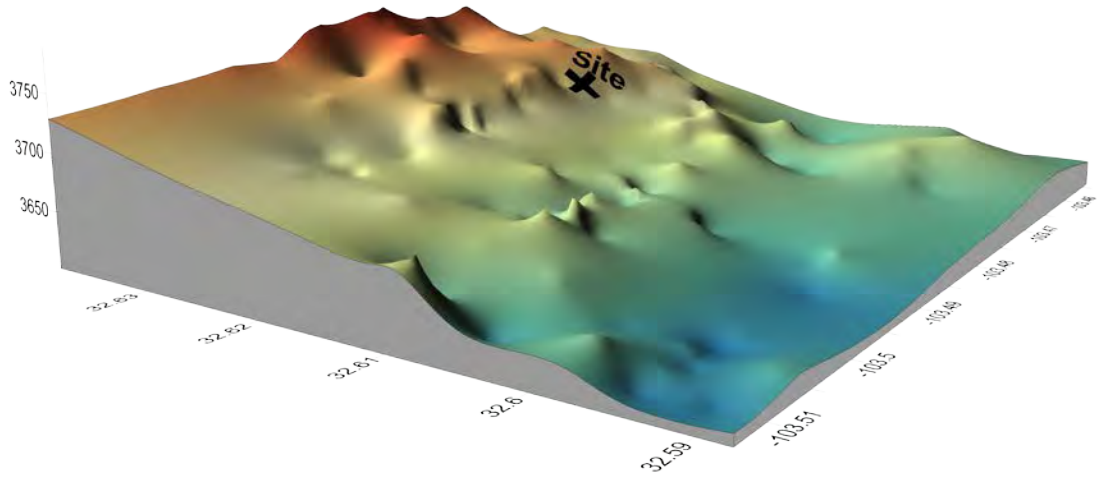


Figure 2: Triassic Red Bed Elevation

In general, the land surfaces dips toward the south, and the Triassic red beds are higher in elevation in the north section of the AOI with an apparent red bed trough in the southern/southwestern reaches of the AOI.

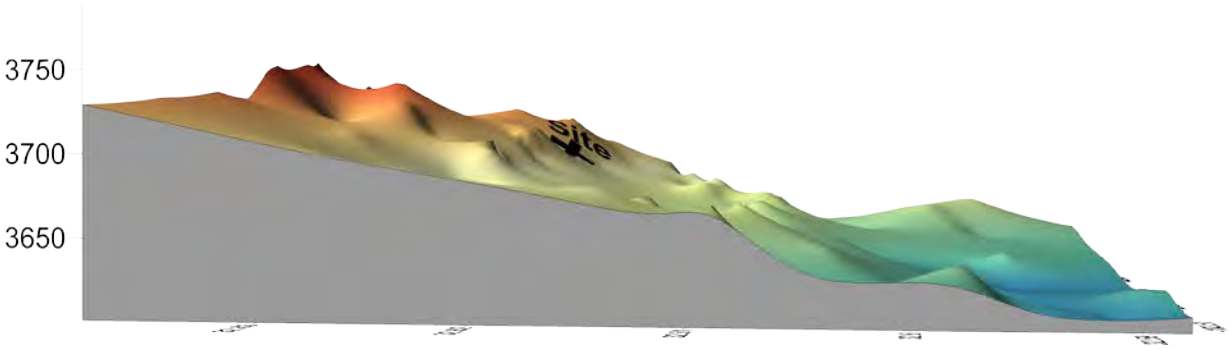


Figure 3: Triassic Redbed Side View

The shothole records land surface elevation were also gridded and contoured to provide a reference three-dimensional figure.

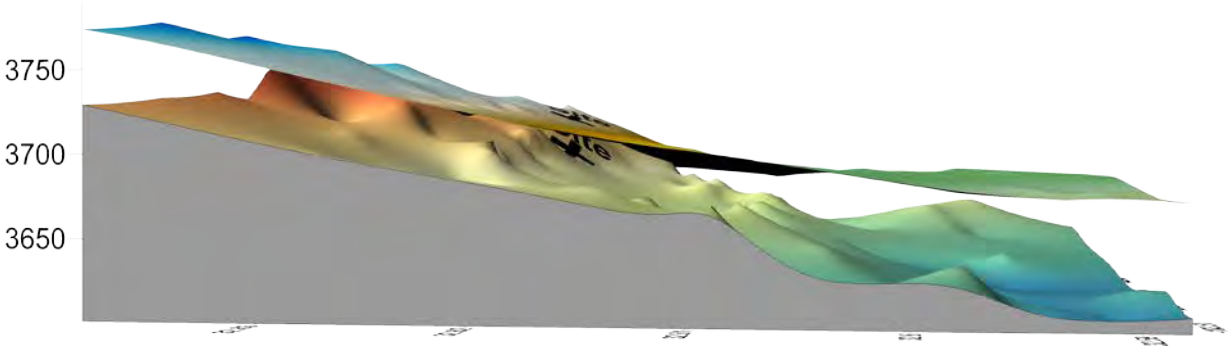


Figure 4: Triassic Redbed versus Shothole LandSurface

Office of the State Engineering Records

NMWRRS Records

AEA reviewed the Office of the State Engineer (OSE) New Mexico Water Rights Reporting System (NMWRRS) located online at http://nmwrrs.ose.state.nm.us/nmwrrs/wellSurfaceDiversion.html

A point of diversion query for each of the AOI sections was run. Copies of each of the NMWRRS reports are in Appendix B, and the section below discuss the results of the searches.

NMWRRS 19S 35E Section 28

No Points of diversion reported.

NMWRRS 19S 35E Section 29

No points of diversion reported.

NMWRRS 19S 35E Section 30

One point of diversion entry reported being RA-12222. This is a mis-entry in the NMWRRS as permit RA-12222 were five (5) exploratory wells permitted by AEA for a soil investigation in the Roswell Artesian Basin. The borings were in Section 30 of Township 19S, Range 25E not Range 35E.

NMWRRS 19S 35E Section 31

No points of diversion reported.

NMWRRS 19S 35E Section 32

No points of diversion reported.

NMWRRS 19S 35E Section 33

No points of diversion reported.

NMWRRS 20S 34E Section 01

No points of diversion reported

NMWRRS 20S 34E Section 12

One point of diversion reported in the SE/4 SE/4 which is not in the AOI.

NMWRRS 20S 35E Section 04

One point of diversion, L-04627, was located. Well L-04627 is a stock well located in the NE/4NE/4 of Section 4, Township 20S, Range 35E NMPM and listed as being owned by Thelma A. Linam. This well was permitted in 1961, though the permit indicates the well was drilled prior to that date. No well record or log was entered in NMWRRS.

NMWRRS 20S 35E Section 05

One point of diversion, L-04158, was located. Well L-4158 is a stock well permitted and drilled in 1959 at a point in the NE/4 SE/4 of Section 5, Township 20S, Range 35E NMPM. The owner is listed as Virgil Linam. A well record was available on NMWRRS and indicates the well was drilled to a total depth of 70 feet with a water level on completion at 64 feet. The log indicates the red bed was encountered at 68 feet. A copy of the well log is in Appendix C.

NMWRRS 20S 35E Section 06

Two points of diversion– L-04157 and L-14097POD1– were located.

Well L-4157 is a stock well permitted and drilled in 1959 at a point in the SW/4 SW/4 of Section 6, Township 20S, Range 35E NMPM. The owner is listed as Virgil Linam. A well record was available on NMWRRS and indicates the well was drilled to a total depth of 70 feet with a water level on completion at 64 feet. The log indicates the red bed was encountered at 68 feet. A copy of the well log is in Appendix C.

Well L-14097 POD1 is a stock well permitted and drilled in 2016 at a point in the NW/4SW/4SW/4 of Section 6, Township 20S, Range 35E NMPM. The driller provided a coordinate of 32° 35' 50", -103° 30' 17". The log indicates the well was drilled to 61 feet with no static water level reported. A copy of the well log is in Appendix C.

NMWRRS 20S 35E Section 07

One permitted well reported that would fall in the N/2 of the Section, but no log submitted per the NMWRRS.

OSE Field Schedules

AEA reviewed its copies of OSE Field Schedules in the AOI. None of the sections of interest in Township 19S Range 35E had any field schedules. In Township 20S Range 34E no field schedules in the AOI were located. In Township 20S Range 35E, one field schedule was identified in each of Section 4,5, 6. One was found in Section 7 but is was south of the AOI.

Copies of the three OSE field schedules are found in Appendix D.

USGS Groundwater Records

AEA reviewed the U.S. Geologic Survey Groundwater levels database located at https://nwis.waterdata.usgs.gov/nm/nwis/gwlevels?search_criteria=county_cd&submitted_form=introduction

A query for all of Lea County was conducted and filtered by Townships with Sections in ascending order

Table 2: USGS Query 20S 34E

USGS	323529103332501	20S.34E.04.44434
USGS	323436103302802	20S.34E.12.443
USGS	323436103302801	20S.34E.12.44333
USGS	323409103321301	20S.34E.14.13343
USGS	323345103351101	20S.34E.17.33442
USGS	323336103322501	20S.34E.22.222333
USGS	323109103323801	20S.34E.34.43421

No USGS wells were in Section 1, Township 20S Range 34E and the two entries in Section 12 are not in the AOI.

Table 3: USGS Query 19S 35E Sections 24-

USGS	323855103294001	19S.35E.19.21110
USGS	323832103264901	19S.35E.22.14341
USGS	323808103265701	19S.35E.22.33423
USGS	323808103265601	19S.35E.22.334234
USGS	323855103245101	19S.35E.24.12111
USGS	323838103242001	19S.35E.24.24131
USGS	323905103240501	19S.35E.24.222143
USGS	323828103240701	19S.35E.24.422222
USGS	323727103240701	19S.35E.25.42442
USGS	323713103245601	19S.35E.25.434343
USGS	323721103262601	19S.35E.27.43241
USGS	323709103253701	19S.35E.35.211131
USGS	323725103253302	19S.35E.35.211131A

In Township 19S Range 35E, no observation wells were identified in any of the AOI sections of interest.

Table 4: USGS Query 20S 35E Sections 1-7

USGS	323640103242001	20S.35E.01.22124
USGS	323635103242001	20S.35E.01.22211
USGS	323529103242601	20S.35E.01.43443
USGS	323616103272401	20S.35E.04.22131
USGS	323545103285701	20S.35E.05.31424
USGS	323536103301101	20S.35E.06.331332
USGS	323440103291401	20S.35E.07.44420
USGS	323454103230601	20S.35E.07.44422

In Township 20S, Range 35E, a USGS observation well was found in each of Sections 4, 5 and 6. The USGS well in the Section 7 is in the SE quarter which is not in the AOI.

OSE/USGS Record Discussion

The following table summarizes the results of the OSE and USGS records searches.

Subdivision	Section	NMWRRS	OSE Field Schedule	USGS
All	19S 35E 028	0	0	0
All	19S 35E 029	0	0	0
All	19S 35E 030	1 (misplaced)	0	0
All	19S 35E 031	0	0	0
All	**19S 35E 032**	**0**	**0**	**0**
All	19S 35E 033	0	0	0
E/2	20S 34E 001	0	0	0
NE/4	20S 34E 012	0	0	0
All	20S 35E 004	1	1	1
ALL	20S 35E 005	1	1	1
ALL	20S 35E 006	2	1	1
N/2	20S 35E 007	1 (no Log)	0	0

In the Site Section of Interest, no points of diversion were identified across the sources. No points of diversion were reported in the adjoining sections to the North, East, and West. All three Sections to the immediate south reported wells and are discussed in more detail below.

20S 35E Section 04

One well was located across the sources. The sources all appear to reference the same well, being L-4627 located in the NE/4 NE/4 of said Section 4. The USGS database/OSE field schedule entries further refine the location of this well to the NW/4SW/4NW/4NE/4NE/4 of Section 4. For this well, six water level measurements from 1961-1986 were reported.

20S 35E Section 05

One or two unique wells were located across the sources. From NMWRRS, well L-4158 is located in the NE/4 SE/4 of said section 5. The USGS database/OSE field schedule entries suggest another Linam well located in the SW/4NE/4SE/4NW/4SW/4 of said Section 5. For this well, eight water level measurements from 1961-1996 were reported.

It is unclear whether well L-4158 is the same well as the USGS/Field Schedule well. So there may be two wells in this Section, both of which are in the S/2.

20S 35E Section 06

Two wells were located across the sources. Well L-4157 appears to be the well reported by NMWRRS and USGS/OSE Field schedules. These sources refine the location of the well to the NE/4SW/4SW/4NW/4SW/4SW/4 of said Section 6. For this well USGS reports six water level measurements between 1961-1996. The USGS entry for July 1991 does not match the OSE field schedule entry and is updated in the table located in Appendix A.

Well L-14097 POD1 was drilled in 2016 and does not appear in the USGS/OSE field schedule records. AEA contacted the well owner and he indicated the well went dry within a month or two after drilling.

Groundwater Analysis

Nicholson Jr and Clebsch Jr (1961) mapped the groundwater of Southern Lea County but the Site and the AOI for this report is outside any contoured aquifer (See Figure A4). The eastern edge ofthe AOI falls in a projected alluvial aquifer, but its contours are presumed with limited data points. That said, there are three USGS recording wells in each of the full Sections in the southern portions of the AOI.

To project the water level elevation across the southern portion of the AOI, the USGS wells were plotted using the USGS-provided Latitude and Longitude. The OSE field schedules used to populate the UGSS database were located and the land surface elevations given on those schedules were used because their vertical datums were consistent across those records. The most recent depth to water date in common, being April of 1986, was used to generate a grid and contour of water level elevation across the southern reach of the AOI.

The 1986 water level elevation contours are shown in Figure A5 in Appendix A. The following three-dimensional rendering shows the 1986 water level elevation versus the red bed mapping.

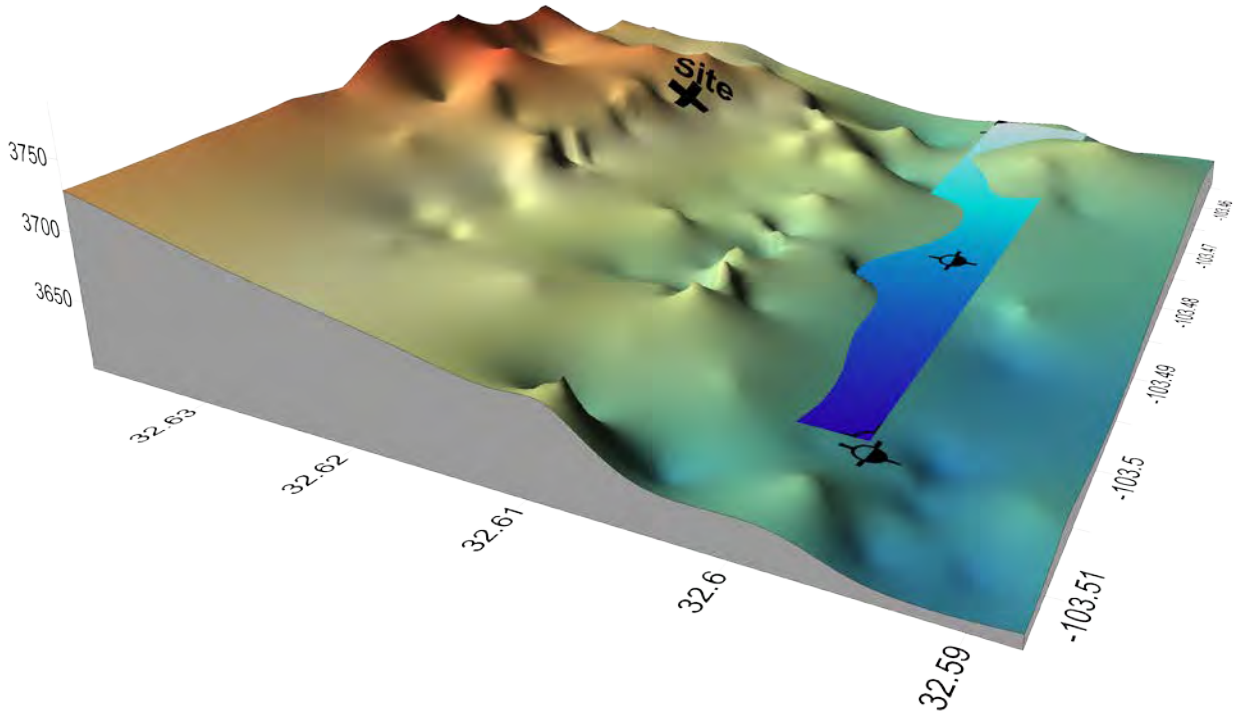


Figure 5: Triassic Red Bed vs 1986 Water Level Elevation

Conclusions

The red bed underneath the site are relatively close to land surface. No records of stock wells have been located in the Site Section of interest and the Sections to the north, west and east of the site. The lack of stock wells in a predominately ranching area strongly suggests that no shallow alluvial groundwater is to be found in the northern portion of the AOI. This is reinforced by the mapping of the red bed under the AOI which clearly rises close to land surface under the site and generally to the north.

The nearest apparent groundwater well is stock Well/USGS observation well 323545103285701 located 1.65 miles southwest of the site. The well has reported depths to water greater than 50 feet with a land surface elevation of 3,678 feet. This recording well sits approximately 58 feet lower than the Site at land surface.

Two more stock/USGS wells (2.4 miles to the southwest and 1.68 miles to the southeast of the site) provide a consistent water level elevation over time that when mapped together show a relatively shallow water bearing formation above the red bed to the south. Nevertheless, this apparent groundwater elevation clearly intersects the northern side of the mapped red bed trough well south of the Site. The east-west and southern limit of this apparent shallow groundwater bearing feature is beyond the scope of this report

Alluvial water underneath the site does not appear to exist. The next possible water bearing structure may be deep layers of sandstone sections that sometimes appear in the Chinle but more likely in the basal layer of the Dockum group being the Santa Rosa Sandstone. Groundwater underneath the site is anticipated to be at depths greater than 100 feet. The shallow red beds under the site provide an aquitard that well prevent/slow the migration of any surface release.

References

Nicholson Jr, Alexander and Clebsch Jr. Alfred (1961). Geology and Ground-Water Conditions in Southern Lea County, New Mexico.

USGS and OSE records as noted above

Appendix A: Figures and Tables

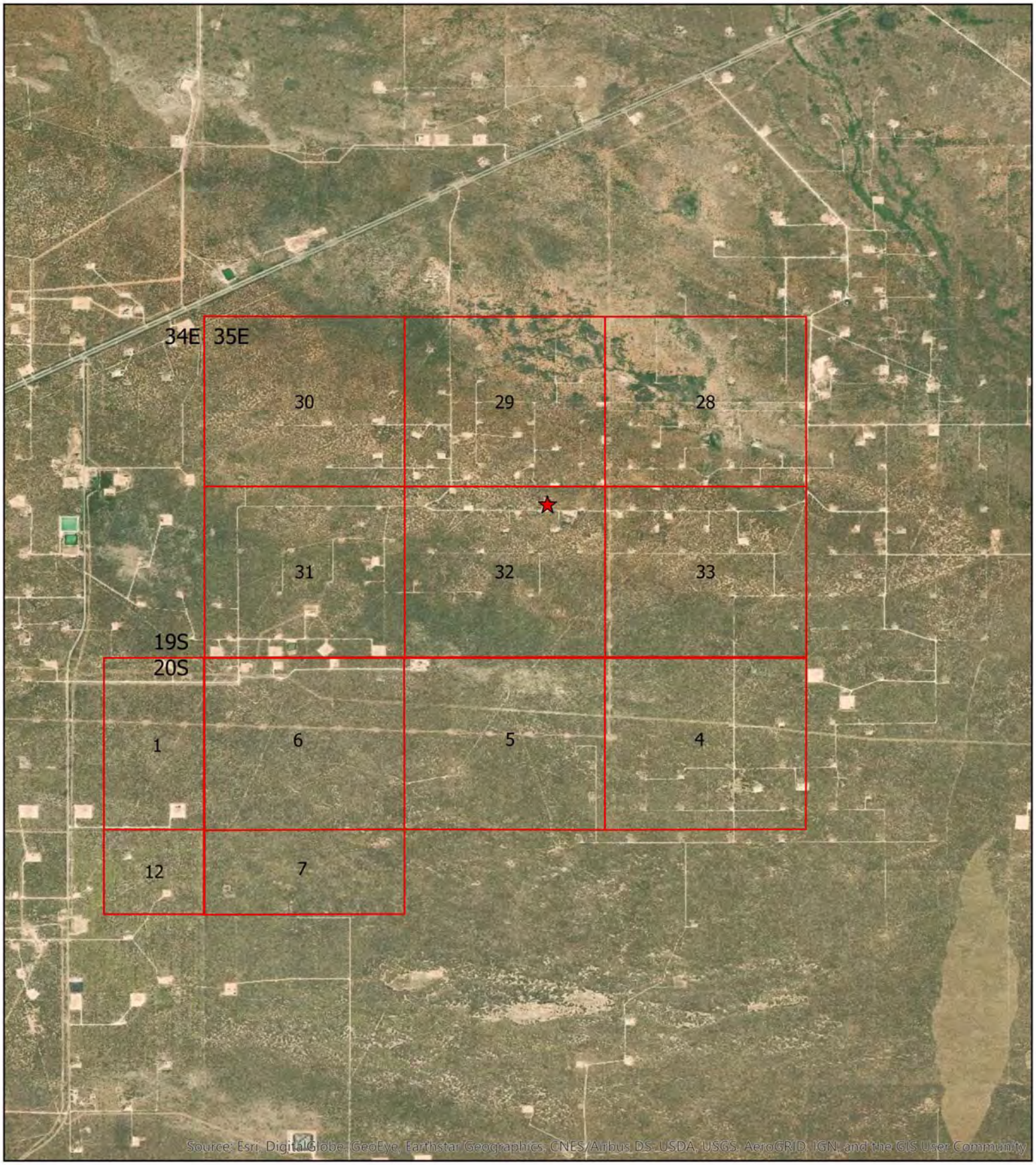
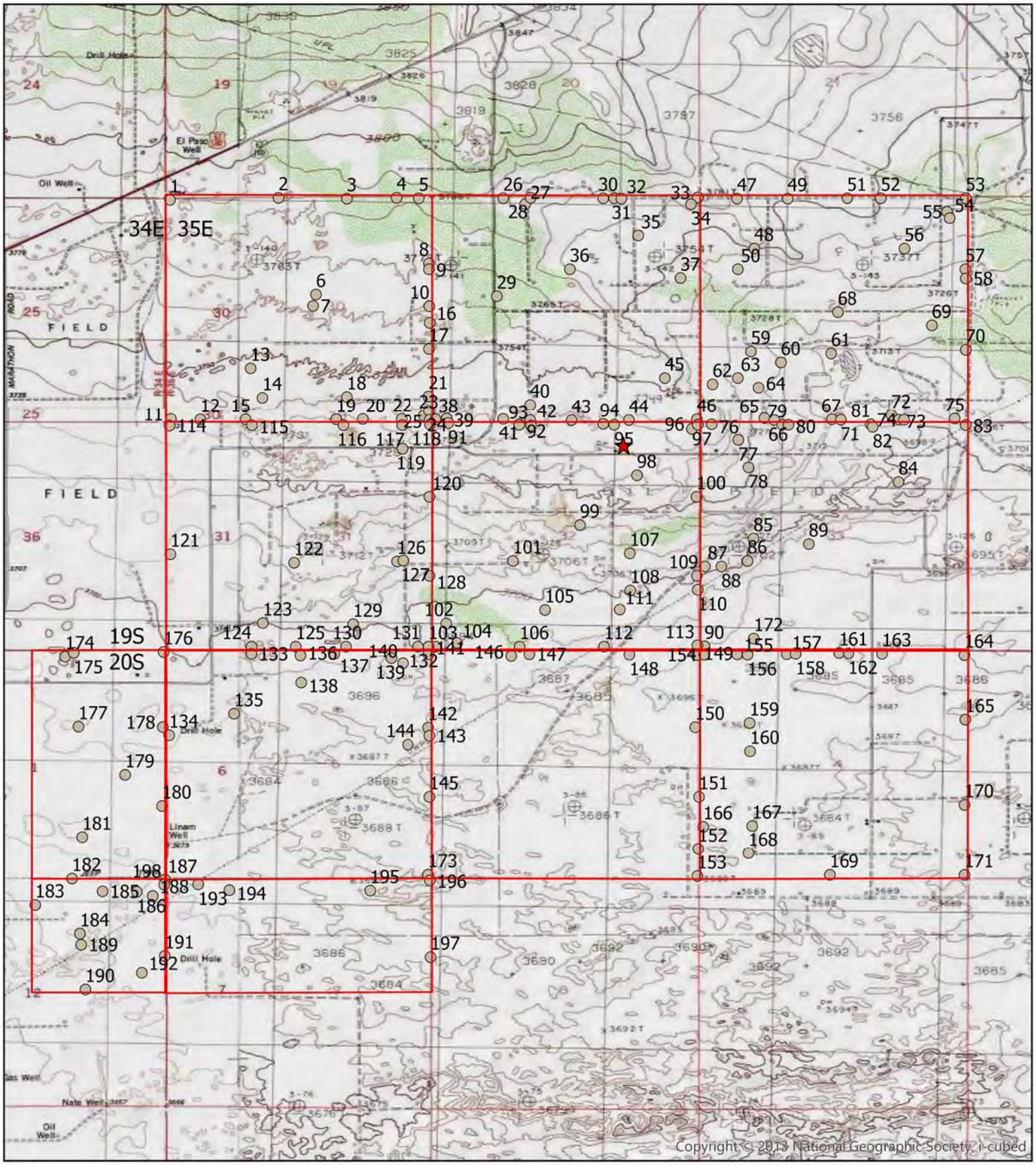


Figure A1: Site and Area of Interest (AOI)

Atkins
ENGINEERING ASSOCIATES



WaterfloodStation
AOI
Seismic Shothole Records

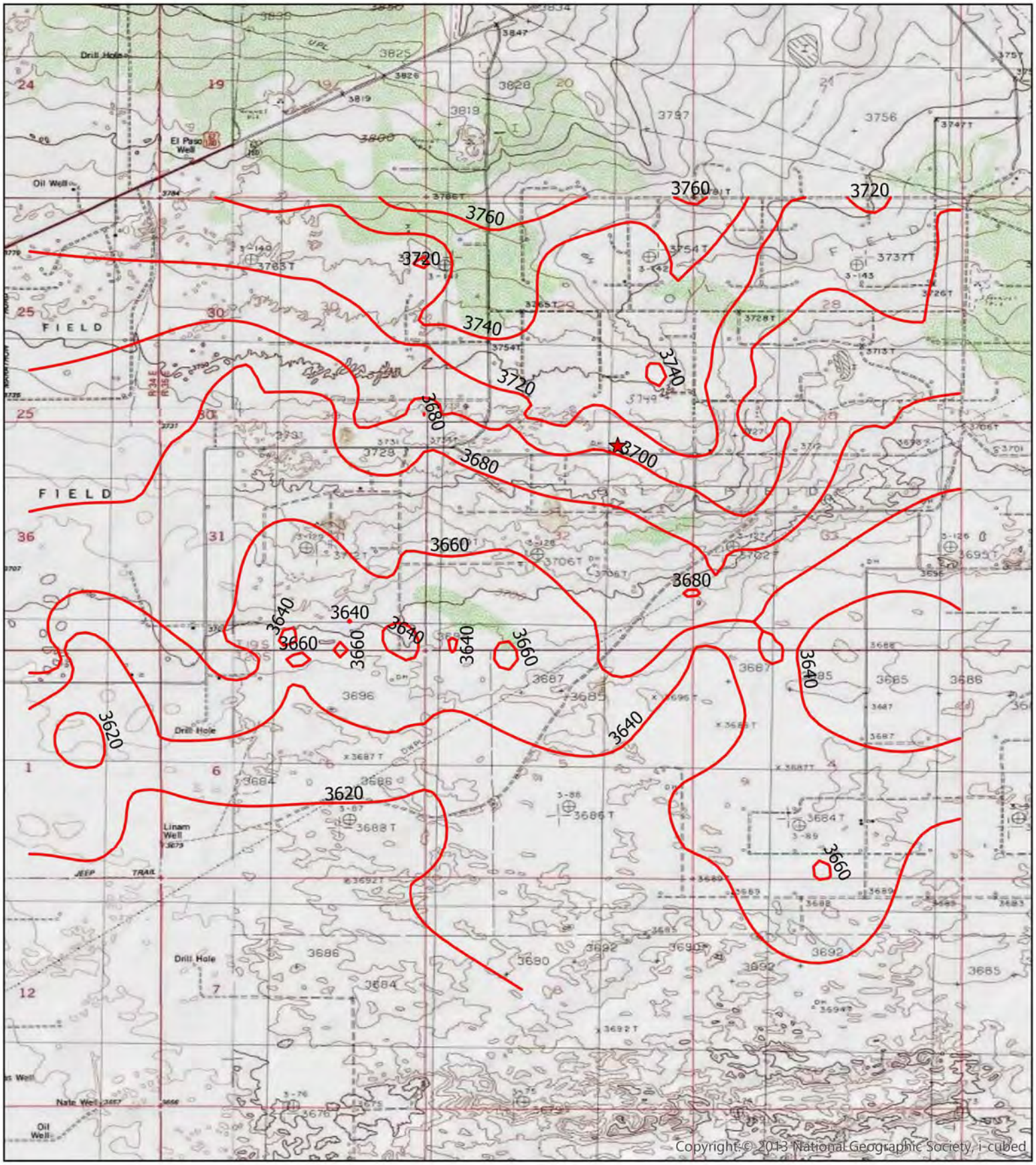
N

0 1,500 3,000 6,000 Feet

1 inch =3000 feet

Figure A2: AOI and Shothole Record Control

Atkins ENGINEERING ASSOCIATES



WaterfloodStation

TriassicContour

N

0 1,500 3,000 6,000 Feet

1 inch =3000 feet

Figure A3: Site with Triassic Redbed Contours

Atkins ENGINEERING ASSOCIATES

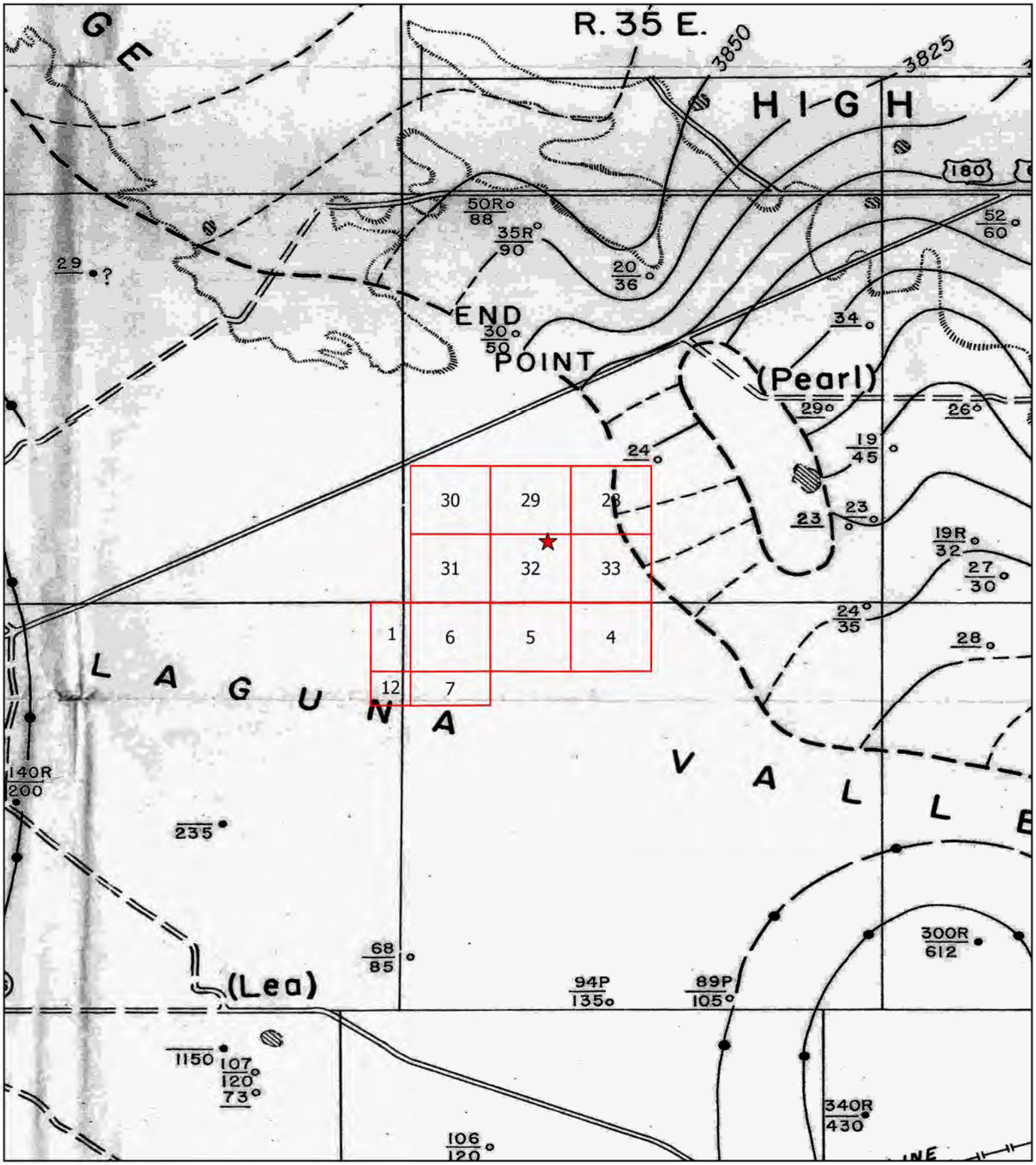
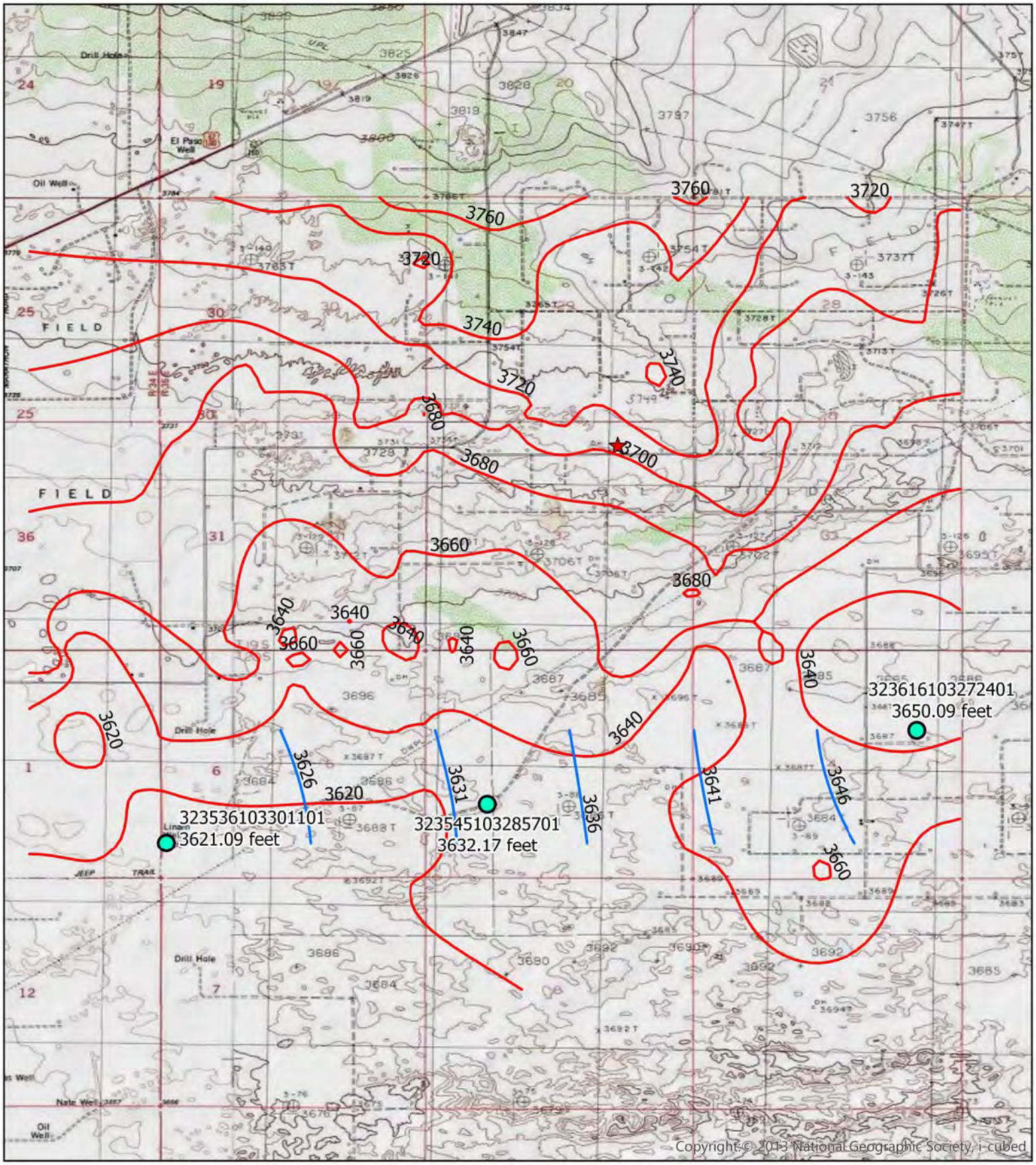


Figure A4: Site and AOI vs
Nicholson Jr and Clebsch Jr Mapping

Atkins
ENGINEERING ASSOCIATES



WaterfloodStation
USGSRecordingWell
TriassicContour
WLE Contour 5 foot interval

N

0 1,500 3,000 6,000 Feet

1 inch =3000 feet

Figure A5: Site with USGS Wells, 1986 Water Level Elevation and Triassic Redbed Contours

Atkins
ENGINEERING ASSOCIATES

Table A1: USGS Recording Well Data

OSEWell	USGS	Lat	Long	OSE Field Schedule LS	Feb-61	Mar-61	Feb-66	Apr-66	Jan-71	Jan-76	Feb-76	Feb-81	Apr-86	Jul-91	Jan-96	1986WLE
L-4627	323616103272401	32°36'16"	103°27'24"	3682	33.33	--	36.85	--	33.63	32.83	--	33.44	31.91	DRY	--	3650.09
n/d	323545103285701	32°35'59"	103°29'03"	3685	--	61.56	--	53.87	54.58	--	53.56	53.4	52.83	54.23	53.48	3632.17
L-4157	323536103301101	32°35'50"	103°30'17"	3678	--	58.7	--	--	57.58	--	61.24	--	56.91	56.95	56.39	3621.09

Appendix B: NMWRRS Section Reports

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 28 **Township:** 19S **Range:** 35E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 29 **Township:** 19S **Range:** 35E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q 6416	q 4	q 2	Sec	Tws	Rng	X	Y
RA 12222	RA	EXP	0	RONALD DEAN HOUGHTALING	ED	RA 12222 POD5				2	4	2	30	19S	35E	545279	3610853

Record Count: 1

PLSS Search:

Section(s): 30 **Township:** 19S **Range:** 35E

Sorted by: File Number

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 31 **Township:** 19S **Range:** 35E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 32 **Township:** 19S **Range:** 35E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 33 **Township:** 19S **Range:** 35E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 1 **Township:** 20S **Range:** 34E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q 6416	q 4	q	Sec	Tws	Rng	X	Y
CP 00654	CP	PLS	2	KENNETH SMITH	LE	CP 00654 POD1			Shallow	4	4		12	20S	34E	640103	3605947*

Record Count: 1

PLSS Search:

Section(s): 12 **Township:** 20S **Range:** 34E

Sorted by: File Number

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

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q 6416	q 4	Sec	Tws	Rng	X	Y
L 04627	L	STK	3	THELMA A. LINAM	LE	L 04627				2	2	04	20S	35E	644889	3608839*

Record Count: 1

PLSS Search:

Section(s): 4 **Township:** 20S **Range:** 35E

Sorted by: File Number

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

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q 6416	q 4	q	Sec	Tws	Rng	X	Y
L 04158	L	DOL	3	VIRGIL LINAM	LE	L 04158			Shallow	2	4		05	20S	35E	643290	3608008*

Record Count: 1

PLSS Search:

Section(s): 5 **Township:** 20S **Range:** 35E

Sorted by: File Number

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

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q 6416	q 4	q	Sec	Tws	Rng	X	Y
L 04157	L	DOL	3	VIRGIL LINAM	LE	L 04157			Shallow	3	3		06	20S	35E	640483	3607561*
L 14097	L	STK	3	FAYE KLEIN	LE	L 14097 POD1	NON		Shallow	1	3	3	06	20S	35E	638740	3718500

Record Count: 2

PLSS Search:

Section(s): 6 **Township:** 20S **Range:** 35E

Sorted by: File Number

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

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Code	Grant	Source	q q q 6416 4	Sec	Tws	Rng	X	Y
L 04499	L	PRO	0	SINCLAIR OIL AND GAS CO	LE	L 04499					07	20S	35E	641109	3606556*

Record Count: 1

PLSS Search:

Section(s): 7 **Township:** 20S **Range:** 35E

Sorted by: File Number

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

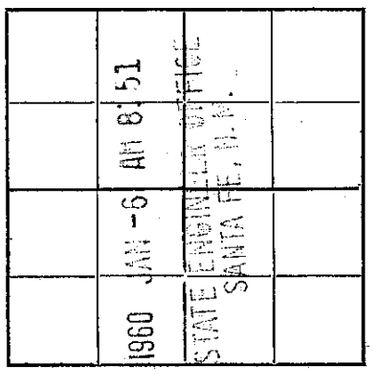
Appendix C: OSE Well Records

Form WR-23 SANTA F[illegible] STATE ENGINEER OFFICE [illegible] 492205

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1



(Plat of 640 acres)

(A) Owner of well Virgil Liman

Street and Number P. O. Box 743

City [illegible] Hobbs, State New Mexico

Well was drilled under Permit No. L-4157 and is located in the

¼ SW ¼ SW ¼ of Section 6 Twp. 20 S Rge. 35 E

(B) Drilling Contractor W. L. Van Noy License No. WD-208

Street and Number P. O. Box 74

City Oil Center, State New Mexico

Drilling was commenced Dec. 12, 1959

Drilling was completed Dec. 13, 1959

Elevation at top of casing in feet above sea level [illegible] Total depth of well 70

State whether well is shallow or artesian Shallow Depth to water upon completion [illegible] 64

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	65	68	3	Course Water Sand
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
5		8	0	70	70		50	70

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received [illegible] DEC 18 PM 8:30 1959

File No. L-4157 Use Dom. Location No. 20.35.6.330

1-4157

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	65	65	Grey	Sand
65	68	3	Grey	Course water sand
68	70	2	Red	Red Bed

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

W. L. Van Tray
Well Driller

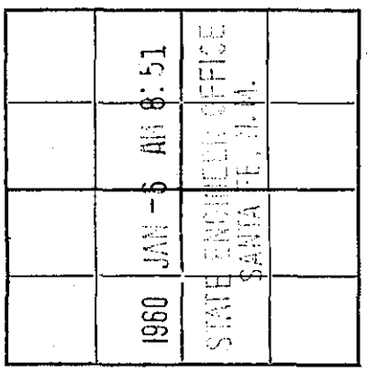
Form WR-23 SANTA FE STATE ENGINEER OFFICE

492209

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1



(Plat of 640 acres)

(A) Owner of well Virgil Liman

Street and Number P. O. Box 743

City Hobbs, State New Mexico

Well was drilled under Permit No. L-4158 and is located in the ¼ NE ¼ SE ¼ of Section 5 Twp. 20 S Rge. 35 E

(B) Drilling Contractor W. L. Van Noy License No. WD-208

Street and Number P. O. Box 74

City Oil Center, State New Mexico

Drilling was commenced Dec. 11, 1959

Drilling was completed Dec. 12, 1959

Elevation at top of casing in feet above sea level ____ Total depth of well 70

State whether well is shallow or artesian ____ Depth to water upon completion 64

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	65	68	3	Course water sand
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
5 "		8	0	70	70		50	70

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor ____ License No. ____

Street and Number ____ City ____ State ____

Tons of Clay used ____ Tons of Roughage used ____ Type of roughage ____

Plugging method used ____ Date Plugged ____ 19____

Plugging approved by:

____
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received DEC 18 1959 PM 8:31

File No. L-4158 Use Dam Location No. 20.35.5.420

L-4158

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	65	65	Greyish	Sand
65	68	3	Greyish	Course water sand
68	70	2	red	Red bed

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

W. L. Van Hoy
Well Driller

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)		OSE FILE NUMBER(S)		
		L 14097		
WELL OWNER NAME(S)		PHONE (OPTIONAL)		
FAYE KLEIN or GEORGE KLEIN				
WELL OWNER MAILING ADDRESS		CITY	STATE	ZIP
PO BOX 540725		GRAND PRAIRIE	TX	75054

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	N32	35	50	N
	LONGITUDE	W103	30	17	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND

* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

NW – SW – SW Section 6 Township 20S Range 35E

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER			NAME OF WELL DRILLING COMPANY
WD 1044	ALAN G. EADES			EADES DRILLING & PUMP SERVICE
DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
05-25-16	05-25-16	61	61	25

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☒ SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT)

DRILLING FLUID: ☐ AIR ☒ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☒ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	20	9.875	PVC	SLIP JOINT	5.135	.21	
20	21	8.75	PVC	SLIP JOINT	5.135	.21	
21	61	8.75	PVC SCREEN	SLIP JOINT	5.135	.21	.020

STATE ENGINEER OFFICE RECEIVED 2016 JUN -2 AM 11:47

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	20	9.875	BENTONITE CHIPS – HYDRATED	7	GRAVITY FED
20	61	8.75	GRAVEL	12	GRAVITY FED

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	POD NUMBER	TRN NUMBER
L-14097	1	584850

20S.35E.06 3.3.1 Dam -

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	2	2	TOP SOIL	☐ Y ☐ N	
2	15	13	YELLOW SAND	☐ Y ☐ N	
15	25	10	BROWN SAND	☐ Y ☐ N	
25	61	36	SAND	☒ Y ☐ N	see note below
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	
				☐ Y ☐ N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ☐ PUMP

☐ AIR LIFT ☐ BAILER ☒ OTHER – SPECIFY: Eades Drilling did not test pump this well.

TOTAL ESTIMATED WELL YIELD (gpm): unknown

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

The water bearing zones are capable of producing at least 24 gpm based on the performance of a 1.5 HP pump.

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Alan Eades / ALAN EADES 05-25-16

SIGNATURE OF DRILLER / PRINT SIGNEE NAME DATE

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER L-14097 POD NUMBER 1 TRN NUMBER 584850

20S-35E-06 3-3-1 Dom--

Appendix D: OSE Field Schedules

FE-1

State of New Mexico
State Engineer

WELL SCHEDULE

Source of data: Obser ☒ Owner ☐ Other _____

Date 2/28 19 61 Record by Emmett - Wilbanks

LOCATION: County Lea Map 108.3.0

OWNER Mrs. Virgil Sriam (V. Klein - 1971)

DRILLER _____ Completed _____ 19__

TOPO SITUATION _____ USHST SPOT Elev 3682

DEPTH _____ ft ☐ Rept ☐ Meas Use Stock

CASING 10 3/4 in to _____ ft Log _____

PUMP: Type piston Make _____

Ser.no./model _____ Size of dischg 1 1/2 in.

PRIME MOVER: Make _____ HP _____

Ser.no. _____ Power/Fuel Wind

PUMP DRIVE: ☐ Gear Head ☐ Belt Head ☐ Pump Jack

Make _____ Ser.no _____ ☐ VHS

WATER LEVEL: 34.33 ft (rept) (meas) 2/28 19 61 (above) (below) TC on north side

_____ which is 1.0 ft (above) (below) LS

PERMANENT RP is _____

which is ____ ft (above) (below) described MP and ____ ft (above) (below) LS

REMARKS Well discharges into a 4' diameter stul

AQUIFER(S): Tog

Well No. ___ on Photo _____ DPN 25-10403

File No L- _____ Loc. No. 20.35.4.2213/

Remarks cont. tub located on south side of well. An earthen tank is located SW of well.

SKETCH:

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER			
	Below MP			Below LS
	1st	2nd	3rd	
Date Feb 28, 1961	37.00	36.00		34.33
Hour ____ AM PM Obs JCE	2.64	1.67		1.00
Not POA ( ) POA (X)	34.36	34.33		33.33

W L meas after pump shut off ____ min. Pumping W L (X)

Remarks Well pumping slowly.

STATE ENGINEER
Technical Division

Owner Mrs Virgil Linam
Use Stock

	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date Feb. 28, 19 61	37.00	36.00	34.34	3682
Hour ____ AM PM Obs T.C.E.	2.64	1.67	1.00	33
Not POA ( ) POA (X)	34.36	34.33	33.33	3649

W L meas after pump shut off ____ min. Pumping W L (X)
Remarks Well Pumping Slowly

Date Feb 9, 19 66	38.00	38.00	37.85	3682
Hour ____ AM PM Obs ?	0.15	0.14	1.00	37
Not POA ( ) POA (X)	37.85	37.86	36.85	3645

W L meas after pump shut off ____ min. Pumping W L (X)
Remarks Pumping hard

Date January 27, 19 71	36.00	35.00	34.63	3682
Hour 2:20 AM PM Obs KEO HWP	1.37	0.37	1.00	34
Not POA (X) POA ( )	34.63	34.63	33.63	3648

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks P.O.A. but making no water - stock tanks low.
Well is just about out of water

Date 30 Jan, 19 76	35.00	35.00	33.83	3682
Hour 10:30 AM PM Obs [illegible]	1.16	1.17	1.00	33
Not POA (X) POA ( )	33.84	33.83	32.83	3649

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks no head on tower

Latitude ____ Longitude DPN 25-10403
File No L- Location No 20.35.4.22131

STATE ENGINEER
Technical Division

Owner V Klein
Use Stock

	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date Feb 17, 1981	37.00	37.00	34.44	3682
Hour 2:34 AM (PM) Obs GC SAW	2.55	2.56	1.00	33
Not POA (X) POA ( )	34.45	34.44	33.44	3649

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks Well has very little water bottom less than 1.0 ft from surface of water

	1st	2nd	Below LSD	ELEV
Date April 2, 1986	33.00	33.00	32.91	3682
Hour 2:30 AM PM Obs RLTd ABM	0.08	.09	1.00	32
Not POA (X) POA ( )	32.92	32.91	31.91	3650

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks Well is now open cased Hole. well has very little water in it.

	1st	2nd	Below LSD	ELEV
Date July 3, 1991		DRY		
Hour 12:25 AM (PM) Obs KO-SD				
Not POA (✓) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks Well dry at 33 ft below TC.

	1st	2nd	Below LSD	ELEV
Date ______ ___, 19___				
Hour ______ AM PM Obs ______				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks

Latitude ______________ Longitude 25-10403
File No L Location No 20.35.4.22131

FE-1

State of New Mexico
State Engineer

WELL SCHEDULE

Source of data: Obser ☒ Owner ☐ Other _____

Date 3/8 1961 Record by Lobley - Pulley

LOCATION: County Lea Map 108.3.0 108.3.3

OWNER Mrs V. Liman Klein "Shilo Well"

DRILLER _____ Completed _____ 19__

TOPO SITUATION _____ USHST SPOT Elev 3685

DEPTH _____ ft ☐ Rept ☐ Meas Use Stock

CASING 6 in to _____ ft Log _____

PUMP: Type piston Make _____

Ser.no./model _____ Size of dischg 2 in.

PRIME MOVER: Make Aermotor HP _____

Ser.no. Steel angle iron tower Power/Fuel Wind

PUMP DRIVE: ☐ Gear Head ☐ Belt Head ☐ Pump Jack

Make _____ Ser.no _____ ☐ VHS

WATER LEVEL: 62.76 ft (rept) (meas) 3/8 1961 (above) (below) Top of 6" X 3" wooden clamp

_____ which is 1.2 ft (above) (below) LS

PERMANENT RP ★ is T. Casing

which is 0.25 ft (above) (below) described MP and 0.95 ft (above) (below) LS

REMARKS Well discharges into a 15' diameter

AQUIFER(S): Tog 323545103285701

Well No. ___ on Photo _____ DPN 25-10404

File No L-4158 Loc. No. 20.35.5.31424

Remarks cont. x 12' tall stel storage tank located 10' NNE of well. Two 10' diameter x 1.5' tall stel tanks are located 12' NE of 15' diameter tank. a 12' diameter x 8' tall stel storage tank is located 10' east of well. Need 4-whel drive to get to well.
10-23-79 RLT Collected water sample.

SKETCH:

11-27-79 J.H Resample

N ↑ ✱ July 3, 91, KD.SD - RP is also Top of 55 gal. berrel filled with concrete 0.03 ft below Top of casing and 0.75 ft abv. 6½x6½ concrete slab.

9/14/95 - BRING 4X4 $\sqrt{2}$

The 15' x 12' Storage tank we Discharges into has hardly no water Bottom is not completely covered w/water. Two small stk tanks to E of this storage tank's contain ± 6" of water each.

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER			
	Below MP			Below
	1st	2nd	3rd	LS
Date May 8, 1961	65.00	66.00		62.76
Hour ____ AM PM Obs HJ-BP	2.22	3.24		1.20
Not POA ( ) POA ( )	62.78	62.76		61.56

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks Well pumped recently.

STATE ENGINEER
Technical Division

Owner Federal / Use Stock	DEPTH TO WATER Below MP 1st	Below MP 2nd	Below LSD	WATER LEVEL ELEV
Date March 8, 19 61	65.00	66.00	62.77	3685
Hour ____ AM/PM Obs HL-BP	2.22	3.24	1.20	62
Not POA ( ) POA ( )	62.78	62.76	61.56	3623

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks Well pumped recently.

Date April 6, 19 66	57.00	58.00	55.07	3685
Hour ____ AM/PM Obs GB-PM	1.93	2.93	1.20	54
Not POA ( ) POA ( )	55.07	55.07	53.87	3631

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks

Date January 21, 19 71	60.00	58.00	55.78	3685
Hour 1145 (AM)/PM Obs HWP KEO	4.22	2.22	1.20	55
Not POA ( ) POA (X)	55.78	55.78	54.58	3630

W L meas after pump shut off 35 min. Pumping W L ( )
Remarks Shut off at 11:28AM Same MP

Date JAN 29, 19 76				
Hour 2:40 AM/PM Obs PRF				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks Need 4 W.D. to get to well

Latitude ____ Longitude DPN 25-10404
File No L-4158 Location No 20.35.5.31424

Feb. 19, 1976 Rm 4 HWP

Not POA - 10:45 A.M.

(1) 60.00
5.24
54.76

(2) 61.00
6.24
54.76

Elev. 3685
54
3631

54.76
1.20
53.56

58.00

59.00
4.97
54.03

STATE ENGINEER
Technical Division

Owner V. L. Klein	DEPTH TO WATER			WATER
Use Stock	Below MP 1st	Below MP 2nd	Below LSD	LEVEL ELEV
Date Feb 19, 1976	60.00	61.00	54.76	3685
Hour 10 45 AM PM Obs RM Hoff	5.24	6.24	1.20	54
Not POA (X) POA ( )	54.76	54.76	53.56	3631

W L meas after pump shut off _____ min. Pumping W L ( )
Remarks _____

Date Feb 17, 1981	58.00	59.00	54.60	3685
Hour 4:26 AM PM Obs GS & AM	3.40	4.39	1.20	53
Not POA (X) POA ( )	54.60	54.61	53.40	3632

W L meas after pump shut off _____ min. Pumping W L ( )
Remarks NEED 4WD - OR A LOT of EFFORT!

Date April 2, 1986 RLTT	59.00	55.00	54.03	3685
Hour 1:45 AM PM Obs ABM	4.97	0.97	1.20	53
Not POA (X) POA ( )	54.03	54.03	52.83	3632

W L meas after pump shut off _____ min. Pumping W L ( )
Remarks _____

Date July 3, 1991	57.00	58.00	55.18	3685
Hour 10:54 AM PM Obs KD-SD	1.82	2.82	0.95	54
Not POA ( ) POA (X)	55.18	55.18	54.23	3631

W L meas after pump shut off 55 min. Pumping W L ( )
Remarks Intv. betwn 1st & 2nd MEAS. 5 MINS
Shut off at 9:59

Latitude _____ Longitude DPN 25-10404
File No L-4158 Location No 20.35.5.31424

4

145

68.00
13.50
54.50

150

35
65.00
10.54
54.46

155

STATE ENGINEER
Technical Division

Owner

Use STK

	DEPTH TO WATER			WATER LEVEL ELEV
	Below MP 1st	Below MP 2nd	Below LSD	
X Date JAN 25, 1996	65.00	65.00	54.43	3685
Hour 1:15 AM (PM) Obs PF	10.56	10.57	0.95	53
Not POA ( ) POA (X)	54.44	54.43	53.48	3632'

1st ✓ on 2nd 3rd

W L meas after pump shut off 30 min. Pumping W L ( )

Remarks MP=TC See note. Wm was not pumping any water on arrival bad leathers?

	DEPTH TO WATER			
Date ______ ______, 19____				
Hour ______ AM PM Obs ______				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

	DEPTH TO WATER			
Date ______ ______, 19____				
Hour ______ AM PM Obs ______				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

	DEPTH TO WATER			
Date ______ ______, 19____				
Hour ______ AM PM Obs ______				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

Latitude ______ Longitude 25-10404

File No ______ Location No 20.35.5.31424

QUALITY CONTROL SHEET — STATE ENGINEER

Date	Collector	POC	Remarks and Use	Cl.	SC	X
6/18/90	KF	EDP	SK POA 66°	350	3939	
9/14/95	JZ	DP	POA NO TEMP. #4	230	3220	

X= More Complete Analysis Available on Sample

Aquifer(s) Tog D.P.N 25-10404

File No. L-4158 Location No. 20.35.5.31424

FE-1 State of New Mexico
State Engineer

WELL SCHEDULE

Source of data: Obser ☒ Owner ☐ Other _____

Date 7-3 19 91 Record by K. O'Hara, S. Dirman

LOCATION: County Lea Map 107.44

OWNER Mrs. Virgil Linam Klein

DRILLER _____ Completed _____ 19__

TOPO SITUATION _____ spot Elev 3679

DEPTH _____ ft ☐ Rept ☐ Meas Use Aban. Stock

CASING 6 5/8 in to _____ ft Log _____

PUMP: Type None Make _____

Ser.no./model _____ Size of dischg _____ in.

PRIME MOVER: Make _____ HP _____

Ser.no. _____ Power/Fuel _____

PUMP DRIVE: ☐ Gear Head ☐ Belt Head ☐ Pump Jack

Make _____ Ser.no _____ ☐ VHS

WATER LEVEL: dry ft rept meas July 3 19 91 above below _____

_____ which is _____ ft above below LS

PERMANENT RP is _____

which is _____ ft above below described MP and _____ ft above below LS

REMARKS 8' W From 8' tall 6" x 20' diam 67' west of

AQUIFER(S): _____

Well No. ___ on Photo _____ DPN _____

File No _____ Loc. No. 20.35.6.33133

(measured))
Remarks cont. windmill. Shown on topo Linam well. Sampled by Ramone 10-23-79 Shown on 107.4.4 at 331313

SKETCH:

N

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER			
	Below MP			Below LS
	1st	2nd	3rd	
Date July 3, 19 91		Dry		
Hour ______ AM PM Obs KO-SD				
Not POA (X) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

QUALITY CONTROL SHEET — STATE ENGINEER

Date	Collector	POC	Remarks and Use	Cl.	SC	X
10/23/79	RLT	Leak	Stock - WM. POA	876	5154	

X- More Complete Analysis Available on Sample

Aquifer(s) _____ D.P.N _____

File No. _____ Location No. 20.35.6.33133

FE-1

State of New Mexico
State Engineer

WELL SCHEDULE

Source of data: Obser ☒ Owner ☐ Other _____

Date 3/8 19 61 Record by Lobley - Pulley

LOCATION: County Lea Map 107.4.0

OWNER Mrs. Virgil Finam Klein

DRILLER W.F. Van Noy Completed 12/13 1959

TOPO SITUATION _____ USGS T Elev 3678

DEPTH 70 ft ☒ Rept ☐ Meas Use Not

CASING 5 in to 70 ft Log Drillers

PUMP: Type None Make _____

Ser.no./model _____ Size of dischg _____ in.

PRIME MOVER: Make _____ HP _____

Ser.no. _____ Power/Fuel _____

PUMP DRIVE: ☐ Gear Head ☐ Belt Head ☐ Pump Jack

Make _____ Ser.no _____ ☐ VHS

WATER LEVEL: 60.25 ft (rept) (meas) 3/8 19 61 (above) (below) TC

_____

_____ which is 1.55 ft (above) (below) LS

PERMANENT RP is _____

_____

_____

_____

which is _____ ft (above) (below) described MP and _____ ft (above) (below) LS

REMARKS Well is located 65' east of windmill

AQUIFER(S): Tog 323536 1033011 01

Well No. ___ on Photo _____ DPN 25-10405

File No L-4157 Loc. No. 20.35.6.331332

Remarks cont. Shown on USGS topo map.

5

SKETCH:

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER			
	Below MP			Below LS
	1st	2nd	3rd	
Date Mar 8, 1961	70.00	71.00		60.25
Hour ____ AM/PM Obs HEL	9.74	10.75		1.55
Not POA (X) POA ( )	60.26	60.25		58.70

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks

STATE ENGINEER
Technical Division

Owner Virgil Linam
Use not in use

	DEPTH TO WATER			WATER
	Below MP		Below	LEVEL
	1st	2nd	LSD	ELEV
Date March 8, 1961	70.00	71.00	60.25	3678
Hour ____ AM PM Obs HL-BP	9.74	10.75	1.55	59
Not POA (X) POA ( )	60.26	60.25	58.70	3619

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks ____

Date March 2, 1966				
Hour ____ AM PM Obs GWB				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks U.T.M. 3-10-66 GWB UTM
Need 4 wheel drive to get to well.

Date January 21, 1971	65.00	66.00	59.13	3678
Hour 11:00 AM PM Obs KEP HWP	5.87	6.87	1.55	58
Not POA (X) POA ( )	59.13	59.13	57.58	3620

W.M. shut off 12"
W L meas after pump shut off ____ min. Pumping W L ( )
Remarks M.P. top csg. E. side. This is 0.63' above present L.S. Is loc. 60'-65' E of equipped, operating mill

Date Feb 19, 1976	63.00	64.00	62.79	3678
Hour 1:45 AM (PM) Obs RMH Hwp	0.21	1.21	1.55	61
Not POA (X) POA ( )	62.79	62.79	61.24	3617

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks Same MP

Latitude ____ Longitude DPN 25-10405
File No L-4157 Location No 20.35.6.331332

35.00
4.54
56.46

STATE ENGINEER
Technical Division

Owner	DEPTH TO WATER			WATER LEVEL ELEV
Use	Below MP 1st	Below MP 2nd	Below LSD	

Date April 2, 1986	65.00	60.00	58.46	3678
Hour 1:30 AM (PM) Obs RLT ABM	6.54	1.53	1.55	57
Not POA (X) POA ( )	58.46	58.47	56.91	3621

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks ______

Date July 3, 1991	60.00	61.00	58.50	3678
Hour 11:20 AM PM Obs KD.SD	1.50	2.50	1.55	57
Not POA (X) POA ( )	58.50	58.50	56.95	3621 ✓

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks Now equip. with steel pipe tower & Aermotor mill. Disch. 47' west into 20' diam x 8'

Date March 5, 1996	79.00	74.00	57.94	3678
Hour 11:50 (AM) PM Obs PF	21.06	16.06	1.55	56
Not POA ( ) POA (X)	57.94	57.94	56.39	3622 ✓

1st
W L meas after pump shut off 25 min. Pumping W L ( )
Remarks Brake held good

Date ______ ______, 19___				
Hour ______ AM PM Obs ______				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )
Remarks ______

Latitude ______ Longitude 25-10405
File No L-4157 Location No 20.35.6.331332

Appendix E: Seismic Shothole Records by Section

(Electronic Records Available on Request)

Attachment B:

Site Location Map
Wetlands Map
Floodplain Map
Karst Area Map

N

Armstrong Energy Corporation

West Pearl Queen

32.62252, -103.47555

Section 32, Township 19S, Range 35E

Site Map

HRL COMPLIANCE SOLUTIONS

Author: J. Knowlton	
Rev: 0	
Date: 10/16/2018	

U.S. Fish and Wildlife Service
National Wetlands Inventory

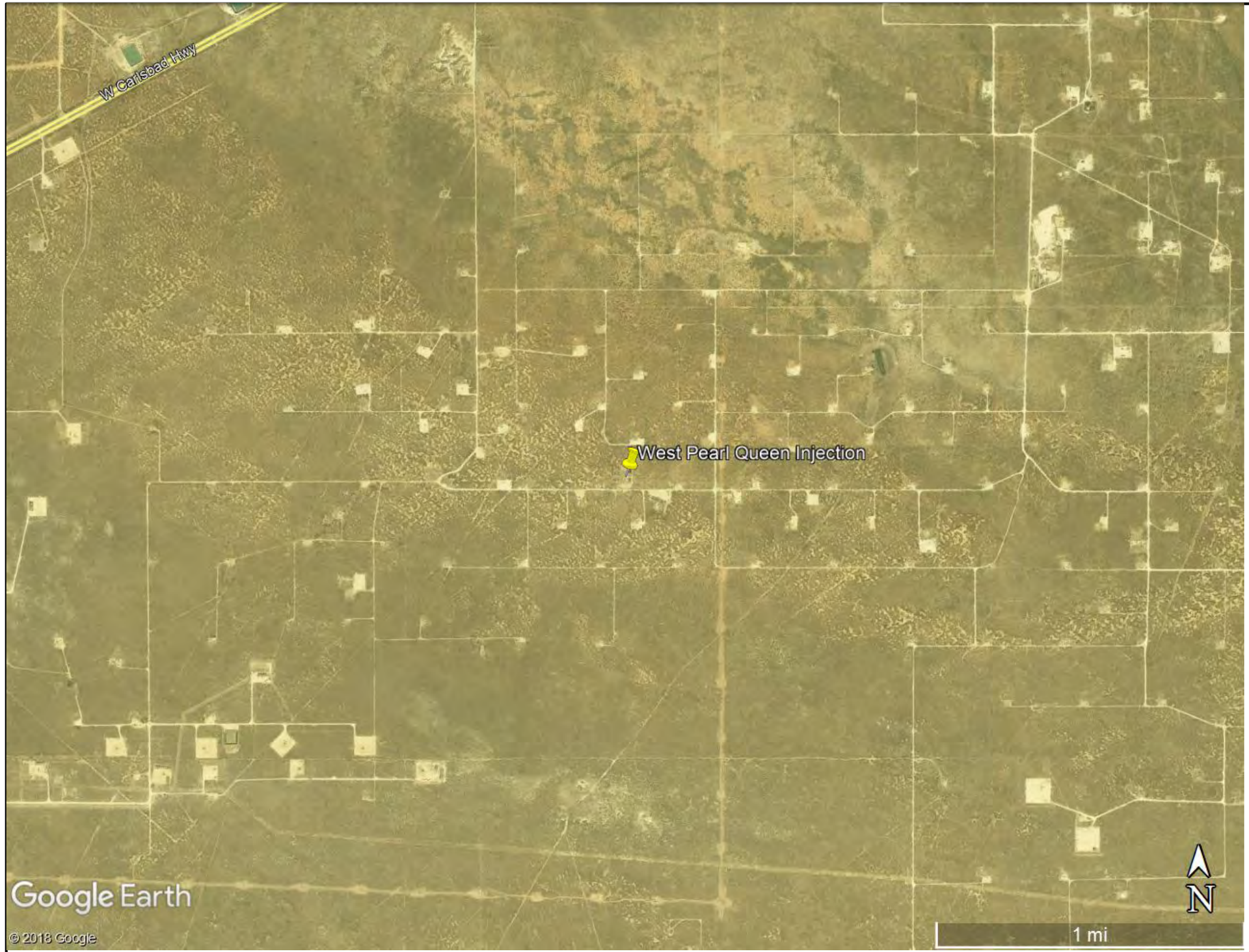
West Pearl Queen Wetlands

October 16, 2018

Wetlands

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

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



N

Armstrong ENERGY CORPORATION

Flood Zone Map

West Pearl Queen

32.62252, -103.47555
Section 32, Township 19S, Range 35E

Flood Zone

REFERENCE LAYERS
- NFHL Data Available
- FIRM Panel Boundary
- LOMR Boundary

SPECIAL FLOOD HAZARD AREAS
- 1% Annual Chance Flood Hazard Zone A, AE, A99, AO, AH, AR, V, VE
- Regulatory Floodway

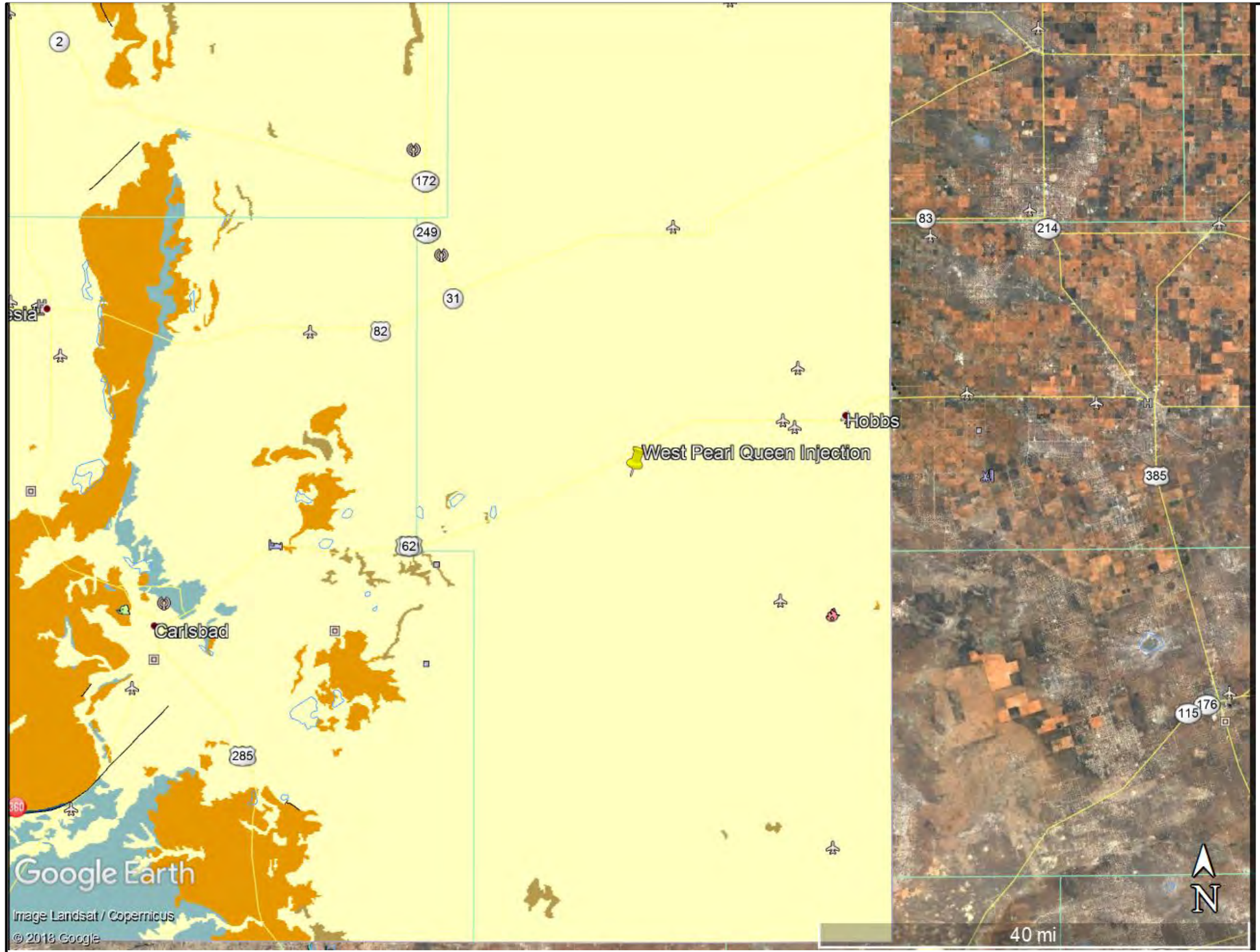
OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee Zone X
- NO SCREEN — Areas Outside the 0.2% Annual Chance Floodplain Zone X
- Areas of Undetermined Flood Hazard Zone D

CROSS SECTIONS & BFES
- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Base Flood Elevation

SUPPORTING INFORMATION
- Limit of Study
- Jurisdictional Boundary

HRL COMPLIANCE SOLUTIONS

Author: J. Knowlton	
Rev: 0	
Date: 10/16/2018	



N

Armstrong Energy Corporation

West Pearl Queen

32.62252, -103.47555

Section 32, Township 19S, Range 35E

Karst Map

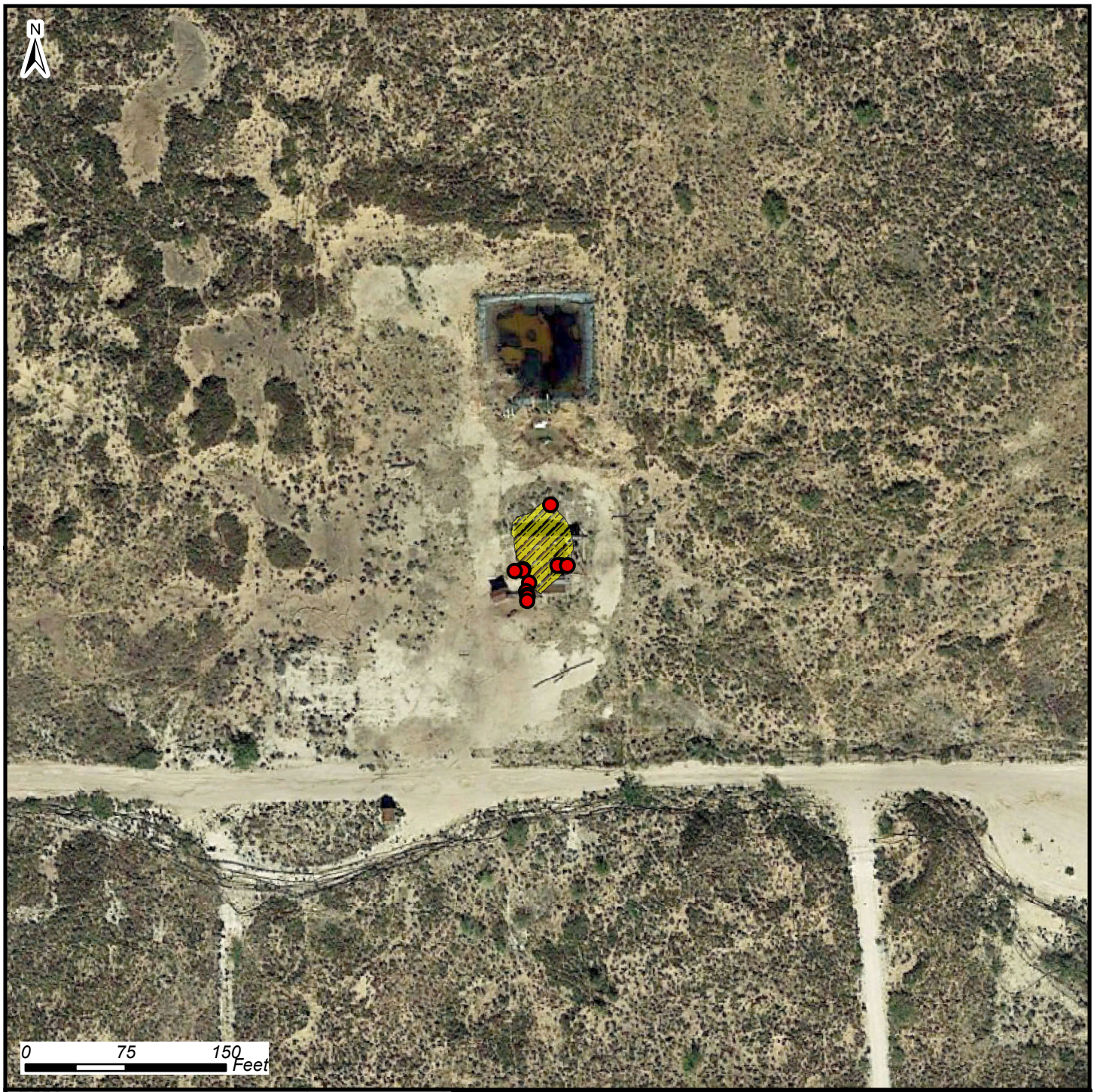
DISCLAIMER: This representation and the Geographic Information System (GIS) used to create it are designed as a source of reference and not intended to replace official records and/or legal surveys. HRL assumes no responsibility for any risks, dangers, or liabilities that may result from its use and makes no guarantees as to the quality or accuracy of the underlying data.

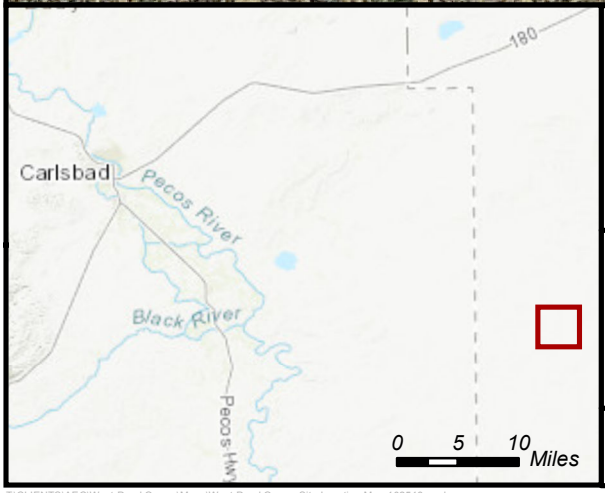
HRL COMPLIANCE SOLUTIONS

Author: J. Knowlton	
Rev: 0	
Date: 10/16/2018	

Attachment C:

Sample Location Map





Armstrong Energy Corporation

Sample Location Map

West Pearl Queen Phase II

32.622594047 -103.475563320

Section 32, Township 19 South, Range 35 East

Mapped Features

- Sample Locations
- Sump

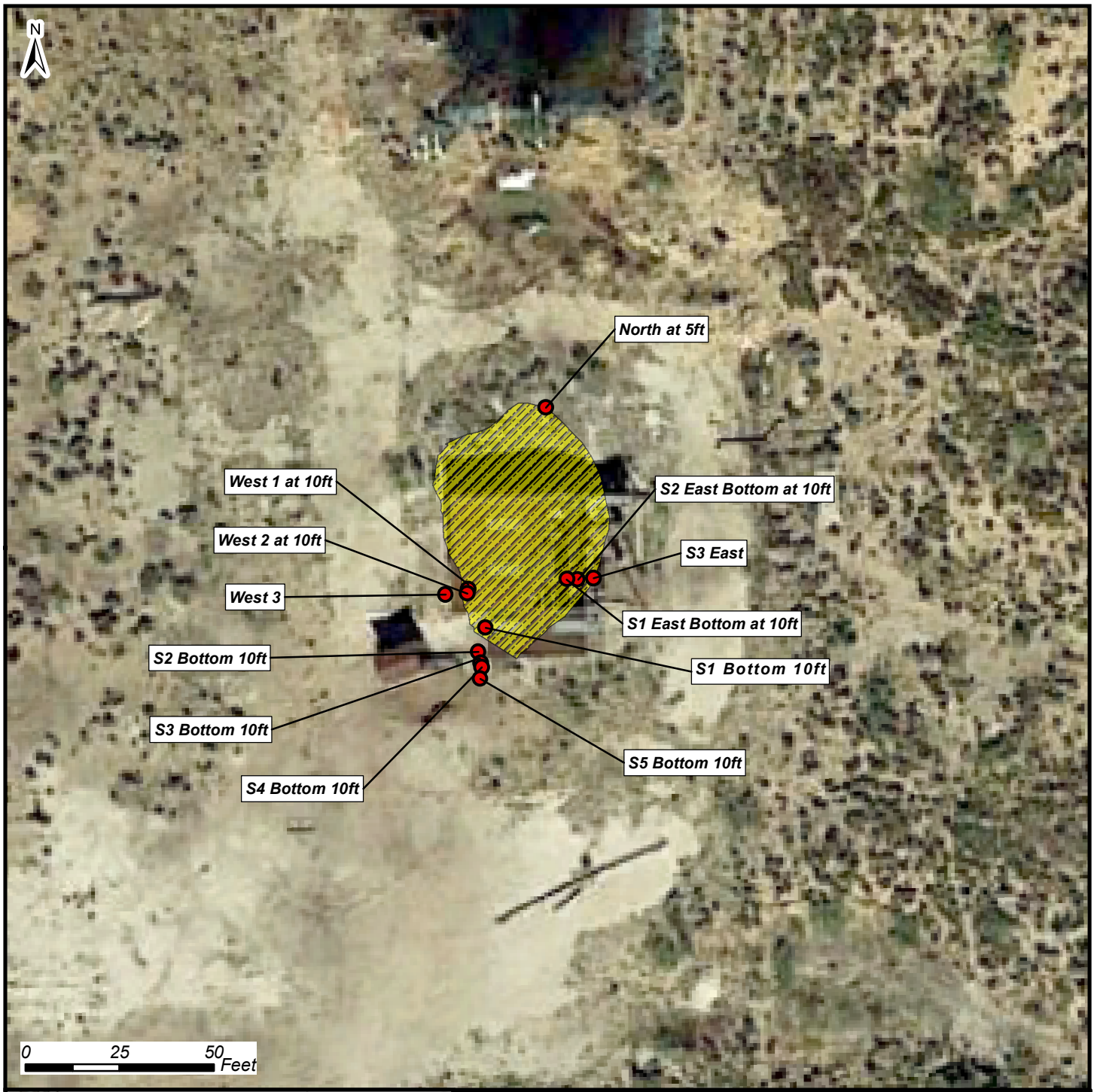
HRL COMPLIANCE SOLUTIONS

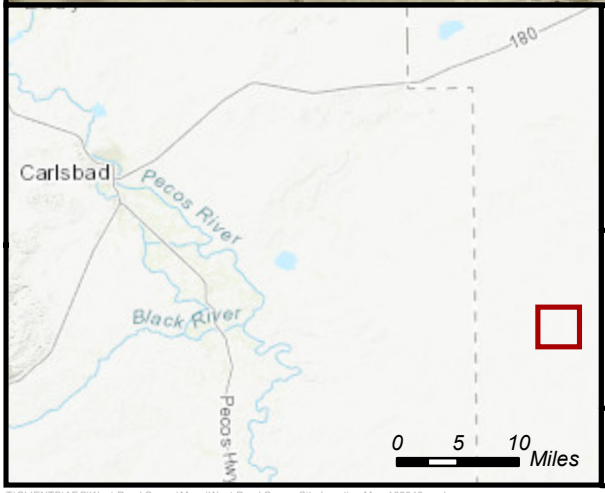
Author: A. Asay

Revision: 0

Date: 10/25/2018

T:\CLIENTS\AEC\West Pearl Queen\Maps\West Pearl Queen Site Location Map 102518.mxd





Armstrong Energy Corporation

Sample Location Map

West Pearl Queen Phase II

32.622594047 -103.475563320

Section 32, Township 19 South, Range 35 East

Mapped Features

- Sample Locations
- Sump

HRL COMPLIANCE SOLUTIONS

Author: A. Asay

Revision: 0

Date: 10/25/2018

T:\CLIENTS\AEC\West Pearl Queen\Maps\West Pearl Queen Site Location Map 102318.mxd

Attachment D:

Laboratory Analytical Reports

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

October 26, 2018

JENNIFER KNOWLTON

HRL COMPLIANCE SOLUTIONS, INC.

2385 F 1/2 ROAD

GRAND JUNCTION, CO 81505

RE: WEST PEARL QUEEN

Enclosed are the results of analyses for samples received by the laboratory on 10/23/18 11:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S1 BOTTOM 10' (H803037-01)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/24/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/24/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/24/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/24/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/24/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *90.0 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**128**	16.0	10/25/2018	ND	416	104	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	**401**	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	**174**	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *88.9 %* *41-142*

Surrogate: 1-Chlorooctadecane *96.8 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S2 @ 10' (H803037-02)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/24/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/24/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/24/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/24/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/24/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.0 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1170**	16.0	10/25/2018	ND	416	104	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	**17.6**	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *85.4 %* *41-142*

Surrogate: 1-Chlorooctadecane *85.6 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S3 @ 10' (H803037-03)

BTEX 8021B mg/kg **Analyzed By: ms**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/24/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/24/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/24/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/24/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/24/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.0 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3000**	16.0	10/25/2018	ND	416	104	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *91.5 %* *41-142*

Surrogate: 1-Chlorooctadecane *90.8 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S4 @ 10' (H803037-04)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/24/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/24/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/24/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/24/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/24/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *92.1 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**608**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *94.9 %* *41-142*

Surrogate: 1-Chlorooctadecane *96.4 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: E1 @ 10' (H803037-05)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *92.4 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**10800**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	**105**	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	**18.0**	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *90.0 %* *41-142*

Surrogate: 1-Chlorooctadecane *90.9 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: E2 @ 10' (H803037-06)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *90.6 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**6800**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	**178**	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	**43.7**	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *97.5 %* *41-142*

Surrogate: 1-Chlorooctadecane *99.6 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: E3 @ 5' (H803037-07)

BTEX 8021B mg/kg **Analyzed By: ms**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *90.1 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *96.3 %* *41-142*

Surrogate: 1-Chlorooctadecane *88.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: E3 @ 7' (H803037-08)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *90.0 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**288**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *97.6 %* *41-142*

Surrogate: 1-Chlorooctadecane *89.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: E3 @ 10' (H803037-09)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.6 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**176**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *98.3 %* *41-142*

Surrogate: 1-Chlorooctadecane *90.4 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: CENTER BOTTOM (H803037-10)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *89.6 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2400**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *99.8 %* *41-142*

Surrogate: 1-Chlorooctadecane *91.8 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: W1 @ 10' (H803037-11)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	1.81	90.4	2.00	0.255	
Toluene*	<0.050	0.050	10/25/2018	ND	1.72	86.0	2.00	0.574	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.72	86.2	2.00	0.926	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.17	86.2	6.00	1.60	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.2 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2640**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *90.0 %* *41-142*

Surrogate: 1-Chlorooctadecane *85.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: W2 @ 10' (H803037-12)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	2.05	102	2.00	0.757	
Toluene*	<0.050	0.050	10/25/2018	ND	1.95	97.5	2.00	0.0918	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.94	97.0	2.00	0.831	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.84	97.3	6.00	0.672	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *92.4 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1600**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *96.9 %* *41-142*

Surrogate: 1-Chlorooctadecane *88.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: W3 @ 5' (H803037-13)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	2.05	102	2.00	0.757	
Toluene*	<0.050	0.050	10/25/2018	ND	1.95	97.5	2.00	0.0918	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.94	97.0	2.00	0.831	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.84	97.3	6.00	0.672	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.8 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**304**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<50.0	50.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	**55.9**	50.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<50.0	50.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *95.6 %* *41-142*

Surrogate: 1-Chlorooctadecane *92.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: W3 @ 7' (H803037-14)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	2.05	102	2.00	0.757	
Toluene*	<0.050	0.050	10/25/2018	ND	1.95	97.5	2.00	0.0918	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.94	97.0	2.00	0.831	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.84	97.3	6.00	0.672	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *90.5 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**720**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *91.7 %* *41-142*

Surrogate: 1-Chlorooctadecane *84.3 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: W3 @ 10' (H803037-15)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	2.05	102	2.00	0.757	
Toluene*	<0.050	0.050	10/25/2018	ND	1.95	97.5	2.00	0.0918	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.94	97.0	2.00	0.831	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.84	97.3	6.00	0.672	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *92.3 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**848**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *92.8 %* *41-142*

Surrogate: 1-Chlorooctadecane *85.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: N @ 5' (H803037-16)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	2.05	102	2.00	0.757	
Toluene*	<0.050	0.050	10/25/2018	ND	1.95	97.5	2.00	0.0918	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.94	97.0	2.00	0.831	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.84	97.3	6.00	0.672	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.4 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**272**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *88.8 %* *41-142*

Surrogate: 1-Chlorooctadecane *79.7 %* *37.6-147*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	HRL
Project Manager:	Jennifer Knowlton
Address:	
City:	Artesia State: NM Zip:
Phone #:	575-616-7398 Fax #:
Project #:	Project Owner:
Project Name:	West Pearl Queen
Project Location:	
Sampler Name:	Henrietta Price

BILL TO

P.O. #:	
Company:	HRL
Attn:	
Address:	
City:	Artesia
State:	NM Zip:
Phone:	
Fax:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	(ICE) COOL	OTHER :	SAMPLING: DATE	TIME	Chlorides	TPH	BTEX
H803037																	
1	S1 Bottom 10'	G	1			X					X		10/23/18		✓	✓	✓
2	S2 @ 10'																
3	S3 @ 10'																
4	S4 @ 10'																
5	E1 @ 10'																
6	E2 @ 10'																
7	E3 @ 5'																
8	EB @ 7'																
9	E3 @ 10'																
10	Center bottom																

Relinquished By:	Date: 10/23/18	Received By:	
Henrietta Price	Time: 1155.	Jodi Henson	
Relinquished By:	Date:	Received By:	
	Time:		

Delivered By: (Circle One)
Sampler - UPS - Bus - Other: 5.4°C / #97

Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:
JKnowlton@hrlcomp.com
HPrice@hrlcomp.com

+ Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	HRL
Project Manager:	Jennifer Knowlton
Address:	
City:	Artesia State: NM Zip: 88210
Phone #:	505 238 3588 Fax #:
Project #:	Project Owner:
Project Name:	West Pearl Queen
Project Location:	
Sampler Name:	Henrietta Price

BILL TO

P.O. #:	
Company:	HRL
Attn:	
Address:	
City:	Artesia
State:	NM Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	Chlorides	TPH	BTEX
H803037																	
11	W1 @ 10'	G	1			X					ICE		10/23/18		✓	✓	✓
12	W2 @ 10'																
13	W3 @ 5'																
14	W3 @ 7'																
15	W3 @ 10'																
16	N @ 5ft.																

Relinquished By: Henrietta Price	Date: 10/23/18 Time: 1155	Received By: Jodi Henson	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other: 5.4°C / #97	Sample Condition Cool: Yes / No Intact: Yes / No	CHECKED BY: (Initials)	

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:
Jknowlton@hrlcomp.com
hprice@hrlcomp.com

+ Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

October 26, 2018

JENNIFER KNOWLTON

HRL COMPLIANCE SOLUTIONS, INC.

2385 F 1/2 ROAD

GRAND JUNCTION, CO 81505

RE: WEST PEARL QUEEN

Enclosed are the results of analyses for samples received by the laboratory on 10/23/18 11:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
JENNIFER KNOWLTON
2385 F 1/2 ROAD
GRAND JUNCTION CO, 81505
Fax To:

Received:	10/23/2018	Sampling Date:	10/23/2018
Reported:	10/26/2018	Sampling Type:	Soil
Project Name:	WEST PEARL QUEEN	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: S5 @ 10' (H803038-01)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/25/2018	ND	2.05	102	2.00	0.757	
Toluene*	<0.050	0.050	10/25/2018	ND	1.95	97.5	2.00	0.0918	
Ethylbenzene*	<0.050	0.050	10/25/2018	ND	1.94	97.0	2.00	0.831	
Total Xylenes*	<0.150	0.150	10/25/2018	ND	5.84	97.3	6.00	0.672	
Total BTEX	<0.300	0.300	10/25/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *91.1 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1650**	16.0	10/25/2018	ND	400	100	400	3.92	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/24/2018	ND	198	99.1	200	1.27	
DRO >C10-C28*	<10.0	10.0	10/24/2018	ND	194	97.2	200	1.94	
EXT DRO >C28-C36	<10.0	10.0	10/24/2018	ND					

Surrogate: 1-Chlorooctane *103 %* *41-142*

Surrogate: 1-Chlorooctadecane *94.3 %* *37.6-147*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	HRL
Project Manager:	Jennifer knowlton
Address:	
City:	Artesia State: NM Zip:
Phone #:	505-238-3588 Fax #:
Project #:	Project Owner:
Project Name:	West Pearl Queen
Project Location:	
Sampler Name:	Henrietta Price

BILL TO

P.O. #:	
Company:	HRL
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	Chlorides	TPH	BTEX
H803038-1	S5 @ 10ft	G	1			X					X		10/23/18		✓	✓	✓

Relinquished By: Henrietta Price	Date: 10.23.18 Time: 11:55	Received By: Jodi Henson	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other: 5.4°C / #97	Sample Condition: Cool Yes / No; Intact Yes / No	CHECKED BY: (Initials)	

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:
jknowlton@hrlcomp.com
hprice@hrlcomp.com