Form C-141
Page 3

State of New Mexico
Oil Conservation Division

Incident ID	NAPP2121549676
District RP	
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?	38 (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.

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State of New Mexico
Oil Conservation Division

Incident ID	NAPP2121549676
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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: KYLE ALPERS Title: VICE PRESIDENT OF ENGINEERING

Signature: Date: 12/2/19

email: KALPERS@AECNM.COM Telephone: 575-623-2999 EXT. 305

OCD Only

Received by: Jocelyn Harimon Date: 08/31/2022

Form C-141
Page 6

State of New Mexico
Oil Conservation Division

Incident ID	NAPP2121549676
District RP	
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

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Printed Name: KYLE ALPERS Title: VICE PRESIDENT OF ENGINEERING

Signature: Date: 12/2/19

email: KALPERS@AECNM.COM Telephone: 575-623-2999 EXT. 305

OCD Only

Received by: Jocelyn Harimon Date: 08/31/2022

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: Jennifer Nobui Date: 09/08/2022

Printed Name: Jennifer Nobui Title: Environmental Specialist A

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Page 3

State of New Mexico
Oil Conservation Division

Incident ID	
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Printed Name: KYLE ALPERS Title: VICE PRESIDENT OF ENGINEERING

Signature: Date: 9/25/22

email: KALPERS@AECNM.COM Telephone: 575-623-2999 EXT. 305

OCD Only

Received by: Date:

Form C-141
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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

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Printed Name: KYLE ALPERS Title: VICE PRESIDENT OF ENGINEERING

Signature: Date: 9/25/20

email: KALPERS@AECNM.COM Telephone: 575-623-2999 EXT. 305

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

SITE CHARACTERIZATION AND CLOSURE REPORT

Property:

ARMSTRONG ENERGY CORPORATION
DORA DEAN 24 # 1 SWD
ROOSEVELT COUNTY, NEW MEXICO
UNIT LETTER "B", SECTION 24, TOWNSHIP 5 SOUTH, RANGE 33 EAST
LATITUDE 33.86264° N, LONGITUDE 103.42913° W
API NUMBER: 30-041-20938

SEPTEMBER 2019

Prepared For:

ARMSTRONG ENERGY CORPORATION
P.O. BOX 1973
ROSWELL, NM 88202
ATTN: **MR. KYLE ALPERS**

Prepared By:

Natalie Gordon
Project Manager

INNOVATIVE SOLUTIONS DELIVERED

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

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ACRONYM LIST

bbl(s)	barrel(s)
bgs	feet below ground surface
Armstrong	Armstrong Energy
EPA	U.S. Environmental Protection Agency
ft	feet
GPS	global positioning system
HRL	HRL Compliance Solutions
NRCS	Natural Resources Conservation Service
NMAC	New Mexico Administrative Code
NM OCD	New Mexico Oil Conservation Division
NM OSE	New Mexico Office of the State Engineer
PW	produced water
SWD	saltwater disposal
USDA	United States Department of Agriculture
USGS	United States Geological Survey

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EXECUTIVE SUMMARY

HRL Compliance Solutions (HRL) was retained by Armstrong Energy Corporation (Armstrong) to conduct a site characterization assessment and liner inspection at the Dora Dean 24 #1 Saltwater Disposal (SWD) on September 4, 2019. The objective of the site assessment was to determine if there are any indications of chloride and/or hydrocarbon impacts from the release that occurred due to a lightning strike and subsequent fire on September 1, 2019. The objective of the liner inspection was to demonstrate continued liner integrity and verify that it remained intact and had the ability to contain the release in question. This report is also intended to serve as a final closure report to obtain approval from New Mexico Oil Conservation Division (NM OCD) for closure of the release.

OVERVIEW:

- Lightning strike on one of the storage tanks at Dora Dean 24 # 1 SWD in the early morning hours of September 1, 2019.
- The resulting fire destroyed all 4 tanks within the battery.
- An estimated 815 barrels (bbls) of produced water were released from the burning tanks into the lined secondary containment.
- An automated warning system alerted personnel of the fire and efforts were made to douse the flames.
- An estimated 660 bbls of produced water was recovered from the containment area using a vacuum truck. An estimated 155 bbls of produced water is believed to have evaporated as a result of the fire.
- Armstrong contacted HRL on September 4, 2019 to evaluate and remediate the spill and to obtain closure from NM OCD.
- HRL conducted a liner inspection on September 23, 2019 and the findings are presented in this report.

RECOMMENDATION:
Given the location of the release wholly within the lined secondary containment and the evaluation and discussion captured in Section 2.4 of this report, HRL recommends that no further action be taken regarding this release. Certification of the liner integrity on form C-141 and this closure report is hereby submitted to NM OCD to obtain closeout of the incident.

1.0 INTRODUCTION

1.1 RELEASE AND INITIAL RESPONSE

On September 1, 2019, a release at Armstrong Energy's (Armstrong) saltwater disposal (SWD) site, Dora Dean 24 # 1 (Dora Dean), occurred when lightning struck one of the tanks, resulting in a fire that destroyed all of the produced water (PW) storage on site. This incident resulted in the release of 815 barrels (bbls) of produced water into the tank battery lined secondary containment. A vacuum truck was brought on site and 660 bbls of free liquid were recovered. An estimated 155 bbls of PW is believed to have evaporated as a result of the fire. No oil or produced water was released outside of the secondary containment area.

Armstrong notified representatives of the New Mexico Oil Conservation Division (NM OCD) and submitted an initial C-141 Release Notification (Appendix A) to NM OCD through their online portal on September 4, 2019. HRL Compliance Solutions (HRL) was contacted by Armstrong on September 4, 2019 to conduct a site assessment for the release at Dora Dean as well as a liner inspection and submit required documentation per 19.15.29 New Mexico Administrative Code (NMAC) regulations to obtain NM OCD closure of the incident.

1.2 PURPOSE OF REPORT

This report, which has been prepared for the exclusive use of Armstrong Energy Corporation, presents the methods and results of the environmental investigation (site characterization) conducted at Dora Dean on September 23, 2019, by HRL. The objective of this site characterization report is to establish that remediation is complete, all applicable regulations are being followed, and to serve as a final closure report to obtain approval from NM OCD for closure of the release that occurred on September 1, 2019.

1.3 SCOPE AND LIMITATIONS

The scope of HRL's services consists of performing site characterization including a regional and local desktop review of potential receptors, verification of release stability, conducting a liner inspection, providing regulatory liaison, and preparation of this characterization report and recommendations associated with the incident specified therein. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin in New Mexico.

2.0 SITE CHARACTERIZATION

2.1 GENERAL SITE INFORMATION

The following information provides a brief outline of the site location and site conditions.

2.1.1 Site Location

Dora Dean 24 # 1 SWD is located on privately-owned land in Unit Letter "B", Section 24, Township 5 South, Range 33 East in Roosevelt County (Figure 1). This location is at the northern extent of the Permian Basin in southeast New Mexico and has historically been used for oil and gas exploration and production, and range land.

2.1.2 Site Description

Dora Dean is typical for oil and gas exploration and production sites in the Permian Basin and southeastern and eastern New Mexico, and it is currently used for produced water storage and disposal. This characterization report discusses an area on the pad within the secondary containment of the tank battery. The impacted area was underneath and around the produced water holding tanks, all of which are inside a lined secondary containment on the two-foot thick, constructed pad.

The surrounding landscape is comprised of upland plains with a semiarid climate and average annual precipitation ranging between 14 and 16 inches. Native vegetation is principally shortgrass and midgrass species such as black grama, blue grama, and sideoats grama and the occasional forbs (Soil Survey Staff, n.d.). Limited vegetation is allowed to grow on the compacted production pad and no vegetation grows within the secondary containment.

2.1.3 Topography

Dora Dean is located at an elevation of approximately 4,371 feet above sea level on flat upland plains typically with a 0-3 percent slope.

2.1.4 Geology

According to the United States Department of Agriculture (USDA) Web Soil Survey, the majority surface soil geology at Dora Dean is Spraberry fine sandy loam, which consists of fine sandy loam over a layer of cemented material and gravelly, sandy loam. The soil tends to be well-drained with high runoff and very low available water storage in the soil profile.

The geology at Dora Dean comes from older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of the High Plains region dating back to the middle to lower Pleistocene age. Although the site is within an area of sedimentary rocks known to locally contain piping or other pseudokarst features, it is not found over true karst geology and is therefore not subject to the requirements of Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

2.1.5 Surface Water

There is no surface water located at the Dora Dean SWD site. Based on USGS National Hydrology Maps, the nearest significant watercourses as defined in Subsection P of 19.15.17.7

NMAC are an intermittent pond located 0.5 miles due west of the tank battery and an intermittent stream located approximately 1 mile south of the tank battery (Figure 2).

2.1.6 Groundwater

Using the NM Office of the State Engineer (NM OSE) Water Column Report, depth to groundwater is estimated to be an average of 46 feet below ground surface (bgs) for an area with a radius of 6 miles around the release location. The minimum depth to groundwater in that same area is 12 ft bgs.

Because NM OSE did not show detailed depth to groundwater information for an area closer to the release site, additional groundwater information was obtained from the United States Geological Survey (USGS) National Water Information System. Of the six USGS wells within two miles of Dora Dean, the shallowest depth to groundwater is 38 feet bgs (Figure 3). See Appendix B for information pertaining to the depth to groundwater determination.

2.1.7 Known Water Sources

There are no known water sources within a half mile of the release as stated in Section 2.1.6 of this report. There are no continuously flowing watercourses or significant watercourses, nor any lakebeds, sinkholes, playa lakes, or other critical water or community features as outlined in Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

2.1.8 Oil and Gas Production/Transfer/Storage Equipment

The release occurred within the tank battery secondary containment on the Dora Dean SWD pad (Figure 1). There were a total of five produced water tanks located within this secondary containment prior to the fire. No additional production equipment is located at this site and no equipment outside of the tank battery was affected by the release.

2.2 INVESTIGATION METHODS

The following information discusses the actions performed at Dora Dean SWD as part of the evaluation and closure activities conducted on September 23, 2019.

2.2.1 Soil Sampling Procedures

No soil sampling was conducted at Dora Dean following vacuum removal of the free liquids because the release was contained within the lined secondary containment where there is no soil.

2.2.2 Liner Inspection and Verification

HRL conducted a visual liner inspection on September 23, 2019. Following appropriate notice to NM OCD District I office, the liner was visually inspected for cracks, tears, cuts, and other signs of damage to verify that the liner remained intact and had the ability to contain the release, as required by Subparagraph (a) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC.

2.3 EVALUATION OF DATA AND DISCUSSION

This section presents investigation results and evaluates the results in respect to NM OCD site characterization requirements and/or guidelines.

2.3.1 Dora Dean 24 # 1 SWD

The site assessment and liner inspection conducted on September 23, 2019 was conducted under NM OCD guidance found in Subparagraph (a) of Paragraph (5) of Subsection A in 19.15.29.11 NMAC. The inspection, along with photographic evidence provided by Armstrong, identified that the liner had fully contained the release and there were no indications of adverse conditions on or near the site. The inspection also identified that the old lined, earthen berm secondary containment had been removed and a new, permanent secondary containment structure was being installed.

3.0 RISK ASSESSMENT

3.1 POTENTIAL RECEPTOR EVALUATION

No potential receptors were identified either on- or off-site based on the following findings.

3.1.1 Human Receptors

There are ongoing SWD operations at the site. Current contamination levels, if any, do not pose a threat to human health so long as existing company health and safety guidelines are followed by site personnel. There is no threat to human health for offsite human receptors due to the fact the release was entirely contained within the secondary containment.

3.1.2 Ecological Receptors

There are no ecological receptors identified which may be threatened by the release that occurred within the Dora Dean secondary containment. Offsite, there are no ecological receptors identified which may be threatened by the minimal presence of hydrocarbons and chlorides that may be present within the lined secondary containment of this tank battery.

3.1.3 Wells and Surface Water

There are no potable wells, non-potable wells, or surface water bodies, onsite nor offsite, that are close enough to be adversely affected by this release (Figure 3). Groundwater is at a sufficient depth below ground surface such that it is not expected to be affected by any hydrocarbons or chlorides that were previously present in the secondary containment as a result of this release.

4.0 REMEDIATION ASSESSMENT

4.1 REMEDIATION DRIVERS AND CLEANUP OBJECTIVES

Clear remediation drivers and objectives are required to establish the framework within which potential remedial technologies are evaluated and compared. The remediation driver for this site is compliance with NM OCD regulations and directives to ensure proper cleanup at the Dora Dean SWD location. Cleanup objectives are chemical and media-specific goals that are protective of human health and the environment and must be achieved to meet regulatory requirements outlined in Table I in 19.15.29 NMAC.

4.2 RECOMMENDATION

Given the location of the spill, the producer's immediate removal of free liquids from the secondary containment area following the release and, based on the success of the liner verification and installation of an upgraded secondary containment system, HRL recommends no additional remediation action to address this release. The presence of any contaminants of concern at the site resulting from the above-referenced release, were wholly contained within the lined secondary containment and have since been removed from site along with the previous liner. There are no anticipated risks to human, ecological, or hydrological receptors at the Dora Dean location.

5.0 CLOSURE

Due to the reasons outlined in Section 4.2 above, HRL recommends that this incident (RP # not yet assigned) be closed. All liner certification requirements as set forth in Subsection A of 19.15.29.12 NMAC and any closure requirements set forth in Subsection E of 10.15.29.12 have been met. Photos included in Appendix C of this report demonstrate the liner certification assertions. Armstrong Energy Corporation certifies that all information in this report and the attachments is correct and that Armstrong has complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NM OCD requirements to obtain closure on the release at Dora Dean 24 # 1 SWD.

6.0 REFERENCES

Geological Survey Staff, United States Geological Survey, U.S. Department of the Interior. Groundwater for New Mexico: Water Levels. Available online at: https://nwis.waterdata.usgs.gov/nm/nwis/gwlevels. Accessed [09/26/2019].

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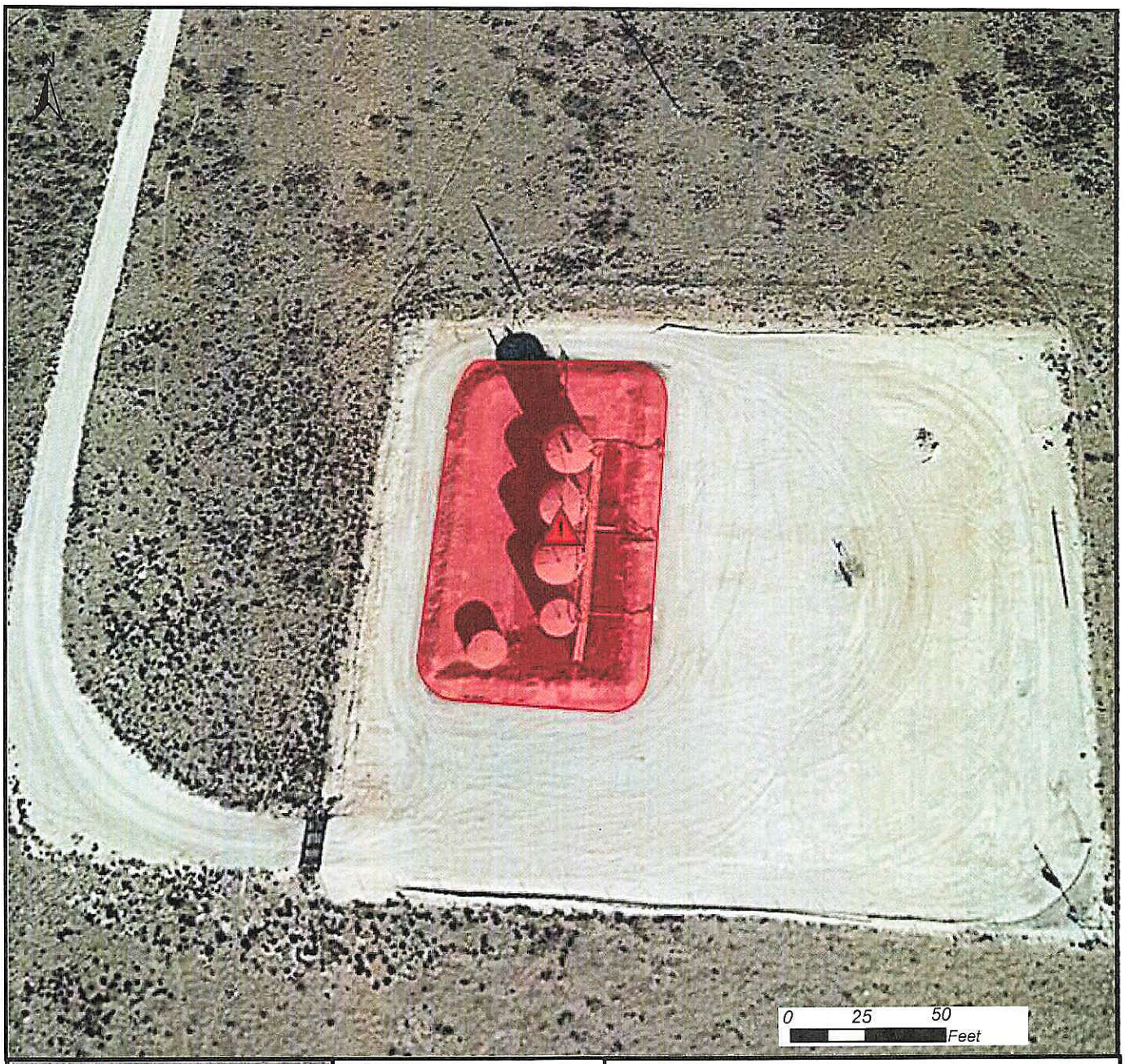

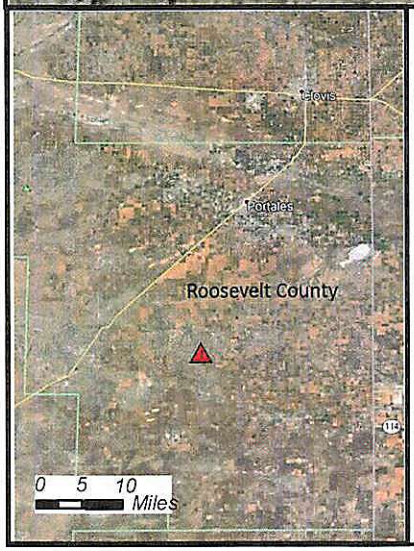

Mapped Features

Release Location

Secondary Containment

Armstrong Energy Corporation

Figure 1

Site Location Map

Dora Dean 24 # 1 SWD

33.86264, -103.42913

Section 24, Township 5South, Range 33 East

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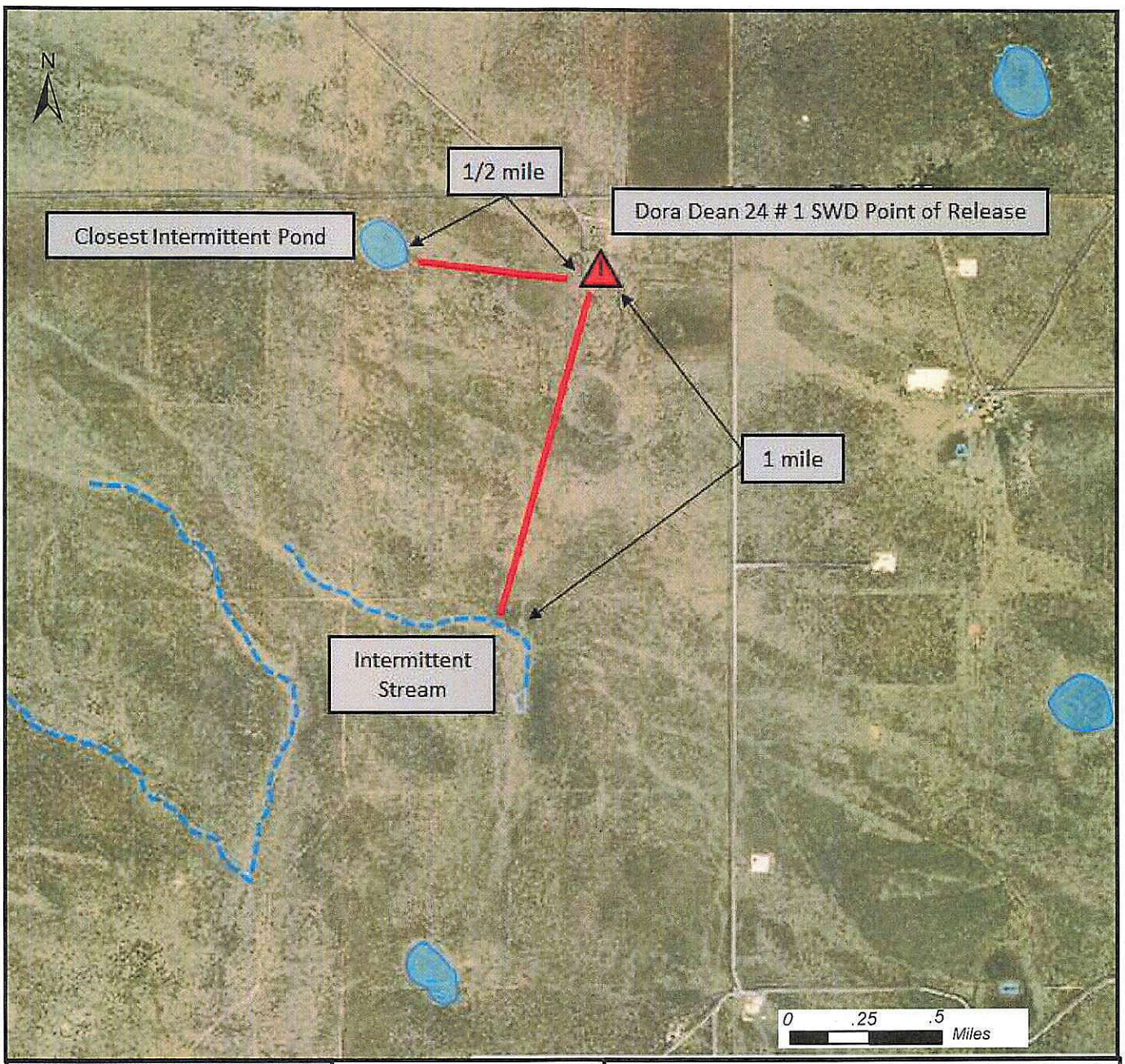
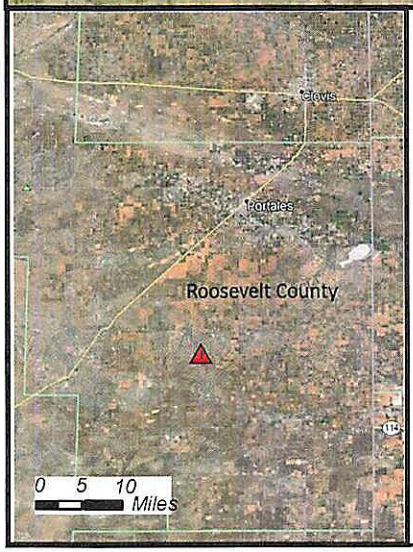
Author:	N. Gordon
Revision:	0
Date:	09/26/2019





Mapped Features

- Release Location
- Intermittent Pond
- Intermittent Stream

Armstrong Energy Corporation

Figure 2

Nearest Surface Water

Dora Dean 24 # 1 SWD

33.86264, -103.42913

Section 24, Township 5South, Range 33 East

HRL COMPLIANCE SOLUTIONS

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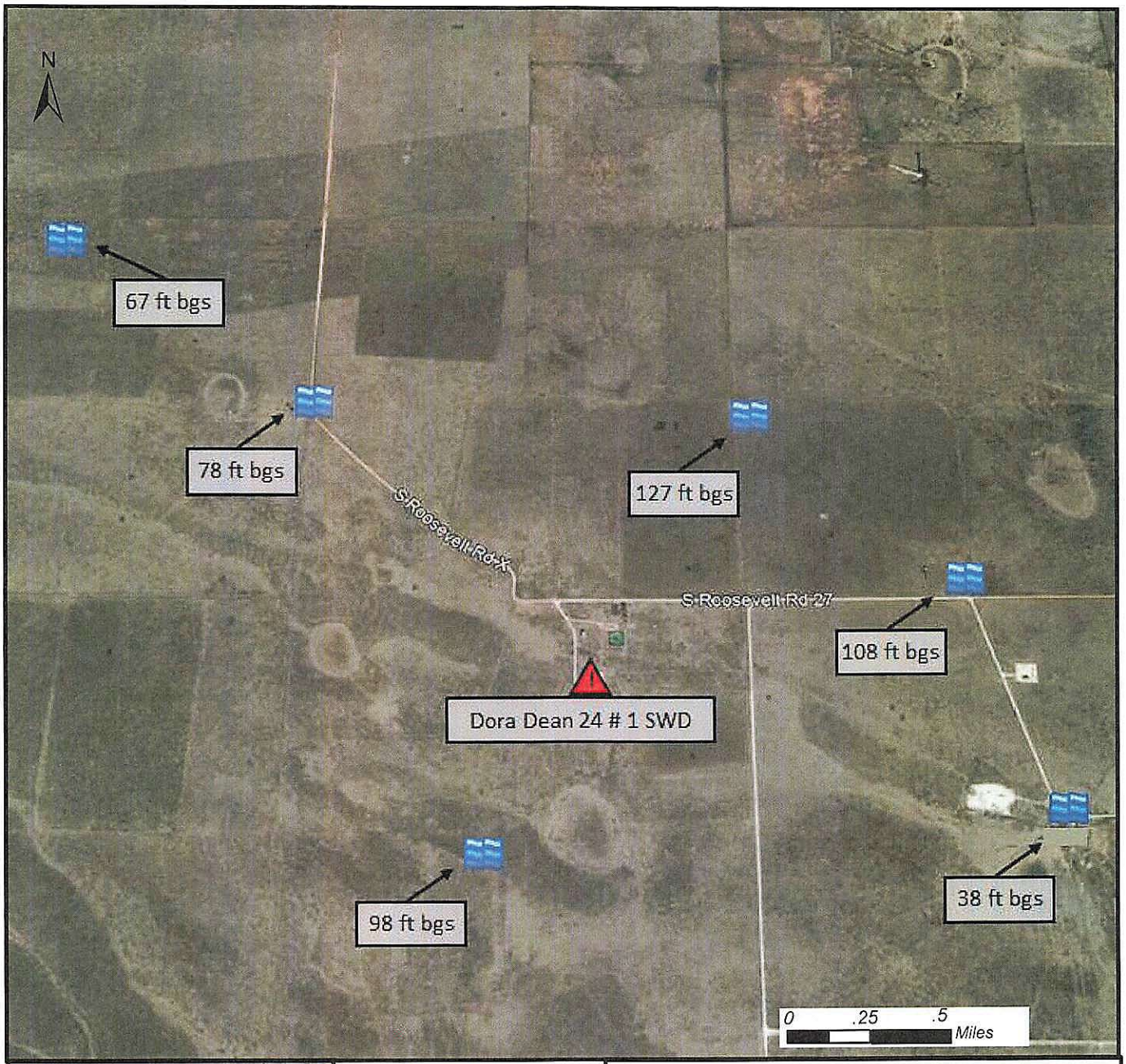
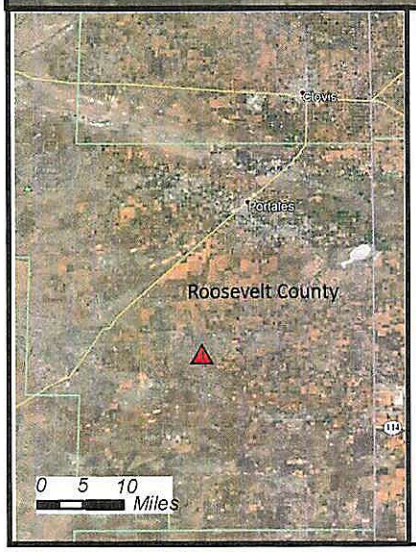




Mapped Features

Release Location

Groundwater Wells

Armstrong Energy Corporation

Figure 3

Nearest Groundwater Wells and Depth to Groundwater

Dora Dean 24 # 1 SWD

33.86264, -103.42913

Section 24, Township 5South, Range 33 East

HRL COMPLIANCE SOLUTIONS

Author:	N. Gordon
Revision:	0
Date:	09/26/2019

Appendix A: Initial C-141

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	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party ARMSTRONG ENERGY CORPORATION	OGRID 1092
Contact Name KYLE ALPERS	Contact Telephone (575) 623-2999 Ext. 305
Contact email kalpers@aecnm.com	Incident # *(assigned by OCD)*
Contact mailing address P.O. BOX 1973 ROSWELL, NM	88202

Location of Release Source

Latitude 33.86264 Longitude -103.42913
(NAD 83 in decimal degrees to 5 decimal places)

Site Name DORA DEAN 24 # 1	Site Type SWD
Date Release Discovered 9/1/2019	API# *(if applicable)* 30-041-20938

Unit Letter	Section	Township	Range	County
B	24	5S	33E	ROOSEVELT

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) 815 BBLS	Volume Recovered (bbls) 660 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

LIGHTNING STRIKE ON TANK BATTERY CAUSED A FIRE WHICH DESTROYED MOST OF THE TANKS IN THE BATTERY. THE RELEASE WAS CONTAINED WITHIN THE LINED BERM SECONDARY CONTAINMENT.

Form C-141
Page 2

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
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? THE VOLUME OF PRODUCED WATER RELEASED EXCEEDED 25 BBLS.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? IMMEDIATE NOTICE WAS NOT PROVIDED TO OCD. THIS FORM IS FIRST NOTIFICATION.	

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: KYLE ALPERS Title: VICE PRESIDENT OF ENGINEERING

Signature: Date: 9/25/20

email: KALPERS@AECNM.COM Telephone: 575-623-2999 EXT. 305

OCD Only

Received by: Date:

Appendix B: Depth to Groundwater Analysis

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

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

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

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

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Twn	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
CL 00156 POD1		CL	RO	1	1	2	24	05S	33E	645169	3748205*	217	130		
CL 00157 POD1		CL	RO	3	3	4	13	05S	33E	645163	3748407*	397	130		
CL 00158 POD1		CL	RO	2	2	4	13	05S	33E	645760	3749020*	1083	169		
CL 00099 POD1		CL	RO		2	2	14	05S	34E	653698	3749861*	8587	165		
CL 00100 POD1		CL	RO		2	2	14	05S	34E	653698	3749861*	8587	185	115	70
CL 00105 POD1		CL	RO	3	3	2	28	04S	33E	640209	3755527*	9060	38	12	26
CL 00108 POD1		CL	RO	3	3	2	28	04S	33E	640209	3755527*	9060	38	12	26

Average Depth to Water: **46 feet**
Minimum Depth: **12 feet**
Maximum Depth: **115 feet**

Record Count: 7

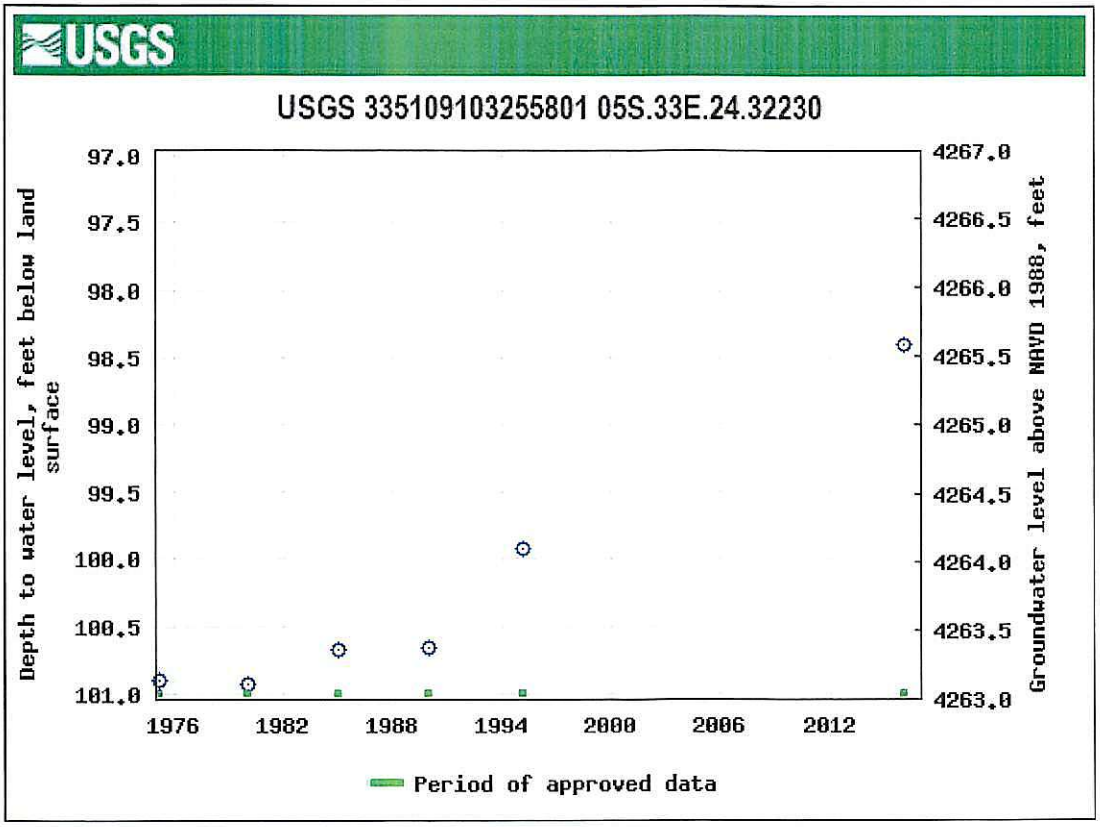
UTMNAD83 Radius Search (in meters):

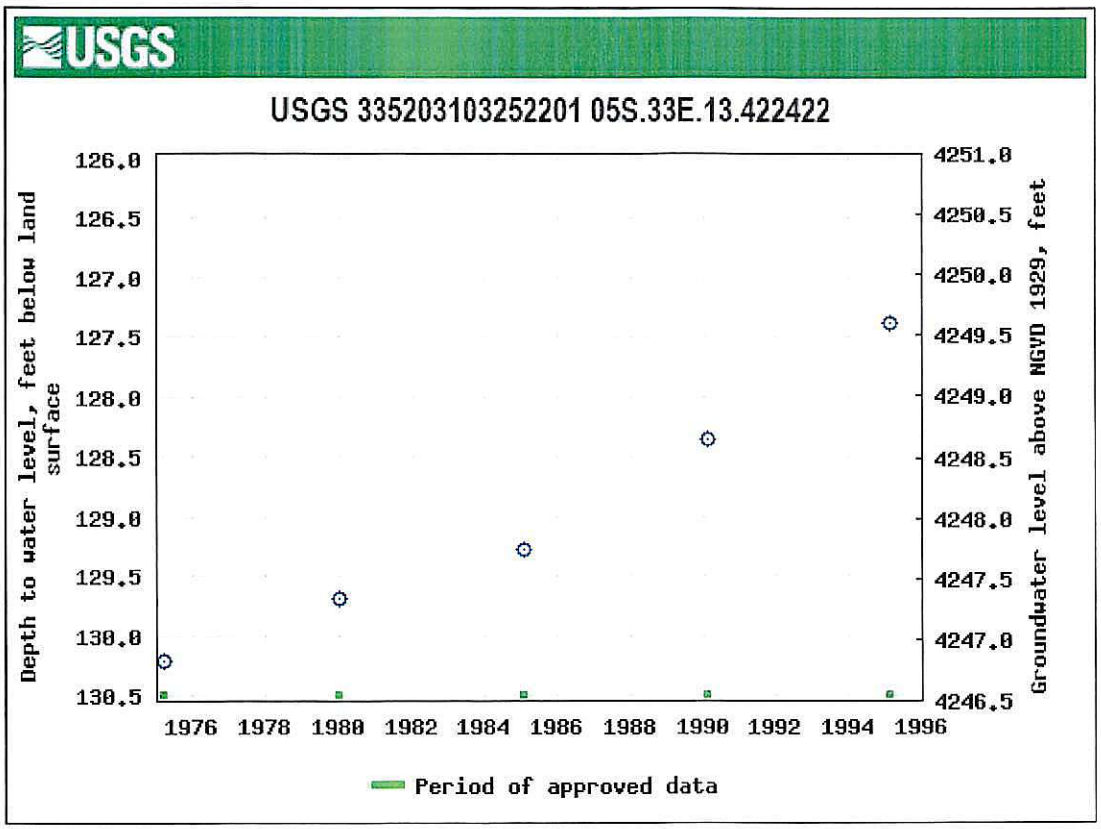
Easting (X): 645306.48 **Northing (Y):** 3748036 **Radius:** 10000

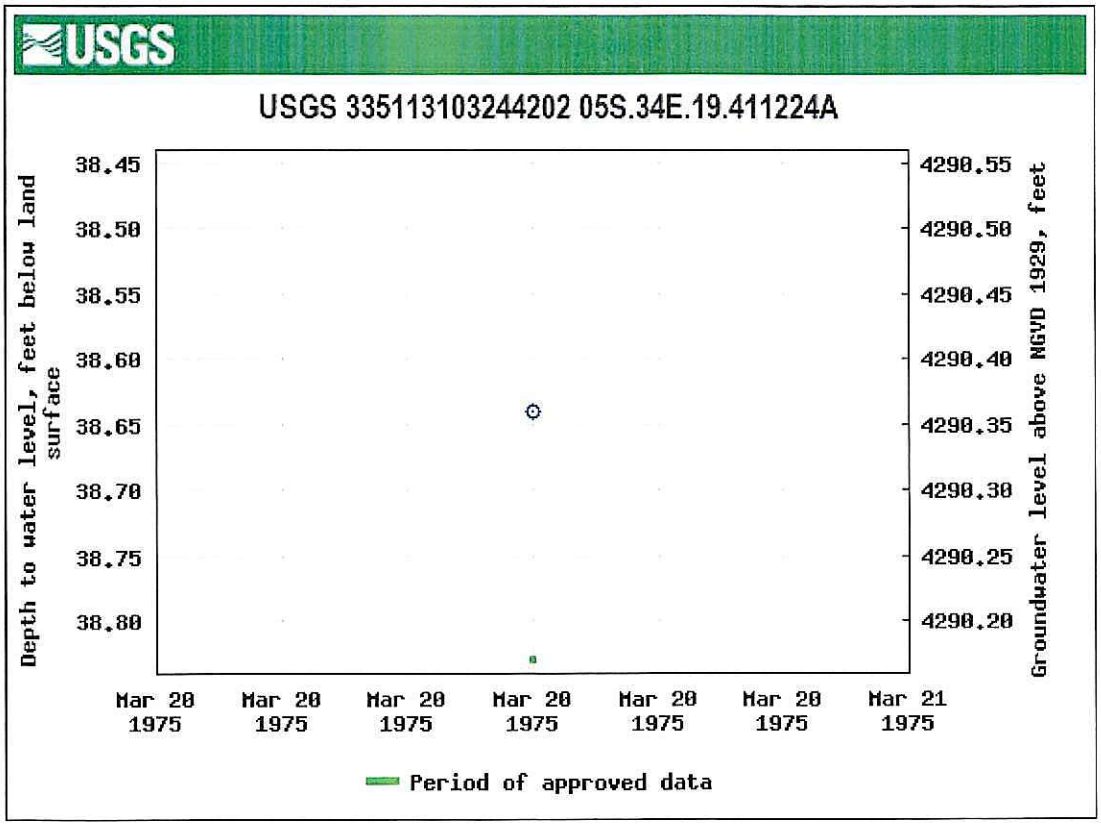
***UTM location was derived from PLSS - see Help**

9/26/19 10:39 AM

WATER COLUMN/ AVERAGE DEPTH TO WATER


USGS
USGS 335109103255801 05S.33E.24.32230
Depth to water level, feet below land surface
97.0
97.5
98.0
98.5
99.0
99.5
100.0
100.5
101.0
Groundwater level above NAVD 1988, feet
4267.0
4266.5
4266.0
4265.5
4265.0
4264.5
4264.0
4263.5
4263.0
1976
1982
1988
1994
2000
2006
2012
Period of approved data


USGS
USGS 335203103252201 05S.33E.13.422422
Depth to water level, feet below land surface
126.0
126.5
127.0
127.5
128.0
128.5
129.0
129.5
130.0
130.5
Groundwater level above NGVD 1929, feet
4251.0
4250.5
4250.0
4249.5
4249.0
4248.5
4248.0
4247.5
4247.0
4246.5
1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996
Period of approved data


USGS
USGS 335113103244202 05S.34E.19.411224A
Depth to water level, feet below land surface
38.45
38.50
38.55
38.60
38.65
38.70
38.75
38.80
Groundwater level above NGVD 1929, feet
4290.55
4290.50
4290.45
4290.40
4290.35
4290.30
4290.25
4290.20
Mar 20 1975
Mar 20 1975
Mar 20 1975
Mar 20 1975
Mar 20 1975
Mar 20 1975
Mar 21 1975
Period of approved data

Appendix C: Photographs

Photograph 1: Burned Production Water Storage Tanks and Standing Water in Lined, Bermed Secondary Containment

Photograph 2: Original Secondary Containment Holding All Released Liquids

Photograph 3: Produced Water Release Contained in Secondary Containment

Photograph 4: Secondary Containment Liner and Earthen Berm Removed

Photograph 5: Removal of Secondary Containment Liner and Berm to Make Way for New Secondary Containment Structure

Photograph 6: Pad Surface Prepared for Installation of New Secondary Containment Structure

Photograph 7: Brand New Secondary Containment Structure Installed

Photograph 8: New Storage Tank Bases Installed in New Secondary Containment Structure

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

December 4, 2020

Mr. Kyle Alpers
Armstrong Energy Corporation
P.O. Box 1973
Roswell, New Mexico 88202

Subject: **Liner Inspection and Closure Report**
Dora Dean 24 #1
NRM1926756372
Roosevelt County, New Mexico

Dear Mr. Alpers:

Armstrong Energy Corporation (Armstrong) (Client) retained HRL Compliance Solutions, Inc. (HRL) to conduct a liner inspection and prepare this closure report for the September 1, 2019 release at Dora Dean 24 #1 well pad (Site). The Site is in Roosevelt County, New Mexico (Figure 1).

Release Summary and Initial Response

On September 1, 2019, a release of 815 barrels of produced water was observed at the Site. The release was caused by a lightning strike to a storage tank, resulting in a fire. The entire release was contained within the lined earthen berm. Initial response activities included stopping the source of the release, securing the impacted area and removing free liquids within the secondary containment. 660 barrels of produced water was recovered; the remaining 155 barrels was consumed by the fire. On September 4, 2019 the C-141 (Attachment A) was submitted to the New Mexico Oil Conservation Division (NMOCD).

Item	Discussion
Site Name	Dora Dean 24 #1
Latitude	33.86264
Longitude	-103.42913
Unit/Section/Township/Range	Unit B / Section 24 / Township 5 South / Range 33 East
Release Number	NRM1926756372
Date Release Discovered	9/1/2019
Cause of Release	Lightning Strike to a Storage Tank
Type of Material Released	Produced water
Volume Release	815 barrels

Item	Discussion
Volume Recovered	660 barrels

Liner Inspection

On September 3, 2019, after the released fluid was removed from the lined earthen berm, Armstrong conducted a site visit and took photographs of the lined earthen berm (Attachment B, Photographs). No holes or breaches were observed in the lined earthen berm. Additionally, these photographs show the maximum fluid line within the berm; which based on its consistency across the berm in addition to the absence of stained soil outside of the berm, demonstrate that the lined earthen berm fully contained the release. Based on these photographs, HRL has determined that the lined earthen berm fully contained the release (Attachment C, Inspection Form).

New Mexico Administrative Code (NMAC) Site Characterization Criteria

Title 19, Chapter 15, Part 29, Section 11 of the New Mexico Administrative Code (NMAC) provides requirements for release characterization once the free liquids and recoverable materials have been removed from the Site.

Site Map

A scaled diagram depicting the site and nearby significant features has been prepared (Figure 1).

Depth to Groundwater

Depth to groundwater at the release was estimated by evaluating data from the New Mexico Office of the State Engineer (NMOSE) and United States Geological Survey (USGS) (Figure 2). The nearest groundwater well was approximately 0.49 miles from the Site; the depth to water in this well was 98.45 feet below ground surface (bgs).

Wellhead Protection Area

There are no sources of water, including springs, wells, or other sources of fresh water, within one-half mile of the release.

Distance to Nearest Significant Watercourse

A significant watercourse is defined as "…a watercourse with a defined bed and bank either named or identified by a dashed blue line on a USGS 7.5-minute quadrangle map or the next lower order tributary with a defined bed and bank" (19.15.17.7 NMAC). There are no significant watercourses within one –half mile of the Site.

Additional Site Characterization Criteria

The following additional site characterization criteria were evaluated for the release.

Site Characterization	Response/Discussion
What is the shallowest depth to groundwater beneath the area affected by the release?	Between 50 feet and 100 feet
Did the release impact groundwater or surface water?	No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or other significant watercourse?	No
Are the lateral extents of the release within 200 feet of a lakebed, sinkhole, or playa lake?	No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital institution, or church?	No
Are the lateral extents of the release within 500 feet of a spring or private, domestic fresh water well used by less than five households for domestic or stock watering purposes?	No
Are the lateral extents of the release within 1,000 feet of any fresh water well or spring?	No
Are the lateral extents of the release within any incorporated municipal boundaries?	No
Are the lateral extents of the release within a defined municipal fresh water well field?	No
Are the lateral extents of the release within 300 feet of a wetland?	No
Are the lateral extents of the release overlying a subsurface mine?	No
Are the lateral extents of the release overlying an unstable area such as karst geology?	The Site is in an area of low potential for karst topography
Are the lateral extents of the release within the 100-year floodplain?	No
Did the release impact areas not on an exploration, development, production, or storage site?	No

Conclusions and Recommendations

The September 1, 2019 release of 815 barrels of produced water at the Site was completely contained within the lined containment structure. HRL has determined that the liner integrity was good and completely contained the release; therefore, additional characterization of the soil and/or groundwater at the Site is not necessary. HRL recommends closure of this release.

Scope and Limitations

The scope of HRL's services consists of performing a liner integrity inspection and preparation of this closure report. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin.

If you have any questions or concerns, please do not hesitate to contact me at (970) 243-3271 or via email at jlinn@hrlcomp.com.

Sincerely,

HRL Compliance Solutions, Inc.

Julie Linn, PG, RG
Project Manager

Figures:

Figure 1: Site Location Map
Figure 2: Depth to Groundwater Map

Attachments:

Attachment A: NMOCD Form C-141
Attachment B: Photographs
Attachment C: Liner Inspection Field Form

Figures

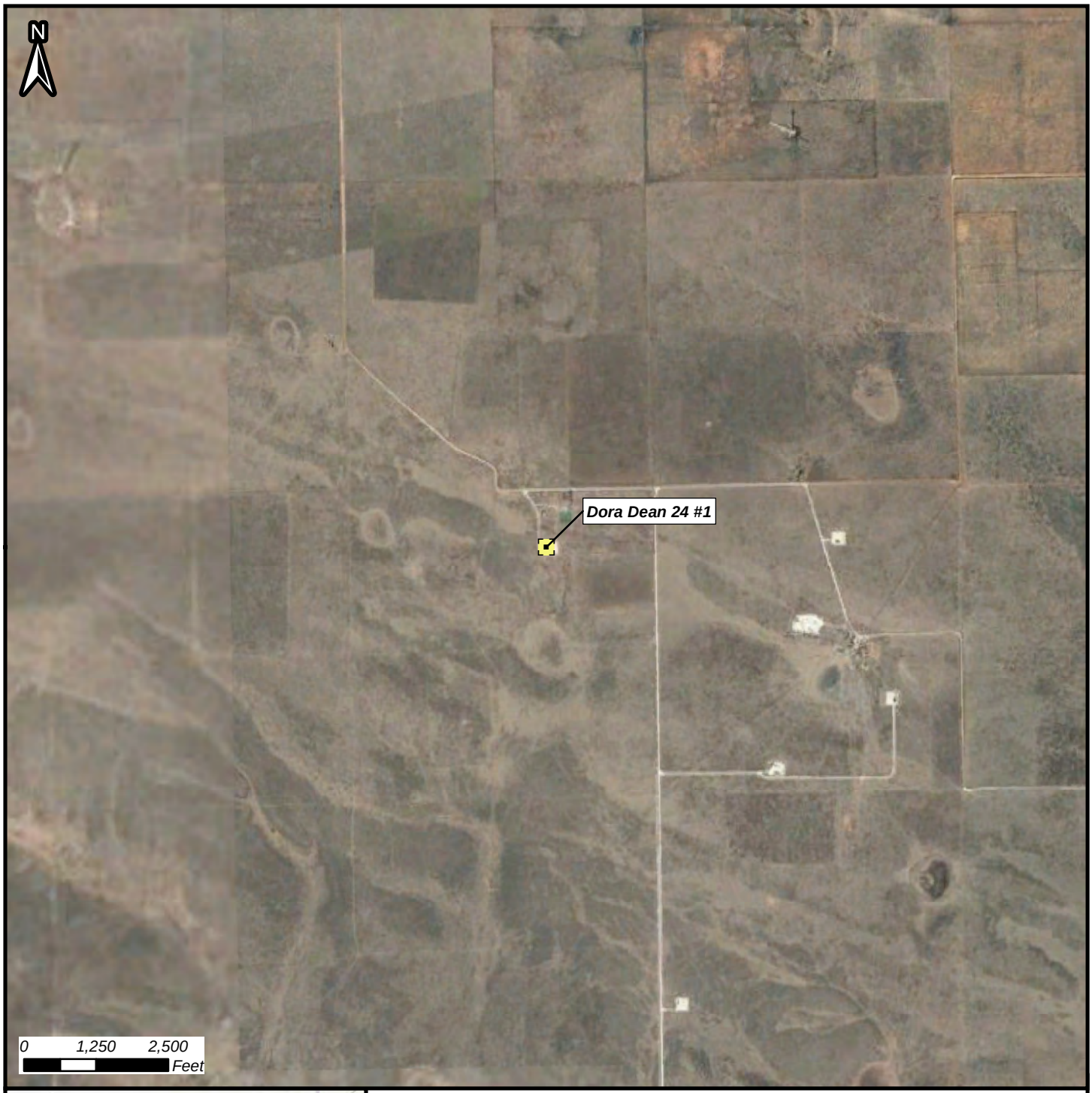


Figure 1: Site Location Map

Dora Dean 24 #1
September 2019 Release

33.86264, -103.42913
Section 24, Township 5 South, Range 33 East

NOTES / COMMENTS:

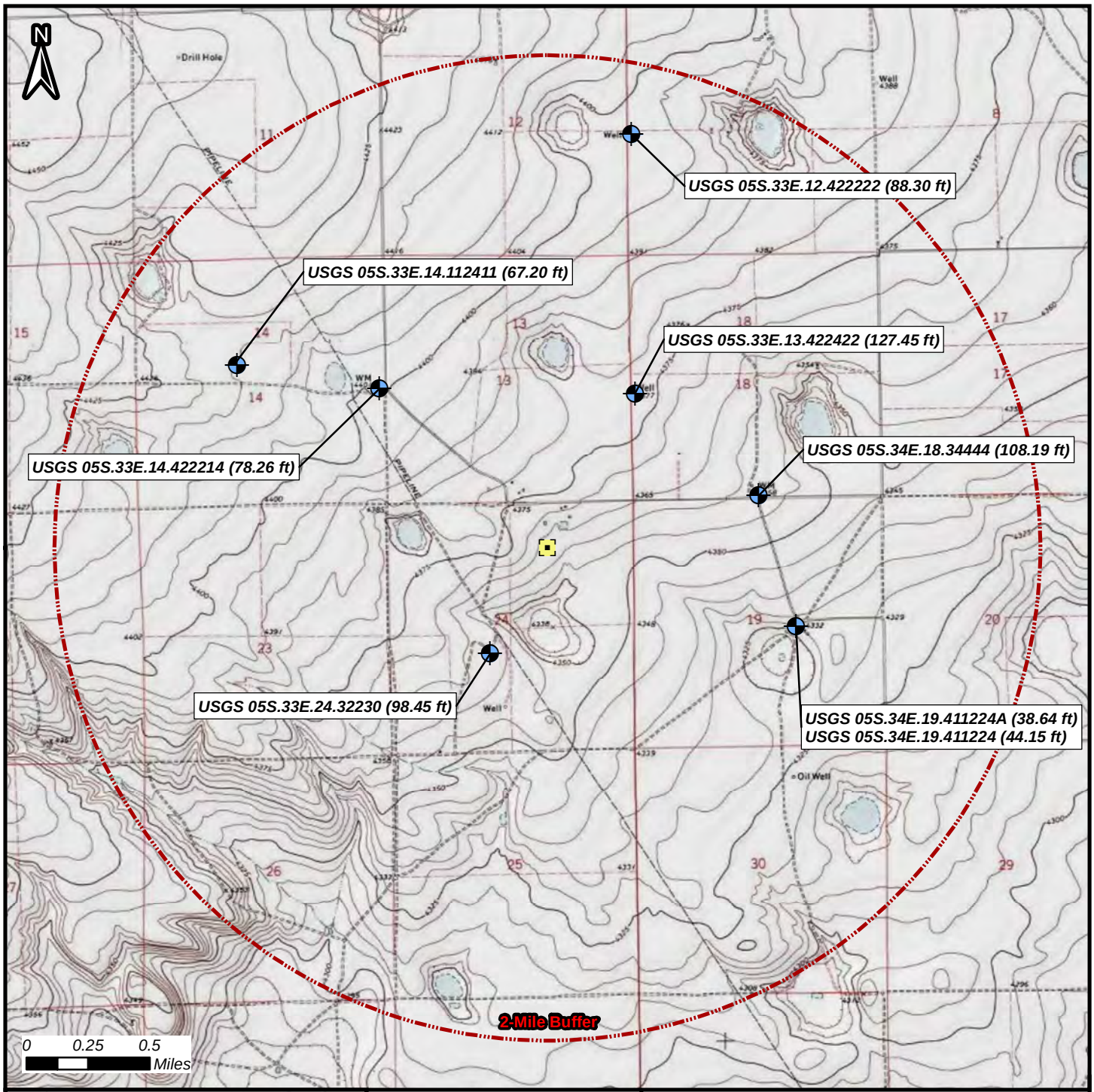
Mapped Features

Facility Location

HRL COMPLIANCE SOLUTIONS

Author: A. Asay
Revision: 0
Date: 11/24/2020

T:\CLIENTS\ARMSTRONG ENERGY CORPORATION\2020\Dora Dean 24 #1\Maps\Dora Dean 24 #1 Site Location Map 112420.mxd



Mapped Features

- Point of Release
- Groundwater Well
- 2-Mile Buffer

NOTES / COMMENTS:

The nearest well permitted by the NMOSE (CL 00100 POD1) is approximately 5.33 miles to the east-northeast of the facility.

Figure 2: Depth to Groundwater Map

Armstrong

Dora Dean 24 #1
September 2019 Release

33.86264, -103.42913
Section 24, Township 5 South, Range 33 East

Well Number	Water Level Below Ground Surface (ft)	Distance from Source (mi)
USGS 05S.34E.19.411224A	38.64	1.06
USGS 05S.34E.19.411224	44.15	1.06
USGS 05S.34E.18.34444	108.19	0.88
USGS 05S.33E.13.422422	127.45	0.72
USGS 05S.33E.24.32230	98.45	0.49
USGS 05S.33E.14.422214	78.26	0.94
USGS 05S.33E.12.422222	88.30	1.71
USGS 05S.33E.14.112411	67.20	1.46

HRL COMPLIANCE SOLUTIONS

Author: A. Asay
Revision: 0
Date: 11/25/2020

T:\CLIENTS\ARMSTRONG ENERGY CORPORATION\2020\Dora Dean 24 #1\Maps\Dora Dean 24 #1 DTGW Map 112420.mxd

Attachment A

NMOCD Form C-141

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	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party ARMSTRONG ENERGY CORPORATION	OGRID 1092
Contact Name KYLE ALPERS	Contact Telephone (575) 623-2999 Ext. 305
Contact email kalpers@aecnm.com	Incident # *(assigned by OCD)*
Contact mailing address P.O. BOX 1973 ROSWELL, NM 88202	

Location of Release Source

Latitude 33.86264 Longitude -103.42913
(NAD 83 in decimal degrees to 5 decimal places)

Site Name DORA DEAN 24 # 1	Site Type SWD
Date Release Discovered 9/1/2019	API# *(if applicable)* 30-041-20938

Unit Letter	Section	Township	Range	County
B	24	5S	33E	ROOSEVELT

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) 815 BBLS	Volume Recovered (bbls) 660 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

LIGHTNING STRIKE ON TANK BATTERY CAUSED A FIRE WHICH DESTROYED MOST OF THE TANKS IN THE BATTERY. THE RELEASE WAS CONTAINED WITHIN THE LINED BERM SECONDARY CONTAINMENT.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
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? THE VOLUME OF PRODUCED WATER RELEASED EXCEEDED 25 BBLS.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? IMMEDIATE NOTICE WAS NOT PROVIDED TO OCD. THIS FORM IS FIRST NOTIFICATION.	

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: KYLE ALPERS Title: VICE PRESIDENT OF ENGINEERING .

Signature: _____ Date: _____

email: KALPERS@AECNM.COM Telephone: 575-623-2999 EXT. 305

OCD Only

Received by: _____ Date: _____

Attachment B

Photographs

Photo of Release contained in earthen berm. No staining is observed outside of the earthen berm. Photo Date: 9/1/2019

Photo of Release contained in earthen berm. No staining is observed outside of the earthen berm. Photo Date: 9/1/2019

Photo of lined earthen berm after fluids were removed. No staining is observed outside of the earthen berm. Photo Date: 9/3/2019

Photo of lined earthen berm after fluids were removed. No staining is observed outside of the earthen berm. Photo Date: 9/3/2019

Photo of lined earthen berm after fluids were removed. No staining is observed outside of the earthen berm. Photo Date: 9/3/2019

Attachment C

Liner Inspection Field Form

HRL COMPLIANCE SOLUTIONS

Liner Inspection Form

Client: Armstrong Energy

Site Name: Dora Dean 24 #1

Latitude: 33.86264

Longitude: -103.42913

Date of Release: 9-1-2019

NMOCD Incident Number: NRM 1926756372

Date of Inspection: 9-3-2019

Observations	Yes	No	Comments
Is the liner present?	X		
Is the liner torn?		X	
Are there visible holes in the liner?		X	
Is the liner retaining any liquids?	X		on 9/1/2019 - Produced water
Does it appear the liner had the ability to contain the leak?	X		

Type of Liner: PolyStar | Earthen with liner | Earthen no liner | Metal with Poly Lining | Metal with Spray Epoxy Lining

Other (describe here): _____

Other Concerns or Observations:

Inspector Name: Julie Linn and Natalie Gordon on behalf of Armstrong Energy

Inspector Signature: Julie L-

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 139994

CONDITIONS

Operator: ARMSTRONG ENERGY CORP P.O. Box 1973 Roswell, NM 88202	OGRID: 1092
	Action Number: 139994
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
jnobui	Closure Approved. Please apply 19.15.29.13 NMAC when completing P&A.	9/8/2022