



North Jetty

Environmental Services, LLC

November 15, 2017

VIA EMAIL: mike.bratcher@state.nm.us

Mike Bratcher
NMOCD District 2
811 S. First Street
Artesia, NM 88210
O: 575-748-1283 X108
C: 575-626-0857
F: 575-748-9720

**Re: Remediation Plan for Spill Remediation, Forehand 22 State # 8 H, Eddy County, New Mexico
2RP-4395**

Dear Mr. Bratcher:

North Jetty Environmental Services, LLC (North Jetty) appreciates the opportunity to provide this remediation plan for Caza Petroleum, Inc. (Caza), to remediate the Forehand 22 State # 8 H spill in Eddy County, New Mexico.

DELINEATION

On November 10, 2017, North Jetty field personnel delineated a release at the Caza Forehand 22 State # 8 H (Site) located at 32.288262° N, -104.179429°W in Eddy County, New Mexico. The Site was delineated down to three (3) feet before probe refusal and samples were taken in one (1) foot intervals. Caza reported 152 bbls of crude oil was lost at the Site and covered approximately 3,960 sq. ft. of the secondary containment. The containment was lined with manufactured polymer lining. A fire consumed most of the liner and crude oil. This was confirmed during the investigation but photo documentation was not allowed during the investigation. The delineation of the Site was performed after the damaged equipment and visual impact to liner and soil were removed. The delineation indicated the impacted soil, if any, was removed in the site preparation for delineation. Table 1 presents a summary of the laboratory results from the delineation. The site score for this spill is zero (0) with groundwater greater than 100 ft bgs and surface water greater than 1,000 ft from release area. Figure 1 presents the sample points.

REMEDIATION PLAN

North Jetty proposes to apply microbials to address any residual hydrocarbon in the impacted area before the facility is rebuilt. North Jetty will submit a final report to Caza and the New Mexico Oil Conservation Division (NMOCD) once the

work is complete. It is expected to take one (1) day to complete the application of microbials. All removed material (equipment and visually impacted soil) during remediation will be hauled to disposal facilities. This is expected to take five (5) days to complete with a final report to follow once all data is collected.

Equipment decontamination, sample collection, field documentation, sample custody, and laboratory analyses were, is, or will be in general accordance with industry standards of practice and in conformance with applicable Federal and State regulations. All work will be performed under the supervision of a qualified environmental professional. All laboratory work will be performed under standard turn-around times and costs, unless otherwise directed.

AUTHORIZATION

If this plan is acceptable to you, please sign below as notice to proceed and return one copy of this plan intact to our office. We will proceed with the work upon receipt of proposal authorization. You may contact me at (325) 669-5735 (cell) to discuss any questions you may have.

Respectfully submitted,

North Jetty Environmental Services, LLC



Coty Woolf
President
North Jetty Environmental Services, LLC
325.669.5735 cell
432.897.4988 office
432.897.4977 fax
cotywoolf@icloud.com

AUTHORIZATION

If this plan is acceptable to you, please sign below as notice to proceed and return one copy of this proposal intact to our office. We will proceed with the work upon receipt of proposal authorization and executed consulting services agreement.

AGREED TO, THIS _____ DAY OF _____, 2017

BY (please print): _____

TITLE: _____

COMPANY: _____

SIGNATURE: _____

North Jetty Environmental Site Investigation Sketch

Investigator: Fabian Torrez

Date: 11/10/17

Well/ Lease: Fore hand 22 State # 8 H

Project Name: 17-1103

↑ N

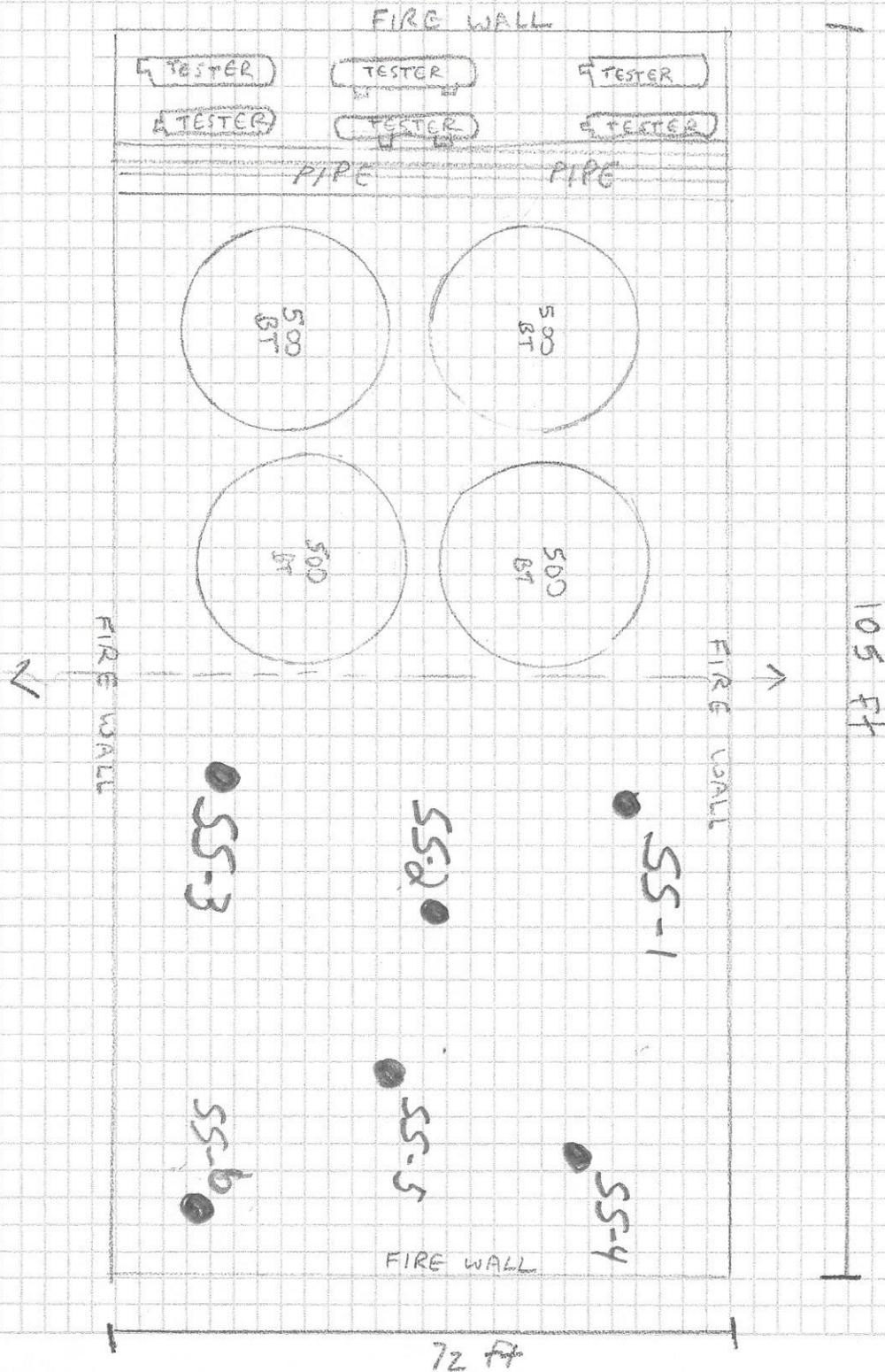


Table 1
Soil Samples Analytical Summary
Caza Petroleum, Forehand 22 State # 8 H
Eddie County, New Mexico

Boring	Depth Feet BGS	Date	Chloride mg/Kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene mg/kg	GRO mg/Kg	DRO mg/Kg	Oil mg/Kg	Total TPH mg/Kg
RRAL:											
SB-1	0 - 1	11/10/2017	<1.14	<0.00114	<0.00227	<0.00114	<0.00227	<28.4	<28.4	<28.4	<28.4
	1 - 2	11/10/2017	--	--	--	--	--	--	--	--	--
	2 - 3	11/10/2017	--	--	--	--	--	--	--	--	--
SB-2	0 - 1	11/10/2017	70.5	<0.00114	<0.00227	<0.00114	<0.00227	<28.4	53.0	90.6	144
	1 - 2	11/10/2017	--	--	--	--	--	<28.1	<28.1	<28.1	<28.1
	2 - 3	11/10/2017	--	--	--	--	--	--	--	--	--
SB-3	0 - 1	11/10/2017	176	<0.00112	<0.00225	<0.00112	<0.00225	<28.1	<28.1	<28.1	<28.1
	1 - 2	11/10/2017	--	--	--	--	--	--	--	--	--
	2 - 3	11/10/2017	--	--	--	--	--	--	--	--	--
SB-4	0 - 1	11/10/2017	21.3	<0.00115	<0.00230	<0.00115	<0.00230	40.3	<28.7	<28.7	40.3
	1 - 2	11/10/2017	--	--	--	--	--	<28.4	<28.4	<28.4	<28.4
	2 - 3	11/10/2017	--	--	--	--	--	--	--	--	--
SB-5	0 - 1	11/10/2017	125	<0.00115	<0.00230	<0.00115	<0.00230	<28.7	<28.7	<28.7	<28.7
	1 - 2	11/10/2017	--	--	--	--	--	--	--	--	--
	2 - 3	11/10/2017	--	--	--	--	--	--	--	--	--
SB-6	0 - 1	11/10/2017	122	<0.00112	<0.00225	<0.00112	<0.00225	<28.1	<28.1	<28.1	<28.1
	1 - 2	11/10/2017	--	--	--	--	--	--	--	--	--
	2 - 3	11/10/2017	--	--	--	--	--	--	--	--	--

Notes: Analysis performed by Permian Basin Environmental Lab, Midland, Texas
Samples analyzed via EPA method SW-8015B (TPH), SW-8021B (BTEX), and SW-300 (chloride).
Depth measurements are in feet below ground surface (bgs).
All concentrations are in milligrams per kilogram (mg/Kg) equivalent to parts per million (ppm).

**PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701**



Analytical Report

Prepared for:

Coty Woolf
North Jetty Environmental Services
5004 Whitman Drive
Midland, TEXAS 79705

Project: Caza Forehand 22 State #8 H

Project Number: 17-1103

Location: New Mexico

Lab Order Number: 7K13003



NELAP/TCEQ # T104704516-16-7

Report Date: 11/14/17

North Jetty Environmental Services
5004 Whitman Drive
Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
Project Number: 17-1103
Project Manager: Coty Woolf

Fax:

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-1 0-1	7K13003-01	Soil	11/10/17 10:36	11-13-2017 11:00
SS-2 0-1	7K13003-04	Soil	11/10/17 10:48	11-13-2017 11:00
SS-2 1-2	7K13003-05	Soil	11/10/17 10:52	11-13-2017 11:00
SS-3 0-1	7K13003-07	Soil	11/10/17 11:00	11-13-2017 11:00
SS-4 0-1	7K13003-10	Soil	11/10/17 12:34	11-13-2017 11:00
SS-4 1-2	7K13003-11	Soil	11/10/17 12:40	11-13-2017 11:00
SS-5 0-1	7K13003-13	Soil	11/10/17 12:52	11-13-2017 11:00
SS-6 0-1	7K13003-16	Soil	11/10/17 13:12	11-13-2017 11:00

North Jetty Environmental Services
5004 Whitman Drive
Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
Project Number: 17-1103
Project Manager: Coty Woolf

Fax:

SS-1 0-1
7K13003-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00114	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Toluene	ND	0.00227	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Ethylbenzene	ND	0.00114	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (p/m)	ND	0.00227	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (o)	ND	0.00114	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	
<i>Surrogate: 1,4-Difluorobenzene</i>		98.2 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	ND	1.14	mg/kg dry	1	P7K1307	11/13/17	11/14/17	EPA 300.0	
% Moisture	12.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C12-C28	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C28-C35	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		111 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
<i>Surrogate: o-Terphenyl</i>		128 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	28.4	mg/kg dry	1	[CALC]	11/13/17	11/13/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-2 0-1
7K13003-04 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00114	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Toluene	ND	0.00227	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Ethylbenzene	ND	0.00114	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (p/m)	ND	0.00227	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (o)	ND	0.00114	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		108 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		83.9 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	70.5	1.14	mg/kg dry	1	P7K1307	11/13/17	11/14/17	EPA 300.0	
% Moisture	12.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C12-C28	53.0	28.4	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C28-C35	90.6	28.4	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		107 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Surrogate: o-Terphenyl		123 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	144	28.4	mg/kg dry	1	[CALC]	11/13/17	11/13/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-2 1-2
7K13003-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

% Moisture	11.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	
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Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C12-C28	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C28-C35	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		<i>106 %</i>	<i>70-130</i>		<i>P7K1304</i>	<i>11/13/17</i>	<i>11/13/17</i>	<i>TPH 8015M</i>	
<i>Surrogate: o-Terphenyl</i>		<i>119 %</i>	<i>70-130</i>		<i>P7K1304</i>	<i>11/13/17</i>	<i>11/13/17</i>	<i>TPH 8015M</i>	
Total Petroleum Hydrocarbon C6-C35	ND	28.1	mg/kg dry	1	[CALC]	11/13/17	11/13/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-3 0-1
7K13003-07 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00112	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Toluene	ND	0.00225	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Ethylbenzene	ND	0.00112	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (p/m)	ND	0.00225	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (o)	ND	0.00112	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		115 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		97.3 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	176	1.12	mg/kg dry	1	P7K1307	11/13/17	11/14/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C12-C28	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C28-C35	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		105 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Surrogate: o-Terphenyl		120 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	28.1	mg/kg dry	1	[CALC]	11/13/17	11/13/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-4 0-1
7K13003-10 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00115	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Toluene	ND	0.00230	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Ethylbenzene	ND	0.00115	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (p/m)	ND	0.00230	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (o)	ND	0.00115	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Surrogate: 1,4-Difluorobenzene		92.1 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	
Surrogate: 4-Bromofluorobenzene		115 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	21.3	1.15	mg/kg dry	1	P7K1308	11/13/17	11/14/17	EPA 300.0	
% Moisture	13.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	40.3	28.7	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C12-C28	ND	28.7	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
>C28-C35	ND	28.7	mg/kg dry	1	P7K1304	11/13/17	11/13/17	TPH 8015M	
Surrogate: 1-Chlorooctane		106 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Surrogate: o-Terphenyl		122 %	70-130		P7K1304	11/13/17	11/13/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	40.3	28.7	mg/kg dry	1	[CALC]	11/13/17	11/13/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-4 1-2
7K13003-11 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

General Chemistry Parameters by EPA / Standard Methods

% Moisture	12.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	
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Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
>C12-C28	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
>C28-C35	ND	28.4	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		108 %	70-130		P7K1304	11/13/17	11/14/17	TPH 8015M	
<i>Surrogate: o-Terphenyl</i>		123 %	70-130		P7K1304	11/13/17	11/14/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	28.4	mg/kg dry	1	[CALC]	11/13/17	11/14/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-5 0-1
7K13003-13 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00115	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Toluene	ND	0.00230	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Ethylbenzene	ND	0.00115	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (p/m)	ND	0.00230	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
Xylene (o)	ND	0.00115	mg/kg dry	1	P7K1305	11/13/17	11/13/17	EPA 8021B	
<i>Surrogate: 1,4-Difluorobenzene</i>		93.2 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	
<i>Surrogate: 4-Bromofluorobenzene</i>		113 %	75-125		P7K1305	11/13/17	11/13/17	EPA 8021B	

General Chemistry Parameters by EPA / Standard Methods

Chloride	125	1.15	mg/kg dry	1	P7K1308	11/13/17	11/14/17	EPA 300.0	
% Moisture	13.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.7	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
>C12-C28	ND	28.7	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
>C28-C35	ND	28.7	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		112 %	70-130		P7K1304	11/13/17	11/14/17	TPH 8015M	
<i>Surrogate: o-Terphenyl</i>		130 %	70-130		P7K1304	11/13/17	11/14/17	TPH 8015M	
Total Petroleum Hydrocarbon C6-C35	ND	28.7	mg/kg dry	1	[CALC]	11/13/17	11/14/17	calc	

North Jetty Environmental Services
 5004 Whitman Drive
 Midland TEXAS, 79705

Project: Caza Forehand 22 State #8 H
 Project Number: 17-1103
 Project Manager: Coty Woolf

Fax:

SS-6 0-1
7K13003-16 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Permian Basin Environmental Lab, L.P.

Organics by GC

Benzene	ND	0.00112	mg/kg dry	1	P7K1305	11/13/17	11/14/17	EPA 8021B	
Toluene	ND	0.00225	mg/kg dry	1	P7K1305	11/13/17	11/14/17	EPA 8021B	
Ethylbenzene	ND	0.00112	mg/kg dry	1	P7K1305	11/13/17	11/14/17	EPA 8021B	
Xylene (p/m)	ND	0.00225	mg/kg dry	1	P7K1305	11/13/17	11/14/17	EPA 8021B	
Xylene (o)	ND	0.00112	mg/kg dry	1	P7K1305	11/13/17	11/14/17	EPA 8021B	
<i>Surrogate: 1,4-Difluorobenzene</i>		109 %	75-125		P7K1305	11/13/17	11/14/17	EPA 8021B	
<i>Surrogate: 4-Bromofluorobenzene</i>		137 %	75-125		P7K1305	11/13/17	11/14/17	EPA 8021B	S-GC

General Chemistry Parameters by EPA / Standard Methods

Chloride	122	1.12	mg/kg dry	1	P7K1308	11/13/17	11/14/17	EPA 300.0	
% Moisture	11.0	0.1	%	1	P7K1402	11/14/17	11/14/17	ASTM D2216	

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M

C6-C12	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
>C12-C28	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
>C28-C35	ND	28.1	mg/kg dry	1	P7K1304	11/13/17	11/14/17	TPH 8015M	
<i>Surrogate: 1-Chlorooctane</i>		116 %	70-130		P7K1304	11/13/17	11/14/17	TPH 8015M	
<i>Surrogate: o-Terphenyl</i>		134 %	70-130		P7K1304	11/13/17	11/14/17	TPH 8015M	S-GC
Total Petroleum Hydrocarbon C6-C35	ND	28.1	mg/kg dry	1	[CALC]	11/13/17	11/14/17	calc	

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Project: Caza Forehand 22 State #8 H
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Project Manager: Coty Woolf

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Organics by GC - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7K1305 - General Preparation (GC)

Blank (P7K1305-BLK1)

Prepared & Analyzed: 11/13/17

Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00200	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00200	"							
Xylene (o)	ND	0.00100	"							
Surrogate: 4-Bromofluorobenzene	0.0676		"	0.0600		113	75-125			
Surrogate: 1,4-Difluorobenzene	0.0623		"	0.0600		104	75-125			

LCS (P7K1305-BS1)

Prepared & Analyzed: 11/13/17

Benzene	0.116	0.00100	mg/kg wet	0.100		116	70-130			
Toluene	0.114	0.00200	"	0.100		114	70-130			
Ethylbenzene	0.117	0.00100	"	0.100		117	70-130			
Xylene (p/m)	0.220	0.00200	"				70-130			
Xylene (o)	0.117	0.00100	"				70-130			
Surrogate: 4-Bromofluorobenzene	0.0671		"	0.0600		112	75-125			
Surrogate: 1,4-Difluorobenzene	0.0673		"	0.0600		112	75-125			

LCS Dup (P7K1305-BSD1)

Prepared & Analyzed: 11/13/17

Benzene	0.113	0.00100	mg/kg wet	0.100		113	70-130	2.43	20	
Toluene	0.110	0.00200	"	0.100		110	70-130	3.55	20	
Ethylbenzene	0.113	0.00100	"	0.100		113	70-130	2.76	20	
Xylene (p/m)	0.214	0.00200	"				70-130		20	
Xylene (o)	0.120	0.00100	"				70-130		20	
Surrogate: 4-Bromofluorobenzene	0.0696		"	0.0600		116	75-125			
Surrogate: 1,4-Difluorobenzene	0.0614		"	0.0600		102	75-125			

Calibration Blank (P7K1305-CCB1)

Prepared & Analyzed: 11/13/17

Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 4-Bromofluorobenzene	0.0595		"	0.0600		99.1	75-125			
Surrogate: 1,4-Difluorobenzene	0.0538		"	0.0600		89.6	75-125			

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Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7K1305 - General Preparation (GC)

Calibration Blank (P7K1305-CCB2)

Prepared & Analyzed: 11/13/17

Benzene	0.00		mg/kg wet							
Toluene	0.00		"							
Ethylbenzene	0.00		"							
Xylene (p/m)	0.00		"							
Xylene (o)	0.00		"							
Surrogate: 1,4-Difluorobenzene	0.0557		"	0.0600		92.8	75-125			
Surrogate: 4-Bromofluorobenzene	0.0650		"	0.0600		108	75-125			

Calibration Check (P7K1305-CCV1)

Prepared & Analyzed: 11/13/17

Benzene	0.119	0.00100	mg/kg wet	0.100		119	80-120			
Toluene	0.118	0.00200	"	0.100		118	80-120			
Ethylbenzene	0.115	0.00100	"	0.100		115	80-120			
Xylene (p/m)	0.216	0.00200	"	0.200		108	80-120			
Xylene (o)	0.119	0.00100	"	0.100		119	80-120			
Surrogate: 4-Bromofluorobenzene	0.0693		"	0.0600		115	75-125			
Surrogate: 1,4-Difluorobenzene	0.0672		"	0.0600		112	75-125			

Calibration Check (P7K1305-CCV2)

Prepared & Analyzed: 11/13/17

Benzene	0.106	0.00100	mg/kg wet	0.100		106	80-120			
Toluene	0.100	0.00200	"	0.100		100	80-120			
Ethylbenzene	0.105	0.00100	"	0.100		105	80-120			
Xylene (p/m)	0.211	0.00200	"	0.200		105	80-120			
Xylene (o)	0.117	0.00100	"	0.100		117	80-120			
Surrogate: 4-Bromofluorobenzene	0.0633		"	0.0600		105	75-125			
Surrogate: 1,4-Difluorobenzene	0.0593		"	0.0600		98.8	75-125			

Calibration Check (P7K1305-CCV3)

Prepared: 11/13/17 Analyzed: 11/14/17

Benzene	0.106	0.00100	mg/kg wet	0.100		106	80-120			
Toluene	0.106	0.00200	"	0.100		106	80-120			
Ethylbenzene	0.110	0.00100	"	0.100		110	80-120			
Xylene (p/m)	0.214	0.00200	"	0.200		107	80-120			
Xylene (o)	0.114	0.00100	"	0.100		114	80-120			
Surrogate: 4-Bromofluorobenzene	0.0845		"	0.0600		141	75-125			S-GC
Surrogate: 1,4-Difluorobenzene	0.0653		"	0.0600		109	75-125			

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Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7K1305 - General Preparation (GC)

Matrix Spike (P7K1305-MS1)	Source: 7K13003-02			Prepared: 11/13/17		Analyzed: 11/14/17				
Benzene	0.0926	0.00112	mg/kg dry	0.112	ND	82.4	80-120			
Toluene	0.0934	0.00225	"	0.112	ND	83.1	80-120			
Ethylbenzene	0.108	0.00112	"	0.112	ND	96.0	80-120			
Xylene (p/m)	0.207	0.00225	"		ND		80-120			
Xylene (o)	0.0956	0.00112	"		ND		80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0820</i>		"	<i>0.0674</i>		<i>122</i>	<i>75-125</i>			
<i>Surrogate: 1,4-Difluorobenzene</i>	<i>0.0725</i>		"	<i>0.0674</i>		<i>108</i>	<i>75-125</i>			

Matrix Spike Dup (P7K1305-MSD1)	Source: 7K13003-02			Prepared: 11/13/17		Analyzed: 11/14/17				
Benzene	0.120	0.00112	mg/kg dry	0.112	ND	106	80-120	25.4	20	QM-05
Toluene	0.119	0.00225	"	0.112	ND	106	80-120	24.0	20	QM-05
Ethylbenzene	0.124	0.00112	"	0.112	ND	110	80-120	13.8	20	
Xylene (p/m)	0.240	0.00225	"		ND		80-120		20	
Xylene (o)	0.128	0.00112	"		ND		80-120		20	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0949</i>		"	<i>0.0674</i>		<i>141</i>	<i>75-125</i>			<i>S-GC</i>
<i>Surrogate: 1,4-Difluorobenzene</i>	<i>0.0734</i>		"	<i>0.0674</i>		<i>109</i>	<i>75-125</i>			

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7K1307 - * DEFAULT PREP *****

Blank (P7K1307-BLK1)										
Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	ND	1.00	mg/kg wet							
LCS (P7K1307-BS1)										
Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	400	1.00	mg/kg wet	400		99.9	80-120			
LCS Dup (P7K1307-BSD1)										
Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	404	1.00	mg/kg wet	400		101	80-120	1.05	20	
Duplicate (P7K1307-DUP1)										
Source: 7K08010-17 Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	177	1.18	mg/kg dry		187			5.28	20	
Duplicate (P7K1307-DUP2)										
Source: 7K10004-04 Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	ND	1.01	mg/kg dry		ND				20	
Matrix Spike (P7K1307-MS1)										
Source: 7K08010-17 Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	1420	1.18	mg/kg dry	1180	187	105	80-120			

Batch P7K1308 - * DEFAULT PREP *****

Blank (P7K1308-BLK1)										
Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	ND	1.00	mg/kg wet							
LCS (P7K1308-BS1)										
Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	422	1.00	mg/kg wet	400		106	80-120			
LCS Dup (P7K1308-BSD1)										
Prepared: 11/13/17 Analyzed: 11/14/17										
Chloride	421	1.00	mg/kg wet	400		105	80-120	0.332	20	

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General Chemistry Parameters by EPA / Standard Methods - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7K1308 - *** DEFAULT PREP ***										
Duplicate (P7K1308-DUP1)		Source: 7K13003-08			Prepared: 11/13/17 Analyzed: 11/14/17					
Chloride	166	1.12	mg/kg dry		164			1.31	20	
Duplicate (P7K1308-DUP2)		Source: 7K13003-18			Prepared: 11/13/17 Analyzed: 11/14/17					
Chloride	122	1.16	mg/kg dry		120			1.47	20	
Matrix Spike (P7K1308-MS1)		Source: 7K13003-08			Prepared: 11/13/17 Analyzed: 11/14/17					
Chloride	1290	1.12	mg/kg dry	1120	164	100	80-120			
Batch P7K1402 - *** DEFAULT PREP ***										
Blank (P7K1402-BLK1)					Prepared & Analyzed: 11/14/17					
% Moisture	ND	0.1	%							
Duplicate (P7K1402-DUP1)		Source: 7K10007-26			Prepared & Analyzed: 11/14/17					
% Moisture	9.0	0.1	%		9.0			0.00	20	
Duplicate (P7K1402-DUP2)		Source: 7K13003-05			Prepared & Analyzed: 11/14/17					
% Moisture	9.0	0.1	%		11.0			20.0	20	
Duplicate (P7K1402-DUP3)		Source: 7K13005-01			Prepared & Analyzed: 11/14/17					
% Moisture	3.0	0.1	%		3.0			0.00	20	

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Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P7K1304 - General Preparation (GC)										
Blank (P7K1304-BLK1) Prepared & Analyzed: 11/13/17										
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	114		"	100		114	70-130			
Surrogate: o-Terphenyl	65.5		"	50.0		131	70-130			S-GC
LCS (P7K1304-BS1) Prepared & Analyzed: 11/13/17										
C6-C12	871	25.0	mg/kg wet	1000		87.1	75-125			
>C12-C28	1080	25.0	"	1000		108	75-125			
Surrogate: 1-Chlorooctane	146		"	100		146	70-130			S-GC
Surrogate: o-Terphenyl	61.9		"	50.0		124	70-130			
LCS Dup (P7K1304-BSD1) Prepared & Analyzed: 11/13/17										
C6-C12	877	25.0	mg/kg wet	1000		87.7	75-125	0.681	20	
>C12-C28	1080	25.0	"	1000		108	75-125	0.570	20	
Surrogate: 1-Chlorooctane	146		"	100		146	70-130			S-GC
Surrogate: o-Terphenyl	61.8		"	50.0		124	70-130			
Calibration Blank (P7K1304-CCB1) Prepared & Analyzed: 11/13/17										
C6-C12	16.6		mg/kg wet							
>C12-C28	13.3		"							
Surrogate: 1-Chlorooctane	108		"	100		108	70-130			
Surrogate: o-Terphenyl	61.6		"	50.0		123	70-130			
Calibration Blank (P7K1304-CCB2) Prepared & Analyzed: 11/13/17										
C6-C12	13.6		mg/kg wet							
>C12-C28	11.6		"							
Surrogate: 1-Chlorooctane	114		"	100		114	70-130			
Surrogate: o-Terphenyl	65.8		"	50.0		132	70-130			S-GC

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Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control
Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch P7K1304 - General Preparation (GC)

Calibration Check (P7K1304-CCV1)

Prepared & Analyzed: 11/13/17

C6-C12	455	25.0	mg/kg wet	500		90.9	85-115			
>C12-C28	491	25.0	"	500		98.2	85-115			
Surrogate: 1-Chlorooctane	120		"	100		120	70-130			
Surrogate: o-Terphenyl	61.0		"	50.0		122	70-130			

Calibration Check (P7K1304-CCV2)

Prepared & Analyzed: 11/13/17

C6-C12	451	25.0	mg/kg wet	500		90.3	85-115			
>C12-C28	476	25.0	"	500		95.3	85-115			
Surrogate: 1-Chlorooctane	118		"	100		118	70-130			
Surrogate: o-Terphenyl	59.8		"	50.0		120	70-130			

Calibration Check (P7K1304-CCV3)

Prepared: 11/13/17 Analyzed: 11/14/17

C6-C12	469	25.0	mg/kg wet	500		93.8	85-115			
>C12-C28	489	25.0	"	500		97.8	85-115			
Surrogate: 1-Chlorooctane	121		"	100		121	70-130			
Surrogate: o-Terphenyl	60.4		"	50.0		121	70-130			

Matrix Spike (P7K1304-MS1)

Source: 7K13003-02

Prepared: 11/13/17 Analyzed: 11/14/17

C6-C12	1100	28.1	mg/kg dry	1120	26.6	95.3	75-125			
>C12-C28	1300	28.1	"	1120	11.6	115	75-125			
Surrogate: 1-Chlorooctane	126		"	112		112	70-130			
Surrogate: o-Terphenyl	77.2		"	56.2		137	70-130			S-GC

Matrix Spike Dup (P7K1304-MSD1)

Source: 7K13003-02

Prepared: 11/13/17 Analyzed: 11/14/17

C6-C12	1030	28.1	mg/kg dry	1120	26.6	89.0	75-125	6.79	20	
>C12-C28	1210	28.1	"	1120	11.6	107	75-125	7.27	20	
Surrogate: 1-Chlorooctane	129		"	112		114	70-130			
Surrogate: o-Terphenyl	71.4		"	56.2		127	70-130			

Notes and Definitions

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By:



Date: 11/14/2017

Brent Barron, Laboratory Director/Technical Director

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