

Environmental Site Remediation Work Plan
General Information

NMOCD District:	<u>District 1</u>	Incident #	<u>NRM1933138367</u>
Landowner:	<u>Federal</u>		
Client:	<u>Devon Energy Production Company</u>	Site Location:	<u>Billiken 6 Fed #1H</u>
Date:	<u>June 8, 2020</u>	Project #:	<u>20E-00141-028</u>
Client Contact:	<u>Tom Bynum</u>	Phone #:	<u>(580) 748-1613</u>
Vertex PM:	<u>Natalie Gordon</u>	Phone #:	<u>(505) 506-0040</u>

Objective

The objective of this environmental remediation work plan is to identify areas of exceedance for constituents of concern found during spill assessment and site characterization activities and propose appropriate remediation techniques to address the open release at Billiken 6 Fed #1H (hereafter referred to as "Billiken 6"). The incident occurred on August 5, 2019, when a 1" nipple coming off a pumping T developed a leak. Approximately 7 barrels (bbls) of produced water and 3 bbls of oil were released onto the wellpad. Upon discovery of the release, a vacuum truck was dispatched to site and approximately 6 bbls of produced water and 3 bbls of oil were recovered for disposal at an appropriate off-site location. The location and boundaries of this release are identified on Figure 1 (Attachment 1).

Initial site research and characterization has been completed and a closure criteria determination worksheet is included in Attachment 2. The release at Billiken 6 is not subject to the requirements of Paragraph (4) of Subsection C of 19.15.29.12 *New Mexico Administrative Code* (NMAC; New Mexico Oil Conservation Division, 2018) and the closure criteria for the site are determined to be associated with the following constituent concentration limits.

Table 1. Closure Criteria for Soils Impacted by a Release – Depth to Groundwater > 100 feet		
Minimum depth below any point within the horizontal boundary of the release to groundwater less than 10,000 mg/L TDS¹	Constituent	Limit
> 100 feet	Chloride	20,000 mg/kg
	TPH ² (GRO + DRO + MRO)	2,500 mg/kg
	GRO + DRO	1,000 mg/kg
	BTEX ³	50 mg/kg
	Benzene	10 mg/kg

¹Total Dissolved Solids (TDS)

²Total petroleum hydrocarbons (TPH) = gasoline range organics (GRO) + diesel range organics (DRO) + motor oil range organics (MRO)

³Benzene, toluene, ethyl benzene and xylenes (BTEX)

Site Assessment/Characterization

The Billiken 6 release characterization was completed on February 26, 2020. A total of nine sample points were established across the release area (Attachment 1) and soil samples were collected from these locations at various depths. Each soil sample was field screened, using an electrical conductivity (EC) meter to estimate the level of chlorides in the soil, a photoionization detector to detect the presence of volatile organics and the Petroflag system to estimate levels of petroleum hydrocarbons. A selection of these soil samples were submitted to a laboratory for analysis to support the in-field findings. The field screening and laboratory results were used to determine the horizontal and vertical extents of the release.

Environmental Site Remediation Work Plan

Data from the release characterization process have been compared to the above noted closure criteria to establish the appropriate level of remediation required. Characterization field screening and laboratory results are presented in Table 2 (Attachment 3) and exceedances are identified in the table as bold with a grey background.

Proposed Remedial Activities

Vertex proposes areas identified with contaminant concentrations approaching, or above, closure and reclamation criteria be remediated through excavation and removal of contaminated soil with the use of mechanical equipment. Remediation should include excavation of the release footprint of approximately 8,058 square feet, to a depth of between six inches to one foot below ground surface (bgs), as guided by an onsite Vertex environmental technician, who will be conducting field screening during the excavation activities. Approximately 250 cubic yards of contaminated soil are projected to be removed during excavation and stored on a heavy-duty liner prior to disposal at an approved facility.

Once the environmental technician confirms removal of contaminated soil to below the applicable closure criteria as shown in Table 1, five-point composite confirmatory samples will be collected from the base and sidewalls of the excavation in accordance with the sampling plan detailed in Attachment 4. The sampling plan is based on a non-parametric statistical sampling design using the MARSSIM version Sign Test through the Visual Sample Plan (VSP) program that meets the Environmental Protection Agency's data quality assessment standards (DQAs) for composite sampling. The confirmatory samples will be placed into laboratory-provided containers, preserved on ice and submitted to a NELAP-approved laboratory for chemical analysis. Laboratory analysis will include Method 300.0 for chlorides, Method 8021B for volatile organics, including benzene and BTEX, and EPA Method 8015 for TPH, including MRO, DRO and GRO.

A GeoExplorer 7000 Series Trimble global positioning system (GPS) unit, or equivalent, will be used to map the approximate center of each of the five-point composite samples.

Upon receipt of confirmatory sample laboratory data showing all samples meet the required closure criteria, the excavation will be backfilled with locally-sourced, clean backfill and graded to prevent issues associated with erosion or the ponding of water. No reclamation or restoration activities per 19.15.29.13 NMAC are planned at this time due to the release location on an active wellpad.

Timeline for Completion

Remediation activities, as outlined in this workplan, are projected to be completed within 60 days of NM OCD approval of this remediation work plan and the attached alternative sampling plan.

If there are any questions regarding this report, please contact Natalie Gordon at 505-506-0040.

Sincerely,



Natalie Gordon
PROJECT MANAGER

Environmental Site Remediation Work Plan

Attachments

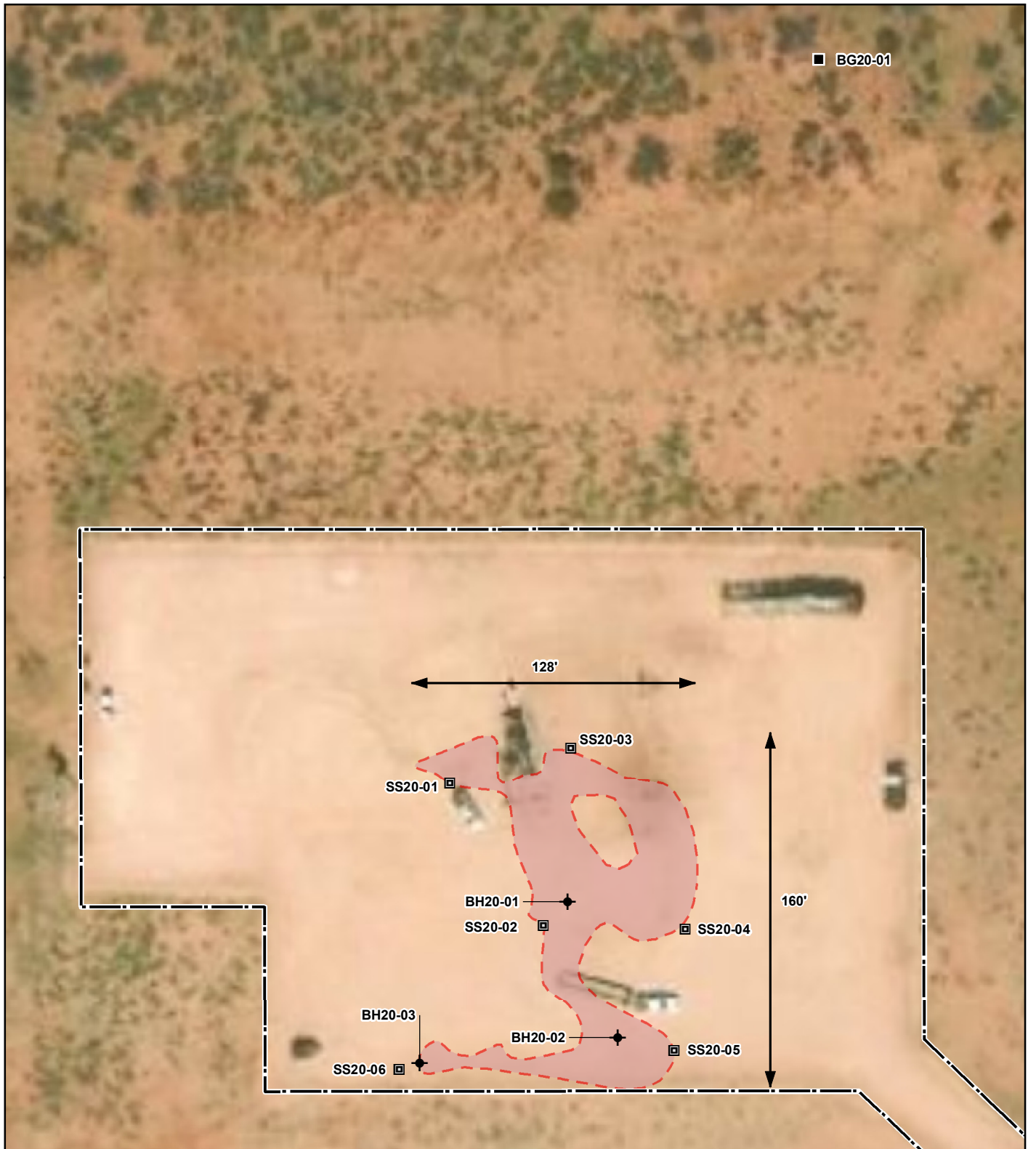
Attachment 1: Figure 1 – Site Schematic and Characterization Sample Points

Attachment 2: Closure Criteria Determination Worksheet

Attachment 3: Table 2 – Release Characterization Sampling – Field Screen and Laboratory Data

Attachment 4: Random Sampling Locations Within Grids for Comparing a Site Mean to a Fixed Threshold

ATTACHMENT 1



- Background
- ◆ Borehole
- Surface Sample
- ▭ Lease Boundary
- ▭ Approximate Spill Extent (~ 8,058 sq. ft.)

Document Path: G:\1-Projects\US PROJECTS\Devon Energy Corporation\20E-00141\028 - Billiken 6 Fed #1H\Billiken 6 Fed 1H Spill Characterization (20E-00141).mxd



0 10 20 40 ft.
 NAD 1983 UTM Zone 13N
 Date: Feb 28/20

Map Center:
 Lat: 32.066117,
 Long: -103.410959



**Site Schematic and
 Characterization Sampling Points
 Billiken 6 Fed #1H**

FIGURE:
1



Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Background image from ESRI, 2018.

ATTACHMENT 2

Site Name: Billiken 6 Federal #001H			
Spill Coordinates:		X: 32.0658503	-103.4109472
Site Specific Conditions		Value	Unit
1	Depth to Groundwater	230.00	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	159,769	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	4,699	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	46,283	feet
5	i) Within 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or	46,283	feet
	ii) Within 1000 feet of any fresh water well or spring	46,283	feet
6	Within incorporated municipal boundaries or within a defined municipal fresh water field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves	No	(Y/N)
7	Within 300 feet of a wetland	4,699	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Low	Critical High Medium Low
10	Within a 100-year Floodplain		year
NMAC 19.15.29.12 E (Table 1) Closure Criteria		>100'	<50' 51-100' >100'

ATTACHMENT 3

Client Name: Devon Energy
 Site Name: Billiken 6 Federal 1H
 NM OCD Incident Tracking #(s): NRM1933138367
 Project #: 20E-00141-028
 Lab Report: 2002D04

Table 2. Characterization Sampling Field Screening and Laboratory Results - Depth to Groundwater > 100 feet													
Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (Petro Flag)	Inorganics (Quantab - High/Low)	Volatile		Extractable					Chloride
						Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	
			(ppm)	(ppm)	(+/-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BG20-01	0	February 26, 2019	-	57	ND	-	-	-	-	-	-	-	-
BG20-01	1	February 26, 2019	-	15	ND	-	-	-	-	-	-	-	-
BG20-01	2	February 26, 2019	-	19	ND	-	-	-	-	-	-	-	-
SS20-01	0	February 26, 2019	-	178	490	<0.024	<0.217	<4.8	18	<49	18	18	670
SS20-02	0	February 26, 2019	-	209	128	<0.024	<0.213	<4.7	45	85	45	130	570
SS20-03	0	February 26, 2019	-		313	-	-	-	-	-	-	-	-
SS20-04	0	February 26, 2019	-	350	192	-	-	-	-	-	-	-	-
SS20-05	0	February 26, 2019	-	292	ND	<0.024	<0.216	<4.8	68	330	68	398	79
SS20-06	0	February 26, 2019	-	41	ND	<0.024	<0.213	<4.7	<9.9	<49	<14.6	<63.6	<60
BH20-01	0	February 26, 2019	-	271	28,810	<0.024	<0.219	<4.9	95	110	95	205	23,000
BH20-01	0.5	February 26, 2019	-	21	6,057	-	-	-	-	-	-	-	-
BH20-01	1	February 26, 2019	-	24	2,973	-	-	-	-	-	-	-	-
BH20-01	2	February 26, 2019	-	14	1,112	<0.025	<0.225	<5.0	<9.3	<46	<14.3	<60.3	730
BH20-02	0	February 26, 2019	-		4,453	<0.120	<1.050	<23	3,500	2,700	3,500	6,200	4,300
BH20-02	0.5	February 26, 2019	-	100	4,756	-	-	-	-	-	-	-	-
BH20-02	1	February 26, 2019	-	23	4,454	-	-	-	-	-	-	-	-
BH20-02	2	February 26, 2019	-	28	1,044	<0.025	<0.222	<4.9	<9.5	<47	<14.4	<61.4	730
BH20-03	0	February 26, 2019	-	10,480	87	<0.120	<1.080	120	29,000	16,000	29,120	45,120	<60
BH20-03	0.5	February 26, 2019	-	7,590	130	-	-	-	-	-	-	-	-
BH20-03	1	February 26, 2019	-	1,050	ND	-	-	-	-	-	-	-	-
BH20-03	2.5	February 26, 2019	-	300	194	<0.024	<0.219	<4.9	95	54	95	149	150

Bold and shaded indicates exceedance outside of applied action level



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 10, 2020

Natalie Gordon

Devon Energy

6488 Seven Rivers Highway

Artesia, NM 88210

TEL: (575) 748-0176

FAX

RE: Beliken 6 Fed 1

OrderNo.: 2002D04

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 11 sample(s) on 2/29/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a light blue horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: BH20-03 2.5'

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 5:00:00 PM

Lab ID: 2002D04-001

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	95	9.3		mg/Kg	1	3/4/2020 9:54:50 PM
Motor Oil Range Organics (MRO)	54	47		mg/Kg	1	3/4/2020 9:54:50 PM
Surr: DNOP	137	55.1-146		%Rec	1	3/4/2020 9:54:50 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	3/6/2020 2:28:45 PM
Surr: BFB	88.5	66.6-105		%Rec	1	3/6/2020 2:28:45 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 2:28:45 PM
Toluene	ND	0.049		mg/Kg	1	3/6/2020 2:28:45 PM
Ethylbenzene	ND	0.049		mg/Kg	1	3/6/2020 2:28:45 PM
Xylenes, Total	ND	0.097		mg/Kg	1	3/6/2020 2:28:45 PM
Surr: 4-Bromofluorobenzene	89.4	80-120		%Rec	1	3/6/2020 2:28:45 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	150	60		mg/Kg	20	3/5/2020 12:08:47 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: BH20-03 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 4:15:00 PM

Lab ID: 2002D04-002

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	29000	470		mg/Kg	50	3/4/2020 10:03:52 PM
Motor Oil Range Organics (MRO)	16000	2300		mg/Kg	50	3/4/2020 10:03:52 PM
Surr: DNOP	0	55.1-146	S	%Rec	50	3/4/2020 10:03:52 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	120	24	D	mg/Kg	5	3/6/2020 4:01:43 PM
Surr: BFB	267	66.6-105	SD	%Rec	5	3/6/2020 4:01:43 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.12	D	mg/Kg	5	3/6/2020 4:01:43 PM
Toluene	ND	0.24	D	mg/Kg	5	3/6/2020 4:01:43 PM
Ethylbenzene	0.48	0.24	D	mg/Kg	5	3/6/2020 4:01:43 PM
Xylenes, Total	2.5	0.48	D	mg/Kg	5	3/6/2020 4:01:43 PM
Surr: 4-Bromofluorobenzene	100	80-120	D	%Rec	5	3/6/2020 4:01:43 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	ND	60		mg/Kg	20	3/4/2020 5:40:30 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: BH20-02 2'

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 4:00:00 PM

Lab ID: 2002D04-003

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	3/4/2020 10:12:55 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	3/4/2020 10:12:55 PM
Surr: DNOP	95.3	55.1-146		%Rec	1	3/4/2020 10:12:55 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	3/6/2020 4:25:00 PM
Surr: BFB	82.9	66.6-105		%Rec	1	3/6/2020 4:25:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	3/6/2020 4:25:00 PM
Toluene	ND	0.049		mg/Kg	1	3/6/2020 4:25:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	3/6/2020 4:25:00 PM
Xylenes, Total	ND	0.099		mg/Kg	1	3/6/2020 4:25:00 PM
Surr: 4-Bromofluorobenzene	94.8	80-120		%Rec	1	3/6/2020 4:25:00 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	730	60		mg/Kg	20	3/4/2020 6:42:33 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: SS20-02 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 1:00:00 PM

Lab ID: 2002D04-004

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	45	9.0		mg/Kg	1	3/9/2020 11:19:23 AM
Motor Oil Range Organics (MRO)	85	45		mg/Kg	1	3/9/2020 11:19:23 AM
Surr: DNOP	101	55.1-146		%Rec	1	3/9/2020 11:19:23 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	3/6/2020 4:48:20 PM
Surr: BFB	81.1	66.6-105		%Rec	1	3/6/2020 4:48:20 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 4:48:20 PM
Toluene	ND	0.047		mg/Kg	1	3/6/2020 4:48:20 PM
Ethylbenzene	ND	0.047		mg/Kg	1	3/6/2020 4:48:20 PM
Xylenes, Total	ND	0.095		mg/Kg	1	3/6/2020 4:48:20 PM
Surr: 4-Bromofluorobenzene	90.5	80-120		%Rec	1	3/6/2020 4:48:20 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	570	60		mg/Kg	20	3/4/2020 6:54:58 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: SS20-01 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 12:45:00 PM

Lab ID: 2002D04-005

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	18	9.7		mg/Kg	1	3/4/2020 10:30:56 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	3/4/2020 10:30:56 PM
Surr: DNOP	86.9	55.1-146		%Rec	1	3/4/2020 10:30:56 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	3/6/2020 5:11:33 PM
Surr: BFB	76.9	66.6-105		%Rec	1	3/6/2020 5:11:33 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 5:11:33 PM
Toluene	ND	0.048		mg/Kg	1	3/6/2020 5:11:33 PM
Ethylbenzene	ND	0.048		mg/Kg	1	3/6/2020 5:11:33 PM
Xylenes, Total	ND	0.097		mg/Kg	1	3/6/2020 5:11:33 PM
Surr: 4-Bromofluorobenzene	85.2	80-120		%Rec	1	3/6/2020 5:11:33 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	670	60		mg/Kg	20	3/4/2020 7:07:22 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: SS20-06 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 2:00:00 PM

Lab ID: 2002D04-006

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	3/4/2020 10:39:57 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	3/4/2020 10:39:57 PM
Surr: DNOP	92.9	55.1-146		%Rec	1	3/4/2020 10:39:57 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	3/6/2020 5:34:50 PM
Surr: BFB	81.1	66.6-105		%Rec	1	3/6/2020 5:34:50 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 5:34:50 PM
Toluene	ND	0.047		mg/Kg	1	3/6/2020 5:34:50 PM
Ethylbenzene	ND	0.047		mg/Kg	1	3/6/2020 5:34:50 PM
Xylenes, Total	ND	0.095		mg/Kg	1	3/6/2020 5:34:50 PM
Surr: 4-Bromofluorobenzene	90.2	80-120		%Rec	1	3/6/2020 5:34:50 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	ND	60		mg/Kg	20	3/4/2020 7:19:46 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: SS20-04 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 1:30:00 PM

Lab ID: 2002D04-007

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	190	9.9		mg/Kg	1	3/9/2020 8:54:46 AM
Motor Oil Range Organics (MRO)	210	49		mg/Kg	1	3/9/2020 8:54:46 AM
Surr: DNOP	86.7	55.1-146		%Rec	1	3/9/2020 8:54:46 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	3/6/2020 5:58:17 PM
Surr: BFB	77.0	66.6-105		%Rec	1	3/6/2020 5:58:17 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 5:58:17 PM
Toluene	ND	0.048		mg/Kg	1	3/6/2020 5:58:17 PM
Ethylbenzene	ND	0.048		mg/Kg	1	3/6/2020 5:58:17 PM
Xylenes, Total	ND	0.096		mg/Kg	1	3/6/2020 5:58:17 PM
Surr: 4-Bromofluorobenzene	83.3	80-120		%Rec	1	3/6/2020 5:58:17 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	570	60		mg/Kg	20	3/4/2020 7:32:11 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: BH20-02 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 3:15:00 PM

Lab ID: 2002D04-008

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	3500	190		mg/Kg	20	3/4/2020 10:57:57 PM
Motor Oil Range Organics (MRO)	2700	950		mg/Kg	20	3/4/2020 10:57:57 PM
Surr: DNOP	0	55.1-146	S	%Rec	20	3/4/2020 10:57:57 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	23	D	mg/Kg	5	3/6/2020 6:21:46 PM
Surr: BFB	118	66.6-105	SD	%Rec	5	3/6/2020 6:21:46 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.12	D	mg/Kg	5	3/6/2020 6:21:46 PM
Toluene	ND	0.23	D	mg/Kg	5	3/6/2020 6:21:46 PM
Ethylbenzene	ND	0.23	D	mg/Kg	5	3/6/2020 6:21:46 PM
Xylenes, Total	ND	0.47	D	mg/Kg	5	3/6/2020 6:21:46 PM
Surr: 4-Bromofluorobenzene	88.2	80-120	D	%Rec	5	3/6/2020 6:21:46 PM
EPA METHOD 300.0: ANIONS						Analyst: JMT
Chloride	4300	150		mg/Kg	50	3/6/2020 10:42:29 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: BH20-01 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 2:15:00 PM

Lab ID: 2002D04-009

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	95	9.1		mg/Kg	1	3/4/2020 11:06:56 PM
Motor Oil Range Organics (MRO)	110	46		mg/Kg	1	3/4/2020 11:06:56 PM
Surr: DNOP	116	55.1-146		%Rec	1	3/4/2020 11:06:56 PM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	3/6/2020 6:45:18 PM
Surr: BFB	80.4	66.6-105		%Rec	1	3/6/2020 6:45:18 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 6:45:18 PM
Toluene	ND	0.049		mg/Kg	1	3/6/2020 6:45:18 PM
Ethylbenzene	ND	0.049		mg/Kg	1	3/6/2020 6:45:18 PM
Xylenes, Total	ND	0.097		mg/Kg	1	3/6/2020 6:45:18 PM
Surr: 4-Bromofluorobenzene	86.4	80-120		%Rec	1	3/6/2020 6:45:18 PM
EPA METHOD 300.0: ANIONS						Analyst: JMT
Chloride	23000	1500		mg/Kg	500	3/6/2020 10:54:50 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: BH20-01 2'

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 3:00:00 PM

Lab ID: 2002D04-010

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	ND	9.3		mg/Kg	1	3/5/2020 12:00:46 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	3/5/2020 12:00:46 AM
Surr: DNOP	99.9	55.1-146		%Rec	1	3/5/2020 12:00:46 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	3/6/2020 7:08:49 PM
Surr: BFB	82.6	66.6-105		%Rec	1	3/6/2020 7:08:49 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.025		mg/Kg	1	3/6/2020 7:08:49 PM
Toluene	ND	0.050		mg/Kg	1	3/6/2020 7:08:49 PM
Ethylbenzene	ND	0.050		mg/Kg	1	3/6/2020 7:08:49 PM
Xylenes, Total	ND	0.10		mg/Kg	1	3/6/2020 7:08:49 PM
Surr: 4-Bromofluorobenzene	91.7	80-120		%Rec	1	3/6/2020 7:08:49 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	730	60		mg/Kg	20	3/4/2020 8:09:25 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Analytical Report

Lab Order 2002D04

Date Reported: 3/10/2020

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Devon Energy

Client Sample ID: SS20-05 0"

Project: Beliken 6 Fed 1

Collection Date: 2/26/2020 1:45:00 PM

Lab ID: 2002D04-011

Matrix: SOIL

Received Date: 2/29/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: BRM
Diesel Range Organics (DRO)	68	9.7		mg/Kg	1	3/5/2020 12:27:37 AM
Motor Oil Range Organics (MRO)	330	49		mg/Kg	1	3/5/2020 12:27:37 AM
Surr: DNOP	103	55.1-146		%Rec	1	3/5/2020 12:27:37 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: RAA
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	3/6/2020 8:19:22 PM
Surr: BFB	78.9	66.6-105		%Rec	1	3/6/2020 8:19:22 PM
EPA METHOD 8021B: VOLATILES						Analyst: RAA
Benzene	ND	0.024		mg/Kg	1	3/6/2020 8:19:22 PM
Toluene	ND	0.048		mg/Kg	1	3/6/2020 8:19:22 PM
Ethylbenzene	ND	0.048		mg/Kg	1	3/6/2020 8:19:22 PM
Xylenes, Total	ND	0.096		mg/Kg	1	3/6/2020 8:19:22 PM
Surr: 4-Bromofluorobenzene	86.5	80-120		%Rec	1	3/6/2020 8:19:22 PM
EPA METHOD 300.0: ANIONS						Analyst: CAS
Chloride	79	61		mg/Kg	20	3/4/2020 8:46:38 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: MB-50889	SampType: mblk	TestCode: EPA Method 300.0: Anions								
Client ID: PBS	Batch ID: 50889	RunNo: 67043								
Prep Date: 3/4/2020	Analysis Date: 3/4/2020	SeqNo: 2307523	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: LCS-50889	SampType: ics	TestCode: EPA Method 300.0: Anions								
Client ID: LCSS	Batch ID: 50889	RunNo: 67043								
Prep Date: 3/4/2020	Analysis Date: 3/4/2020	SeqNo: 2307524	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.6	90	110			

Sample ID: MB-50887	SampType: mblk	TestCode: EPA Method 300.0: Anions								
Client ID: PBS	Batch ID: 50887	RunNo: 67015								
Prep Date: 3/4/2020	Analysis Date: 3/4/2020	SeqNo: 2307606	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: LCS-50887	SampType: ics	TestCode: EPA Method 300.0: Anions								
Client ID: LCSS	Batch ID: 50887	RunNo: 67015								
Prep Date: 3/4/2020	Analysis Date: 3/4/2020	SeqNo: 2307607	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	91.1	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: 2002D04-010AMS	SampType: MS	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: BH20-01 2'	Batch ID: 50849	RunNo: 67011								
Prep Date: 3/3/2020	Analysis Date: 3/5/2020	SeqNo: 2306890	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	9.3	46.47	0	97.8	47.4	136			
Surr: DNOP	5.1		4.647		111	55.1	146			

Sample ID: 2002D04-010AMSD	SampType: MSD	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: BH20-01 2'	Batch ID: 50849	RunNo: 67011								
Prep Date: 3/3/2020	Analysis Date: 3/5/2020	SeqNo: 2306891	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	40	9.5	47.44	0	84.8	47.4	136	12.2	43.4	
Surr: DNOP	5.2		4.744		109	55.1	146	0	0	

Sample ID: LCS-50842	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: LCSS	Batch ID: 50842	RunNo: 67011								
Prep Date: 3/3/2020	Analysis Date: 3/4/2020	SeqNo: 2306911	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	42	10	50.00	0	84.8	70	130			
Surr: DNOP	4.6		5.000		92.2	55.1	146			

Sample ID: LCS-50849	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: LCSS	Batch ID: 50849	RunNo: 67011								
Prep Date: 3/3/2020	Analysis Date: 3/4/2020	SeqNo: 2306912	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52	10	50.00	0	104	70	130			
Surr: DNOP	5.7		5.000		114	55.1	146			

Sample ID: MB-50842	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: PBS	Batch ID: 50842	RunNo: 67011								
Prep Date: 3/3/2020	Analysis Date: 3/4/2020	SeqNo: 2306913	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	11		10.00		105	55.1	146			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: MB-50849	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: PBS	Batch ID: 50849	RunNo: 67011								
Prep Date: 3/3/2020	Analysis Date: 3/4/2020	SeqNo: 2306914	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		104	55.1	146			

Sample ID: LCS-50954	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: LCSS	Batch ID: 50954	RunNo: 67107								
Prep Date: 3/9/2020	Analysis Date: 3/9/2020	SeqNo: 2310944	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	101	70	130			
Surr: DNOP	4.6		5.000		91.5	55.1	146			

Sample ID: MB-50954	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: PBS	Batch ID: 50954	RunNo: 67107								
Prep Date: 3/9/2020	Analysis Date: 3/9/2020	SeqNo: 2310945	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.7		10.00		97.0	55.1	146			

Sample ID: LCS-50931	SampType: LCS	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: LCSS	Batch ID: 50931	RunNo: 67107								
Prep Date: 3/6/2020	Analysis Date: 3/9/2020	SeqNo: 2312091	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.3		5.000		85.8	55.1	146			

Sample ID: MB-50931	SampType: MBLK	TestCode: EPA Method 8015M/D: Diesel Range Organics								
Client ID: PBS	Batch ID: 50931	RunNo: 67107								
Prep Date: 3/6/2020	Analysis Date: 3/9/2020	SeqNo: 2312093	Units: %Rec							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	9.1		10.00		91.5	55.1	146			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: mb-50833	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 50833	RunNo: 67050								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2307829	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	840		1000		83.5	66.6	105			

Sample ID: ics-50833	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 50833	RunNo: 67050								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2307830	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	21	5.0	25.00	0	82.2	80	120			
Surr: BFB	880		1000		87.8	66.6	105			

Sample ID: 2002d04-010ams	SampType: MS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: BH20-01 2'	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309798	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	20	5.0	24.78	0	79.9	69.1	142			
Surr: BFB	870		991.1		87.4	66.6	105			

Sample ID: 2002d04-010amsd	SampType: MSD	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: BH20-01 2'	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309799	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	19	4.8	24.04	0	80.9	69.1	142	1.83	20	
Surr: BFB	840		961.5		87.6	66.6	105	0	0	

Sample ID: ics-50835	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309819	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	91.3	80	120			
Surr: BFB	910		1000		91.3	66.6	105			

Sample ID: mb-50835	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309820	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: mb-50835	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309820	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	860		1000		86.3	66.6	105			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT**Hall Environmental Analysis Laboratory, Inc.**

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: mb-50833	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: 50833	RunNo: 67050								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2307876	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.92		1.000		92.2	80	120			

Sample ID: LCS-50833	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: 50833	RunNo: 67050								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2307877	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.3	80	120			
Toluene	1.0	0.050	1.000	0	100	80	120			
Ethylbenzene	1.0	0.050	1.000	0	102	80	120			
Xylenes, Total	3.1	0.10	3.000	0	102	80	120			
Surr: 4-Bromofluorobenzene	0.96		1.000		95.7	80	120			

Sample ID: 2002d04-011ams	SampType: MS	TestCode: EPA Method 8021B: Volatiles								
Client ID: SS20-05 0"	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309848	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.77	0.025	0.9843	0	78.6	78.5	119			
Toluene	0.83	0.049	0.9843	0.01356	82.6	75.7	123			
Ethylbenzene	0.86	0.049	0.9843	0	87.4	74.3	126			
Xylenes, Total	2.6	0.098	2.953	0	88.8	72.9	130			
Surr: 4-Bromofluorobenzene	0.85		0.9843		86.7	80	120			

Sample ID: 2002d04-011amsd	SampType: MSD	TestCode: EPA Method 8021B: Volatiles								
Client ID: SS20-05 0"	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309849	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.81	0.024	0.9579	0	84.2	78.5	119	4.17	20	
Toluene	0.86	0.048	0.9579	0.01356	88.1	75.7	123	3.62	20	
Ethylbenzene	0.88	0.048	0.9579	0	92.3	74.3	126	2.68	20	
Xylenes, Total	2.7	0.096	2.874	0	94.5	72.9	130	3.51	20	
Surr: 4-Bromofluorobenzene	0.87		0.9579		90.8	80	120	0	0	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2002D04

10-Mar-20

Client: Devon Energy
Project: Beliken 6 Fed 1

Sample ID: LCS-50835	SampType: LCS	TestCode: EPA Method 8021B: Volatiles								
Client ID: LCSS	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309868	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.91	0.025	1.000	0	90.6	80	120			
Toluene	0.94	0.050	1.000	0	94.4	80	120			
Ethylbenzene	0.97	0.050	1.000	0	96.9	80	120			
Xylenes, Total	2.9	0.10	3.000	0	98.3	80	120			
Surr: 4-Bromofluorobenzene	0.89		1.000		89.1	80	120			

Sample ID: mb-50835	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles								
Client ID: PBS	Batch ID: 50835	RunNo: 67089								
Prep Date: 3/3/2020	Analysis Date: 3/6/2020	SeqNo: 2309869	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.95		1.000		94.8	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87109
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **DEVON ENERGY**

Work Order Number: **2002D04**

RcptNo: 1

Received By: **Erin Melendrez**

2/29/2020 8:00:00 AM

EM

Completed By: **Erin Melendrez**

2/29/2020 11:34:22 AM

EM

Reviewed By: **ENM**

3/2/20

Chain of Custody

1. Is Chain of Custody sufficiently complete? Yes No Not Present
2. How was the sample delivered? Courier

Log In

3. Was an attempt made to cool the samples? Yes No NA
4. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
5. Sample(s) in proper container(s)? Yes No
6. Sufficient sample volume for indicated test(s)? Yes No
7. Are samples (except VOA and ONG) properly preserved? Yes No
8. Was preservative added to bottles? Yes No NA
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes No NA
10. Were any sample containers received broken? Yes No
11. Does paperwork match bottle labels? Yes No
 (Note discrepancies on chain of custody)
12. Are matrices correctly identified on Chain of Custody? Yes No
13. Is it clear what analyses were requested? Yes No
14. Were all holding times able to be met? Yes No
 (If no, notify customer for authorization.)

of preserved bottles checked for pH: _____
 (<2 or >12 unless noted)

Adjusted? _____

Checked by: DAD 3/2/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____

By Whom: _____ Via: eMail Phone Fax In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.8	Good				
2	1.4	Good				

Chain-of-Custody Record

Client: Devon

Mailing Address: on file

Phone #: on file

email or Fax#: on file

QA/QC Package:

Standard Level 4 (Full Validation)

Accreditation: AZ Compliance

NELAC Other

EDD (Type)

Turn-Around Time: 5 day

Standard Rush

Project Name: Beliken 6 Fed 1

Project #: 20E-00141

Project Manager: Natalie Gordon

Sampler: Natalie Gordon

On Ice: Yes No

of Coolers: 2

Cooler Temp (including CP): 4.1, 0.3, 0.5, 3.8 (°C)

Container Type and #

Preservative Type

HEAL No: 20022004

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type
2/26/20	17:00	soil	BH20-03 2.5'	402 jar	ice
	16:15		BH20-03 0"		
	16:00		BH20-02 2'		
	13:00		SS20-02 0"		
	12:45		SS20-01 0"		
	14:00		SS20-06 0"		
	13:30		SS20-07 0"		
	15:15		BH20-02 0"		
	14:15		BH20-01 0"		
	15:00		BH20-01 2'		
	13:45		SS20-05 0"		

Received by: Chadley Gay Date: 7/29/20 Time: 1300

Received by: [Signature] Date: 7/29/20 Time: 0800

Relinquished by: Natalie Gordon

Relinquished by: Chadley Gay



HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

<input checked="" type="checkbox"/> BTEX / MTBE / TMB's (8021)	<input checked="" type="checkbox"/> TPH (015D) (GRO / DRO / MRO)	<input checked="" type="checkbox"/> 8081 Pesticides / 8082 PCBs	<input type="checkbox"/> EDB (Method 504.1)	<input type="checkbox"/> PAHs by 8310 or 8270SIMS	<input type="checkbox"/> RCRA 8 Metals	<input checked="" type="checkbox"/> Cl ⁻ , Br ⁻ , NO ₃ ⁻ , NO ₂ ⁻ , PO ₄ ⁻ , SO ₄ ⁻	<input type="checkbox"/> 8260 (VOA)	<input type="checkbox"/> 8270 (Semi-VOA)	<input type="checkbox"/> Total Coliform (Present/Absent)
--	--	---	---	---	--	---	-------------------------------------	--	--

Remarks: Bill: Devon w.o.# - 20836618

CC: Natalie Gordon

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

ATTACHMENT 4

Random sampling locations within grids for comparing a median with a fixed threshold (nonparametric - MARSSIM)

Summary

This report summarizes the sampling design used, associated statistical assumptions, as well as general guidelines for conducting post-sampling data analysis. Sampling plan components presented here include how many sampling locations to choose and where within the sampling area to collect those samples. The type of medium to sample (i.e., soil, groundwater, etc.) and how to analyze the samples (in-situ, fixed laboratory, etc.) are addressed in other sections of the sampling plan.

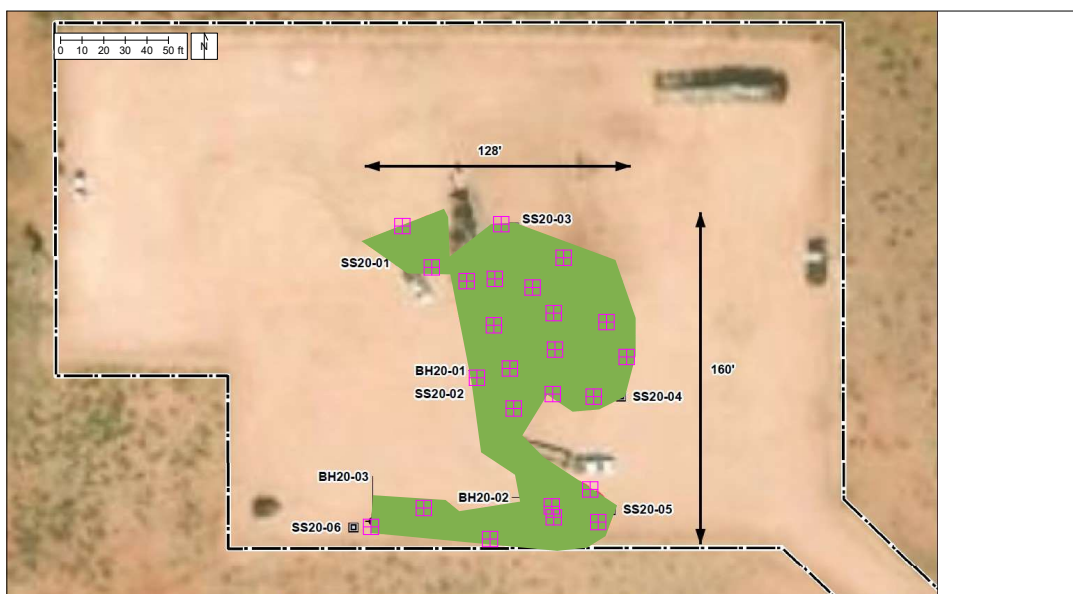
The following table summarizes the sampling design developed. A figure that shows sampling locations in the field and a table that lists sampling location coordinates are also provided below.

SUMMARY OF SAMPLING DESIGN	
Primary Objective of Design	Compare a site mean or median to a fixed threshold
Type of Sampling Design	Nonparametric
Sample Placement (Location) in the Field	Random sampling within grids
Working (Null) Hypothesis	The median(mean) value at the site is less than the threshold
Formula for calculating number of sampling locations	Sign Test - MARSSIM version
Calculated number of samples	20
Number of samples adjusted for EMC	20
Number of samples with MARSSIM Overage	24
Number of samples on map ^a	24
Number of selected sample areas ^b	1
Specified sampling area ^c	10060.95 ft ²

^a This number may differ from the calculated number because of 1) grid edge effects, 2) adding judgment samples, or 3) selecting or unselecting sample areas.

^b The number of selected sample areas is the number of colored areas on the map of the site. These sample areas contain the locations where samples are collected.

^c The sampling area is the total surface area of the selected colored sample areas on the map of the site.



Area: Area 1							
X Coord	Y Coord	Label	Value	Type	Historical	Ref/Surv	Sample Area
-500.4868	-389.5454			Random in Grid		Undefined	
-476.0586	-380.6957			Random in Grid		Undefined	
-445.4397	-395.0409			Random in Grid		Undefined	
-415.9583	-385.0985			Random in Grid		Undefined	
-395.3730	-387.1932			Random in Grid		Undefined	
-416.9386	-379.9913			Random in Grid		Undefined	
-399.1084	-372.2324			Random in Grid		Undefined	
-451.5835	-320.4934			Random in Grid		Undefined	
-434.5440	-334.7600			Random in Grid		Undefined	
-416.4239	-328.0222			Random in Grid		Undefined	
-397.5124	-329.2220			Random in Grid		Undefined	
-436.2131	-316.2394			Random in Grid		Undefined	
-415.3811	-307.4883			Random in Grid		Undefined	
-382.3092	-310.8432			Random in Grid		Undefined	
-443.6869	-296.2467			Random in Grid		Undefined	
-425.7379	-278.7441			Random in Grid		Undefined	
-416.0452	-290.5910			Random in Grid		Undefined	
-391.6142	-294.7255			Random in Grid		Undefined	
-472.4181	-269.4965			Random in Grid		Undefined	
-456.2783	-275.7659			Random in Grid		Undefined	
-443.3128	-274.7139			Random in Grid		Undefined	
-411.3755	-265.0117			Random in Grid		Undefined	
-486.0719	-250.4087			Random in Grid		Undefined	
-440.2499	-249.5450			Random in Grid		Undefined	

Primary Sampling Objective

The primary purpose of sampling at this site is to compare a site median or mean value with a fixed threshold. The working hypothesis (or 'null' hypothesis) is that the median(mean) value at the site is less than the threshold. The alternative hypothesis is that the median(mean) value is equal to or exceeds the threshold. VSP calculates the number of samples required to reject the null hypothesis in favor of the alternative one, given a selected sampling approach and inputs to the associated equation.

Selected Sampling Approach

A nonparametric random sampling within grids approach was used to determine the number of samples and to specify sampling locations. A nonparametric formula was chosen because the conceptual model and historical information (e.g., historical data from this site or a very similar site) indicate that typical parametric assumptions may not be true.

Both parametric and non-parametric equations rely on assumptions about the population. Typically, however, non-parametric equations require fewer assumptions and allow for more uncertainty about the statistical distribution of values at the site. The trade-off is that if the parametric assumptions are valid, the required number of samples is usually less than if a non-parametric equation was used.

VSP offers many options to determine the locations at which measurements are made or samples are collected and subsequently measured. For this design, random point sampling in grids was chosen. This option offers a good balance between providing information about the spatial structure of the potential contamination while ensuring all portions of the site are represented (though, not as thoroughly as systematic grid sampling). Knowledge of the spatial structure is useful

for geostatistical analysis. This option also has the benefit of placing the exact number of samples required by the design.

Nuclides

The following table summarizes the analyzed nuclides.

Nuclides Analyzed by Study		
Nuclide	DCGL _W	DCGL _{EMC}
Analyte 1	5000	

Number of Total Samples: Calculation Equation and Inputs

The equation used to calculate the number of samples is based on a Sign test (see PNNL 13450 for discussion). For this site, the null hypothesis is rejected in favor of the alternative one if the median(mean) is sufficiently larger than the threshold. The number of samples to collect is calculated so that if the inputs to the equation are true, the calculated number of samples will cause the null hypothesis to be rejected.

The formula used to calculate the number of samples is:

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign}P - 0.5)^2}$$

where

$$\text{Sign}P = \Phi\left(\frac{\Delta}{S_{total}}\right)$$

- Φ(z) is the cumulative standard normal distribution on (-∞,z) (see PNNL-13450 for details),
- n is the number of samples,
- S_{total} is the estimated standard deviation of the measured values including analytical error,
- Δ is the width of the gray region,
- α is the acceptable probability of incorrectly concluding the site median(mean) exceeds the threshold,
- β is the acceptable probability of incorrectly concluding the site median(mean) is less than the threshold,
- Z_{1-α} is the value of the standard normal distribution such that the proportion of the distribution less than Z_{1-α} is 1-α,
- Z_{1-β} is the value of the standard normal distribution such that the proportion of the distribution less than Z_{1-β} is 1-β.

Note: MARSSIM suggests that the number of samples should be increased by at least 20% to account for missing or unusable data and uncertainty in the calculated value of n. VSP allows a user-supplied percent overage as discussed in MARSSIM (EPA 2000, p. 5-33).

For each nuclide in the **Nuclides Analyzed by Study** table, the values of these inputs that result in the calculated number of sampling locations are:

Nuclide	n ^a	n ^b	n ^c	Parameter					
				S _{total}	Δ	α	β	Z _{1-α} ^d	Z _{1-β} ^e
Analyte 1	20	20	24	7422	95001	0.01	0.02	2.32635	2.05375

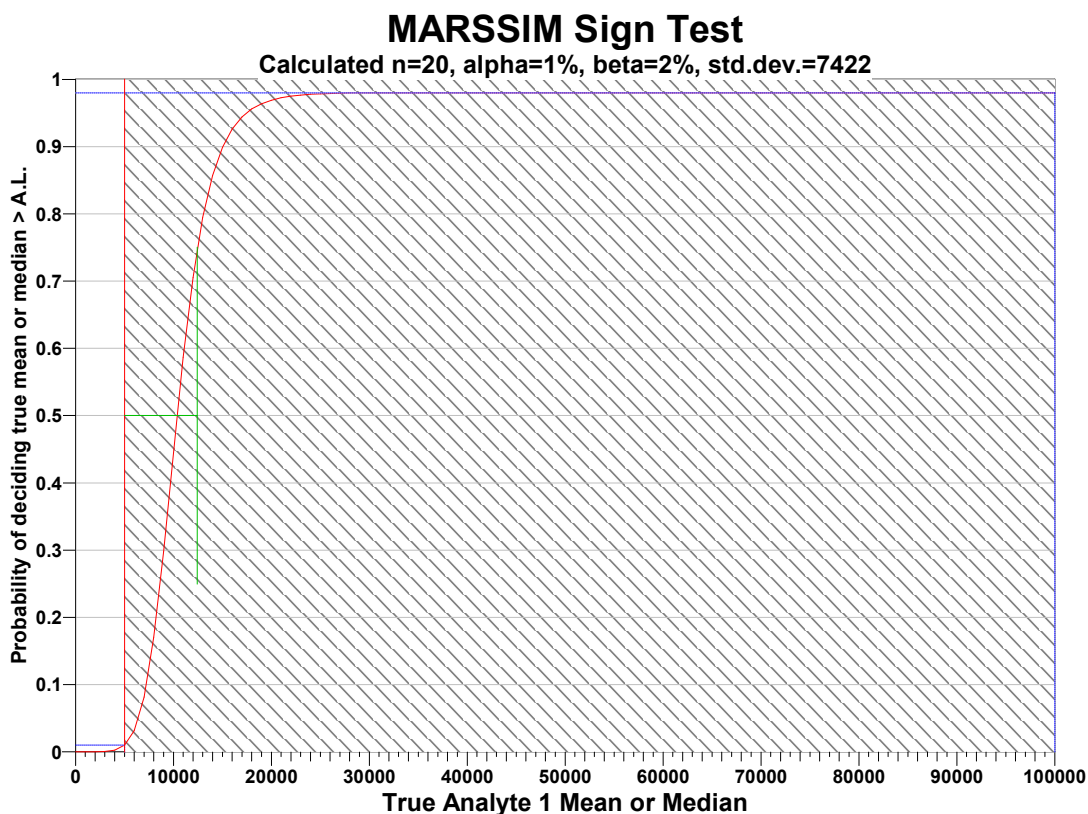
- ^a The number of samples calculated by the formula.
- ^b The number of samples increased by EMC calculations.
- ^c The final number of samples increased by the MARSSIM Overage of 20%.
- ^d This value is automatically calculated by VSP based upon the user defined value of α.
- ^e This value is automatically calculated by VSP based upon the user defined value of β.

Performance

The following figure is a performance goal diagram, described in EPA's QA/G-4 guidance (EPA, 2000). It shows the

probability of concluding the sample area is dirty on the vertical axis versus a range of possible true median(mean) values for the site on the horizontal axis. This graph contains all of the inputs to the number of samples equation and pictorially represents the calculation.

The red vertical line is shown at the threshold (action limit) on the horizontal axis. The width of the gray shaded area is equal to Δ ; the lower horizontal dashed blue line is positioned at α on the vertical axis; the upper horizontal dashed blue line is positioned at $1-\beta$ on the vertical axis. The vertical green line is positioned at one standard deviation above the threshold. The shape of the red curve corresponds to the estimates of variability. The calculated number of samples results in the curve that passes through the lower bound of Δ at α and the upper bound of Δ at $1-\beta$. If any of the inputs change, the number of samples that result in the correct curve changes.



Statistical Assumptions

The assumptions associated with the formulas for computing the number of samples are:

1. the computed sign test statistic is normally distributed,
2. the variance estimate, S^2 , is reasonable and representative of the population being sampled,
3. the population values are not spatially or temporally correlated, and
4. the sampling locations will be selected randomly.

The first three assumptions will be assessed in a post data collection analysis. The last assumption is valid because the sample locations were selected using a random process.

Sensitivity Analysis

The sensitivity of the calculation of number of samples was explored by varying the delta and beta (%), probability of mistakenly concluding that $\mu < \text{action level}$. The following table shows the results of this analysis.

Number of Samples			
	$\beta=5$	$\beta=10$	$\beta=15$
$\Delta=47500.5$	20	17	15
$\Delta=95001$	20	17	15
$\Delta=142502$	20	17	15

Δ = Delta

β = Beta (%), Probability of mistakenly concluding that $\mu <$ action level

Note: Values in table are not adjusted for EMC.

This report was automatically produced* by Visual Sample Plan (VSP) software version 7.12a.

This design was last modified 6/8/2020 3:13:50 PM.

Software and documentation available at <http://vsp.pnnl.gov>

Software copyright (c) 2020 Battelle Memorial Institute. All rights reserved.

* - The report contents may have been modified or reformatted by end-user of software.

Billiken 6 Fed 1

Determination of Standard Deviation from Mean Chloride Levels

490	-2576.28	6637207.19
128	-2938.28	8633476.3
313	-2753.28	7580538.52
192	-2874.28	8261472.74
0	-3066.28	9402059.41
0	-3066.28	9402059.41
28810	25743.72	662739234
6057	2990.722	8944419.41
2973	-93.2778	8700.74383
1112	-1954.28	3819201.63
4453	1386.722	1922998.52
4756	1689.722	2855161.19
4454	1387.722	1925772.97
1044	-2022.28	4089607.41
87	-2979.28	8876096.08
130	-2936.28	8621727.19
0	-3066.28	9402059.41
194	-2872.28	8249979.63
55193		771371772
3066.3		55097983.7
Mean		7422.8 one standard deviation

Determination of Standard Deviation from Mean TPH Levels

57	-3038.1	9230051.6
15	-3080.1	9487016
19	-3076.1	9462391.2
178	-2917.1	8509472.4
209	-2886.1	8329573.2
350	-2745.1	7535574
292	-2803.1	7857369.6
41	-3054.1	9327526.8
271	-2824.1	7975540.8
21	-3074.1	9450090.8
24	-3071.1	9431655.2
14	-3081.1	9493177.2
6200	3104.9	9640404
100	-2995.1	8970624
23	-3072.1	9437798.4
28	-3067.1	9407102.4
45120	42024.9	1.766E+09
7590	4494.9	20204126
1050	-2045.1	4182434
300	-2795.1	7812584
61902		1.942E+09
3095.1		97091837
Mean		9853.519 one standard deviation

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	nRM1933138367
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?	>100 (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 1/2-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

State of New Mexico
Oil Conservation Division

Page 2

Incident ID	nRM1933138367
District RP	
Facility ID	
Application ID	

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.

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: Tom Bynum Title: EHS Consultant

Signature: *Tom Bynum* Date: 6/8/2020

email: tom.bynum@dvn.com Telephone: 575-748-0176

OCD Only

Received by: _____ Date: _____

Incident ID	nRM1933138367
District RP	
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: Tom Bynum Title: EHS Consultant

Signature: *Tom Bynum* Date: 6/8/2020

email: tom.bynum@dvn.com Telephone: 575-748-0176

OCD Only

Received by: _____ Date: _____

- Approved Approved with Attached Conditions of Approval Denied Deferral Approved

Signature: _____ Date: _____