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Ms. Kellie Jones
New Mexico Oil Conservation Division
District 1
1625 N. French Drive
Hobbs, New Mexico 88240

Ms. Shelly Tucker
Environmental Protection Division
Bureau of Land Management
620 E. Greene Street
Carlsbad, NM 88220

September 21, 2015

Subject: Work Plan
EOG Resources, Inc.
Shinnery Fed #1
1RP-3161 (API 30-025-30247)
North Young Fed 12-1 (near Shinnery Fed #1)
1RP-3849 (API 30-025-30247)
Lea County, New Mexico

RECEIVED

By JKeyes at 9:39 am, Sep 28, 2015

APPROVED

By JKeyes at 9:39 am, Sep 28, 2015

Dear Ms. Jones and Ms. Tucker,

On behalf of EOG Resources, Inc. (EOG), CH2M HILL Engineers Inc. (CH2M) is providing this work plan to the New Mexico Oil Conservation Division (NMOCD) and Bureau of Land Management (BLM). This work plan presents the proposed approach for additional site investigation and remediation activities at the Shinnery Fed #1 and North Young Fed 12-1 sites. The sites are collocated given the second release of produced water for North Young Fed 12-1, which occurred within the boundary of the prior release at Shinnery Fed #1.

Site Descriptions

The sites are located approximately 35 miles west of Hobbs, New Mexico. The legal location for the sites is Unit Letter K, Section 13, Township 18S, Range 32E in Lea County, New Mexico. The latitude and longitude for the release is 32.74444, -103.7217, respectively. A site location map is presented in **Figure 1** and an area map is presented in **Figure 2**. Both sites are located approximately 150 yards due south of the well pad for Shinnery Fed #1 (API No. 30-025-30247) on the east side of the lease road.

Site Ranking and Recommended Remedial Action Levels

Per the August 13, 1993 NMOCD Guidelines for Remediation of Leaks, Spills and Releases, the ranking for this site is 10 based on the following criteria:

- Depth to Ground Water 50-99 feet (per USGS Site 324629103253601)
- Wellhead Protection Area >1,000 feet
- Distance to Surface Water Body >1,000 horizontal feet

Based on the site ranking of 10, NMOCD Recommended Remedial Action Levels (RRALs) are 50 milligrams per kilogram (mg/kg) for benzene, toluene, ethylbenzene, xylene (BTEX); 10 mg/kg for benzene; 1,000 mg/kg for total petroleum hydrocarbons (TPH); and 500 mg/kg for chloride. Site ranking criteria and RRALs are summarized in the following Table 1 and Table2, respectively.

Table 1 – NMOCD Site Ranking Criteria

Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993

Condition	Score
Depth to Groundwater ^a	
< 50 feet	20
50 – 99 feet	10
> 100 feet	0
Wellhead Protection Area	
< 1000 feet from a water source	20
< 200 feet from private domestic water source	20
Distance to Surface Water Body	
< 200 horizontal feet	20
200 – 1000 horizontal feet	10
> 1,000 horizontal feet	0

Notes:

^a Guidance does not explicitly state whether this is depth from ground surface or depth from other reference point.

Table 2 – NMOCD Recommended Remediation Action Levels

Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993

Analyte (ppm)	Score of >19	Score of 10 - 19	Score of 0 - 9
Benzene	10	10	10
BTEX	50	50	50
TPH	100	1,000	5,000
Chloride ^a	250	500	1,000

Notes:

^a The RRAL for chloride was developed subsequent to the publication of the 1993 guidance document and is therefore not referenced within the 1993 version.

ppm parts per million

BTEX benzene, toluene, ethylbenzene, and xylene

TPH total petroleum hydrocarbons

Background Information

The Form C-141 for Shinnery Fed #1 and North Young Fed 12-1 are attached as **Appendix A**. The New Mexico Oil Conservation Division (NMOCD) previously assigned Remediation Permit (RP) numbers 1RP-3161 and 1RP-3849 to the Shinnery Fed #1 and North Young Fed 12-1 sites, respectively. The following summarizes the site history of the reported release at Shinnery Fed #1 where previous investigations have been completed:

- On February 28, 2014, approximately 20 barrels (bbls) of produced water was released due to an equipment malfunction (3-inch poly water line separated). All released fluids were located off the well pad and within the field (150 yards south of the well pad). No fluids were recovered. The spill area measured approximately

60 feet (north to south) by 40 feet (east to west) in the pasture to the north of the equipment malfunction. No watercourses were reached. Based on the source of the spill (produced water), the contaminants of concern (COCs) were identified as BTEX, TPH, and chloride.

- On March 6, 2014, EOG contracted a third party consultant to conduct a site assessment and to facilitate soil sampling activities utilizing a hand auger within the impacted areas. Twelve samples were collected for vertical and horizontal delineation.
- On April 17, 2014, the third party consultant returned to the site and collected four additional samples. Three samples were collected via direct push drilling technologies for vertical delineation. In addition, one sample was collected for horizontal delineation. The spill area was delineated horizontally.
- On October 25, 2014, EOG contracted CH2M to facilitate soil sampling activities within the impacted areas in conjunction with a remediation company (Watson Construction) that was contracted to excavate impacted soils. CH2M HILL collected seven confirmation samples from an excavated zone within the impacted area. The location of the samples was based on observations made from previous soil sampling efforts by the prior contractor and the purpose was to attempt vertical delineation.
- On November 12, 2014, CH2M returned to the site and collected two additional confirmation samples from a deeper excavation to verify that chloride concentrations substantially decreased with depth.
- In support of a NMOCD- and BLM-approved work plan, dated December 8, 2014, impacted soils to a depth of 5 feet below ground surface (bgs) were removed from the site, a polyethylene liner was installed, and non-impacted backfill was placed over the liner by Watson Construction in January 2015. Limits of the prior excavation and existing liner are provided on **Figure 3**.
- Following review of the investigation report (dated August 19, 2015) summarizing these activities, the NMOCD requested additional characterization of chlorides in soil since, although concentrations decreased with depth, the vertical extent of chlorides above the recommended remedial action levels (RRAL) was not demonstrated.

The results of the soil sampling activities at Shinnery Fed #1 have been previously provided to NMOCD and BLM. Historic sample location figures and a data summary table are provided in **Appendix B** and **Appendix C**. The impacted area was characterized based on potential COCs identified for the site. Only chlorides have been detected in soil; BTEX and TPH have not been detected in soils samples to-date. As a result, the additional site characterization summarized in the following sections will be limited to chlorides in soil. This will include additional characterization for potentially impacted soil associated with the collocated North Young Fed 12-1 site.

Scope of Work

The additional scope of work for this investigation will include excavation of the previously installed 20 mil liner and overlying backfill at Shinnery Fed 12-1. This will be followed by additional soil sampling to further delineate the vertical extent of chlorides in soil below the liner. Should chlorides be present in soil horizontally outside the extent of the previously installed liner based on the release at North Young Fed 12-1, additional soil will be excavated to depths of approximately 4 feet (ft) below ground surface (bgs) in those areas. A replacement 20 mil liner, or extension of the existing liner, will then be installed and clean backfill used to bring the site back to the existing grade.

Field Program

The field work will consist of the following:

1. Excavate soil previously placed as backfill above the liner installed at the site. Excavated soil above the liner will be stockpiled onsite and reused, if possible, based on confirmation sampling. Impacted soil will be disposed offsite.
2. Remove liner to facilitate collection of subsurface soil samples.
3. Collect discrete samples from native soil below the liner to verify that chloride concentrations in soil are declining at an adequate rate with depth to be protective of groundwater.
4. Based on communication with NMOCD “adequate rate with depth” will be demonstrated through the collection of 3 consecutively increasing depth samples, that have no less than a 10 foot variance between the shallowest and deepest sample, and show decreasing concentrations. These samples shall be collected in the eastern portion of the footprint of the original spill to address chloride results of a previous sample collected at 20 ft bgs (1,150 ppm) and an additional sample location for vertical delineation of the more recent spill will be collected near the release point (south end of prior/current release area) at the poly line. Although the deepest sample does not have to be below the RRAL for chloride, there does have to be adequate line of evidence or empirical data to indicate that concentrations are decreasing with depth at a rate that is protective of groundwater.
5. Based on the subsequent release at North Young Fed 12-1, additional soil samples will be collected to support horizontal delineation. Results of those samples demonstrating soil concentrations below the RRAL for chloride or a decrease at an adequate rate with depth will drive the excavation of soil from areas horizontally beyond the current limits of the existing liner to depths of up to 4 feet bgs. Confirmation samples will be used to evaluate soil impacts. Excavated soil that is not suitable for reuse as determined by field screening will be taken to an offsite disposal facility.
6. Replace liner, to include potential changes in footprint of impacted soil below 4 ft bgs that exceeds the RRAL for chloride (but meets the description for declination of an “adequate rate with depth”). Additionally liner will extend beneath valve on polyline to mitigate future potential failure of poly lines at this location.
7. Backfill to grade with clean soil.

Health and Safety

The existing Health and Safety Plan (HSP) will be updated, if necessary, and used during the site investigation activities. The HSP will be maintained on-site and will be reviewed and signed by all personnel entering the work area. All staff will at a minimum be required to wear flame retardant clothing, steel-toed boots, safety glasses, and hard-hats.

Quality Assurance/Quality Control

Confirmation sampling will include standard quality control/quality assurance procedures to minimize cross-contamination of samples and provide reliable laboratory analytical results.

Reporting

A brief letter report will be prepared following completion of the site investigation activities included in this Work Plan and submitted to the NMOCD and BLM for review. It will include updates to the site description, summary of the field investigation and laboratory results, and recommendations for additional investigation or no-further-action.

Work Plan Approval Request

EOG is prepared to initiate the scope of work upon approval by the NMOCD and BLM. If you have any questions or comments with regards to this Work Plan, please do not hesitate to contact Jennifer Dussor at Jennifer.Dussor@ch2m.com or (972) 663-2287. Your timely response is appreciated.

Regards,
CH2M HILL Engineers, Inc.



Russ Weigand
Client Services Manager



Jennifer Dussor
Project Manager

Enclosures:

Figures

Figure 1 Site Location Map

Figure 2 Area Map

Figure 3 Original Excavation Limits

Appendixes

Appendix A C-141 Forms

Appendix B Historical Soil Sample Location Figures

Appendix C Historical Soil Sampling Data Summary

C: Jeff Roberston, BLM
Jamie Keyes, NMOCD
Tomáš 'Doc' Oberding, PhD, NMOCD
Jamie Keyes, NMOCD
Zane Kurtz, EOG

Figures



NOTE: This image has been modified from the original. The base map is from Google Earth Pro, but the superimposed information is from CH2M HILL.

FIGURE 1
Site Location Map
EOG Resources - Shinnery Fed #1
Work Plan (1RP3161 and 1RP3849)
Lea County, New Mexico



NOTE: This image has been modified from the original. The base map is from Google Earth Pro, but the superimposed information is from CH2M HILL.

FIGURE 2
Area Map
EOG Resources - Shinnery Fed #1
Work Plan (1RP3161 and 1RP3849)
Lea County, New Mexico



NOTE: This image has been modified from the original. The base map is from Google Earth Pro, but the superimposed information is from CH2M HILL.

LEGEND

- Approximate limits of original excavation and subsequent liner installation
(Appendix B contains figures depicting historical sample locations)
- Revised limits of area of investigation.
- Area of polyline failure for both spills.

FIGURE 3
Excavation Limits
EOG Resources - Shinnery Fed #1
Work Plan (1RP3161 and 1RP3849)
Lea County, New Mexico

Appendix A

C-141 Forms

HOBBS OCD

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
APR 30 2014
Energy, Minerals and Natural Resources
Oil Conservation Division
RECEIVED
220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in
concordance with 19.15.29 NMAC.
RECEIVED

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company – EOG Resources, Inc.	Contact – Ryan Kainer
Address – 5509 Champions Drive, Midland, TX 79706	Telephone No. (432) 686-3662
Facility Name – Shinnery Fed #1	Facility Type – Gas Well

Surface Owner – BLM	Mineral Owner – BLM	API No. 30-025-30247
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LOCATION OF RELEASE

Unit Letter K	Section 13	Township 18S	Range 32E	Feet from the 1980	North/South Line South	Feet from the 1980	East/West Line West	County Lea
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Latitude 32.7444 Longitude -103.7217

NATURE OF RELEASE

Type of Release – Produced Water	Volume of Release – 20 bbls	Volume Recovered – 0 bbls
Source of Release – 3" Poly line ruptured	Date and Hour of Occurrence: 2/28/2014, 4:00 PM	Date and Hour of Discovery 2/28/2014, 4:00 PM

Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Jennifer Van Curen (BLM)
------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------

By Whom? Ryan Kainer	Date and Hour 3/5/2014
----------------------	------------------------

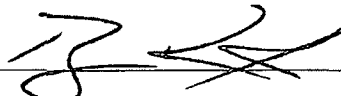
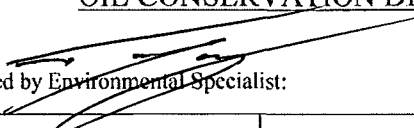
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.
---------------------------------------------------------------------------------------------------	-------------------------------------------

If a Watercourse was Impacted, Describe Fully.* NA	JARL 5/1/14 DEPTH TO WATER = 50'
-------------------------------------------------------	-------------------------------------

Describe Cause of Problem and Remedial Action Taken.* Approximately 20 bbls of produced water was released from equipment malfunction (3" poly water line seperated). All released fluids are located off the location and within the field (100 yards south of well).

Describe Area Affected and Cleanup Action Taken.* EOG propose to delineate the impacted area, vertically and horizontally by collecting soil samples and having them analyzed for TPH, BTEX, and Chlorides. The impacted area will be excavated, stockpiled on poly-plastic, and transported to an approved disposal facility. Clean material will be backfilled within the excavated area to normal grade and seeded with BLM seed mix type II.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOC 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 NMOC marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOC 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.

Signature: 	OIL CONSERVATION DIVISION	
Printed Name: Ryan Kainer	Approved by Environmental Specialist: 	
Title: Sr. Safety & Environmental Rep.	Approval Date: 2-9-14	Expiration Date: 9-12-14
E-mail Address: ryan_kainer@eogresources.com	Conditions of Approval: Site Super approval	Attached <input type="checkbox"/> 7-14-3161
Date: 3/05/2014 Phone: 432-686-3662		

* Attach Additional Sheets If Necessary

Detected & remediate site as per NMOC guide. Submit final C-141 by 9-12-14

09-12-7377
R701419 043007
p 101419 043148

JUL 10 2014

District I
1625 N. French Dr., Hobbs, NM 88240
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State of New Mexico
Energy Minerals and Natural Resources

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

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in
accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company EOG Resources, Inc.	Contact Zane Kurtz	
Address 5509 Champions Drive, Midland, TX 79706	Telephone No. 432-425-2023	
Facility Name Polyline from North Young Fed 12 -1 near Shinnery Federal #1	Facility Type Oil and Gas Well	
Surface Owner BLM	Mineral Owner BLM/EOG	API No. 30-025-30247

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
K	13	18S	32E	1980	South	1980	West	Lea

Latitude 32.7444 Longitude -103.7217

NATURE OF RELEASE

Type of Release Produced Water	Volume of Release 120 bbls	Volume Recovered 0 bbls
Source of Release 3" poly line rupture	Date and Hour of Occurrence 9-9-2015 / 1200	Date and Hour of Discovery 9-9-2015 / 1500
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Shelly Tucker/ BLM 575-361-0084	
By Whom? Zane Kurtz, EOG, 432-425-2023	Date and Hour 9-9-2015 @1625	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

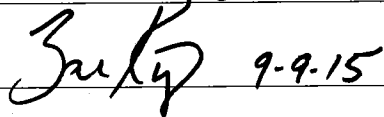
If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

3" poly line came apart at a fussed weld. Released about 120 bbls of produced water. Zero was recovered. Occurred where we had a previous release and installed a poly liner at 4 ft to prevent future releases. 3rd party consultant will go out and delineate spill area and collect samples. Samples will be submitted and a work plan will be submitted to go out and excavate impacted soil and properly remove and dispose of impacted soil. Then area will be backfilled with clean material to normal grade. Hopefully all released fluid was captured in poly line we installed previously.

Describe Area Affected and Cleanup Action Taken.*

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD 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 NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD 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.

Signature:  9-9-15	OIL CONSERVATION DIVISION		
Printed Name: Zane Kurtz	Approved by Environmental Specialist:		
Title: Sr. Safety and Environmental Rep., EOG Resources, Inc.	Approval Date:	Expiration Date:	
E-mail Address: zane_kurtz@eogresources.com	Conditions of Approval:		Attached <input type="checkbox"/>
Date: 9-9-2015 Phone: 432-425-2023			

* Attach Additional Sheets If Necessary

Appendix B

Historical Site and Sample Location Figures

North

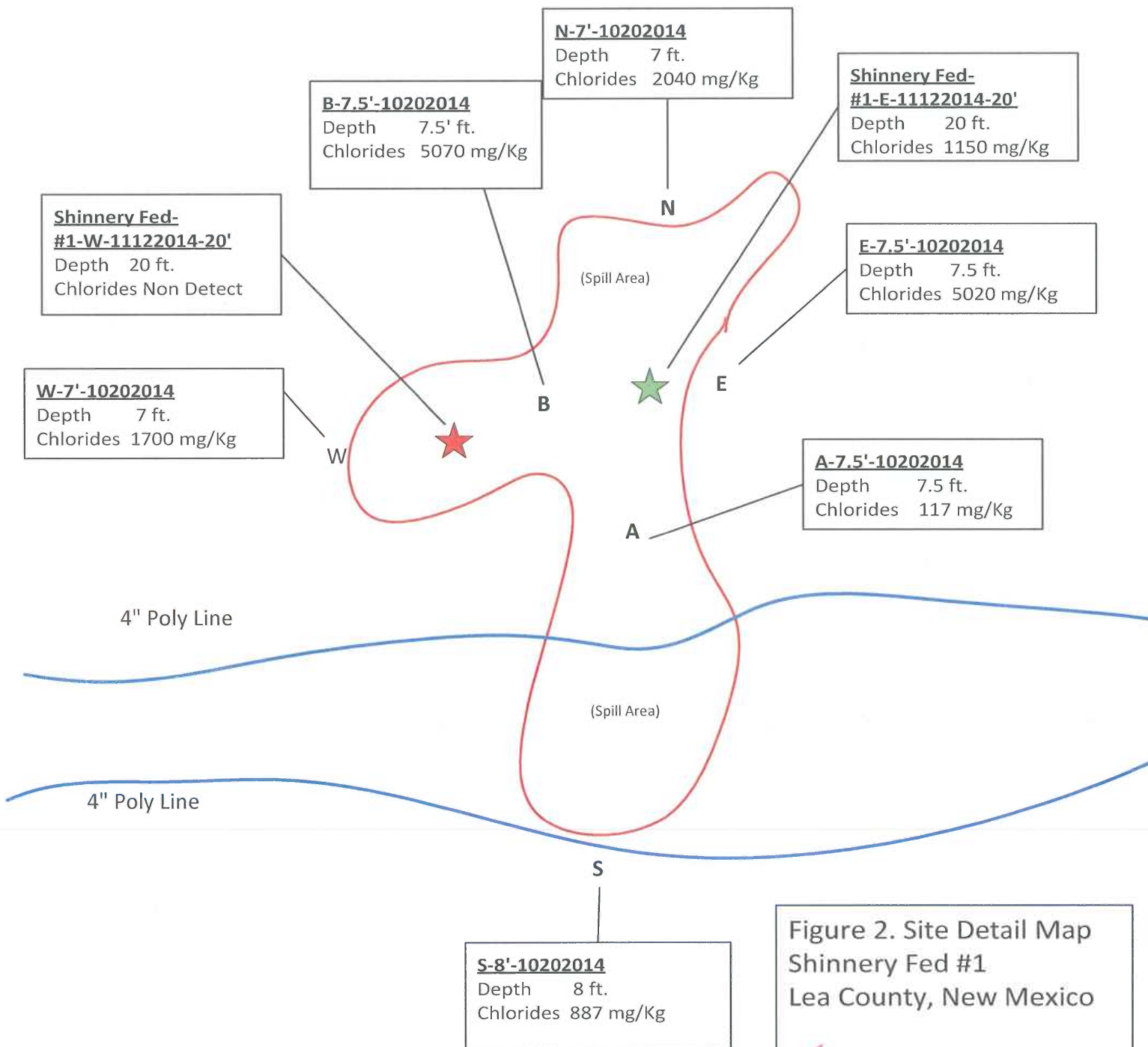
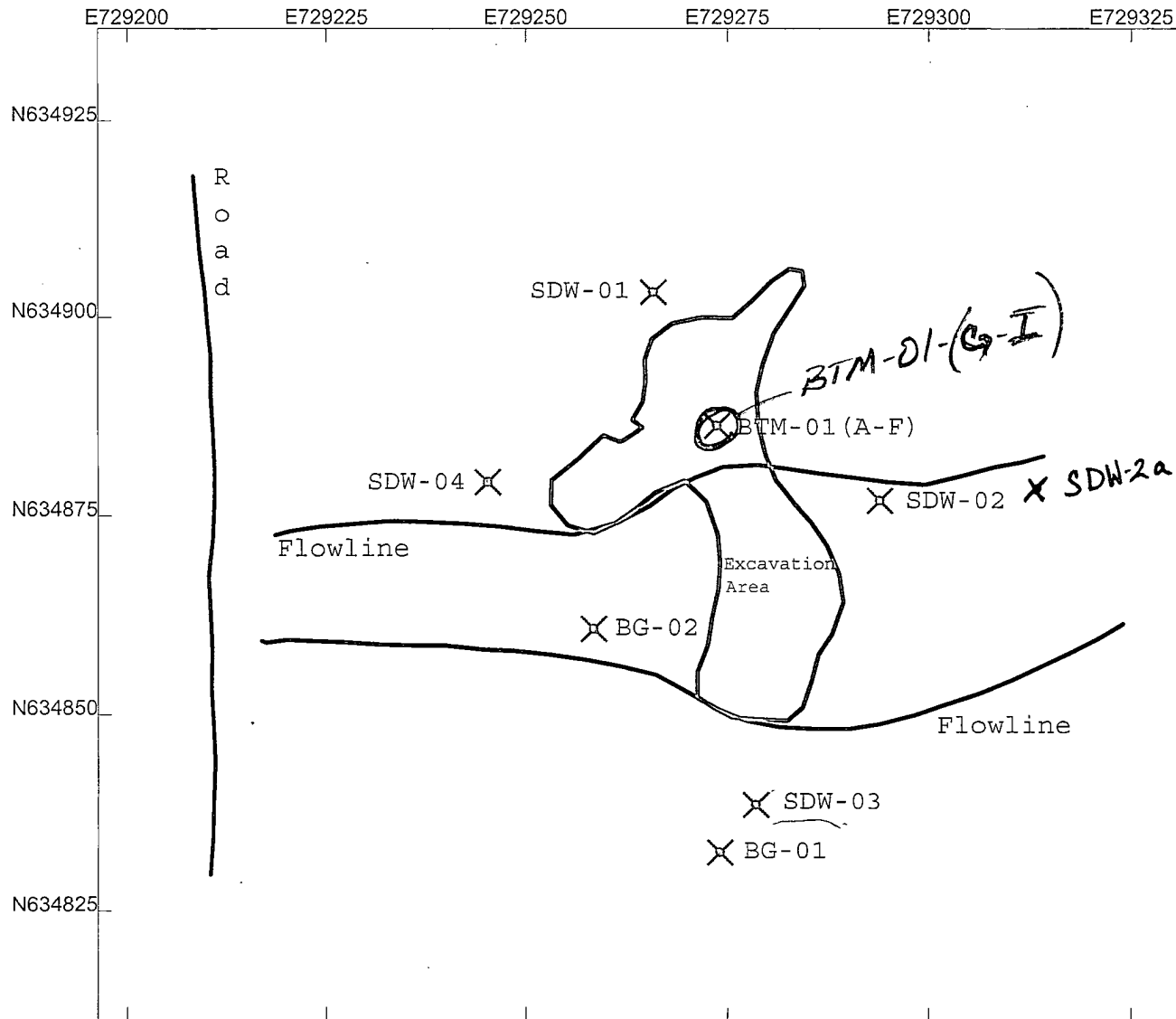


Figure 2. Site Detail Map
Shinnery Fed #1
Lea County, New Mexico



1" = 15ft



Shinnery Fed #1

US State Plane 1983 (2011)
New Mexico East 3001
NAD 1983 (2011)

EOG SHINNERY #1 SSF
3/7/2014

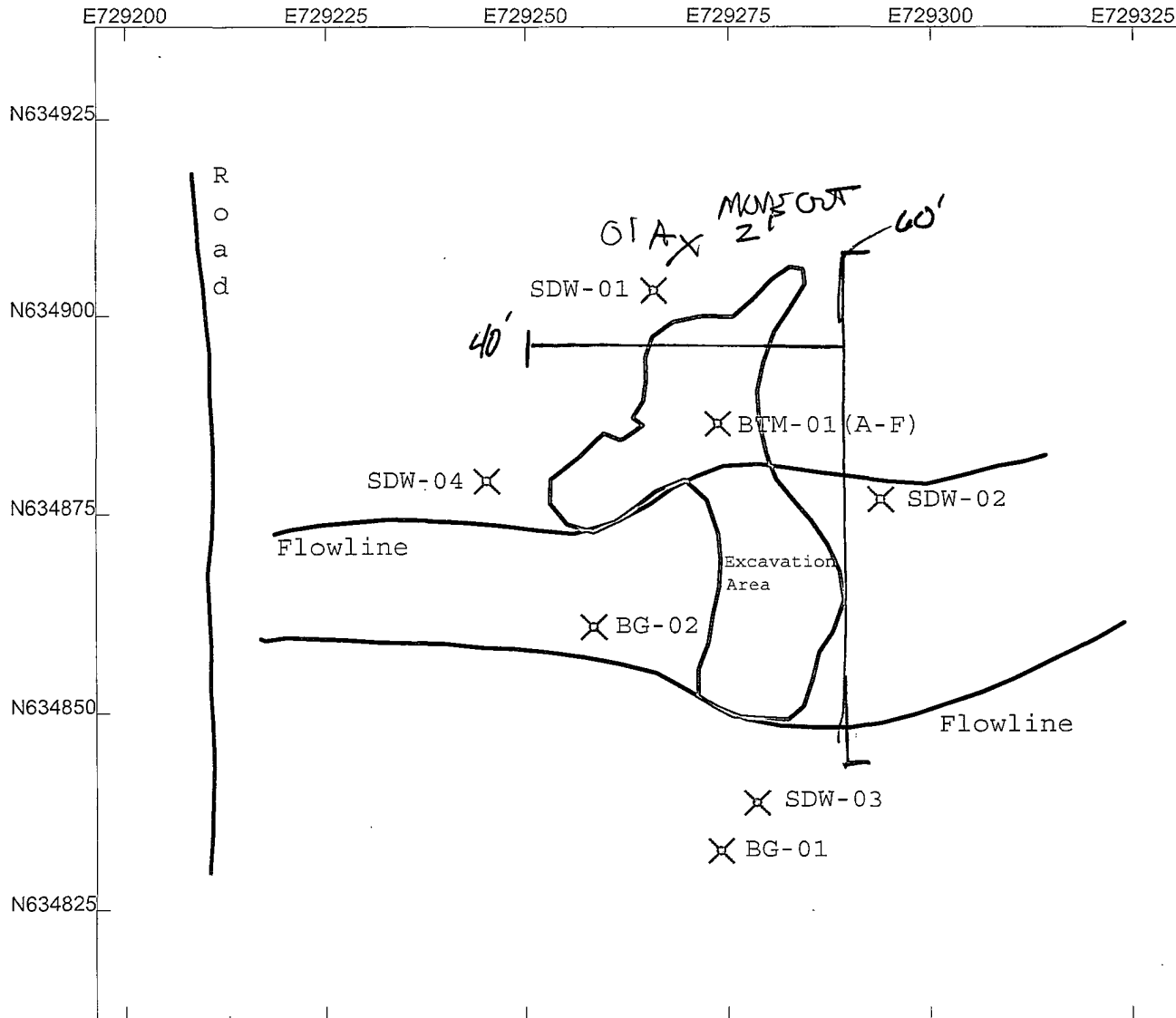
GPS Pathfinder® Office



HOBBS OCD

APR 30 2014

RECEIVED



Shinnery Fed #1

US State Plane 1983 (2011)
New Mexico East 3001
NAD 1983 (2011)

EOG SHINNERY #1.SSF
3/7/2014

GPS Pathfinder® Office



Appendix C

Historical Soil Sampling Data Summary

Appendix C. Historical Soil Sampling Data Summary

EOG Resources - Shinnery Fed #1

Final Report (1RP3161)

Lea County, New Mexico

Sample ID	Depth (bgs)	Sample Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH-DRO (mg/kg)	TPH-GRO (mg/kg)	Chlorides (mg/kg)
SDW-01	0-6"	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0.0	<4.00	907
SDW-02	0-6"	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	88.4	<4.00	3,200
SDW-02a	0-6"	4/17/2014	NA	NA	NA	NA	NA	NA	NA	58
SDW-03	0-6"	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	53
SDW-04	0-6"	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	<25.0
BTM-01-A	1'	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	51.4	<4.00	4,040
BTM-01-B	2'	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	1,440
BTM-01-C	3'	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	6,280
BTM-01-D	4'	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	11,100
BTM-01-E	5'	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	10,300
BTM-01-F	6'	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	9,790
BTM-01-G	10'	4/17/2014	NA	NA	NA	NA	NA	NA	NA	7,260
BTM-01-H	15'	4/17/2014	NA	NA	NA	NA	NA	NA	NA	3,290
BTM-01-I	18'	4/17/2014	NA	NA	NA	NA	NA	NA	NA	4,650
BG-01	0-6"	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	154
BG-02	0-6"	3/6/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	4,250
S-8'-10202014	8'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	887
A-7.5'-10202014	7.5'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	117
B-7.5'-10202014	7.5'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	5,070
W-7'-10202014	7'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	1,700
BG-7'-10202014	7'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	30.1
N-7'-10202014	7'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	2,040
E-7.5'-10202014	7.5'	10/20/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	5,020
Shinnery Fed #1-W-11122014-20'	20'	11/12/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	<25.0
Shinnery Fed #1-E-11122014-20'	20'	11/12/2014	<0.02	<0.02	<0.02	<0.02	<0.02	<50.0	<4.00	1,150

Table Notes:

bold values above Recommended Remedial Action Levels (RRALs)

bgs below ground surface

mg/kg milligram per kilogram

NA not analyzed

' feet

" inches