Jason Michelson
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REVIEWED
By Olivia Yu at 3:34 pm, Jun 15, 2018

May 31, 2018

Olivia Yu
Environmental Specialist
New Mexico Oil Conservation Division, District 1
1625 N. French Drive
Hobbs, NM 88240

Re: Former Moran Well No. 2-6 Tank Battery
2018 Remediation Activities – Scope of Work
Case No. 1RP-3657
Lea County, New Mexico

Dear Ms. Yu,

Please find enclosed for your files copies of the following report:

- 2018 Remediation Activities - Scope of Work – Former Moran Well No. 2-6 Tank Battery, West Nadine Field; Lea County, New Mexico.

The scope of work was prepared by Arcadis U.S. Inc. (Arcadis) on behalf of Chevron Environmental Management Company (CEMC) propose remedial activities for the site.

Please do not hesitate to call Brett Krehbiel with Arcadis at 916-786-5382 or myself at 713-372-0289, should you have any questions.

Sincerely,

Jason Michelson

Encl. 2018 Remediation Activities - Scope of Work – Former Moran Well No. 2-6 Tank Battery

C.C. Amy Barnhill, Chevron/MCBU

ARCADIS Design & Consultancy for natural and built assets

Ms. Olivia Yu
Environmental Specialist
New Mexico Oil Conservation Division – District I
1625 N. French Drive
Hobbs, New Mexico 88240

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Subject:
2018 Remediation Activities – Scope of Work
Former Moran Well No. 2-6 Tank Battery
West Nadine Field
Case No. 1RP-3657
Lea County, New Mexico

Date:
May 31, 2018

Contact:
Brett Krehbiel
Phone:
916.786.5382
Email:
Brett.Krehbiel@arcadis.com
Our ref:
66000701.0510

ARCADIS U.S., Inc.
TX Engineering License # F-533
Geoscientist License # 50158

Dear Ms. Yu:

Arcadis U.S., Inc. (Arcadis) has prepared this scope of work (SOW) for Chevron Environmental Management Company (CEMC) to perform environmental remediation services at the former Moran No. 2-6 Tank Battery site.

A project summary of the specific tasks for the proposed SOW are detailed below.

Project Summary

On August 20, 2014, the Moran No. 2-6 well was plugged, and reclamation of the site was initiated in June 2015. During removal of an aboveground storage tank in the tank battery, soils underneath the tank appeared to be impacted with crude oil. CEMC filed a Release Notification and Corrective Action Form (C-141) with the New Mexico Oil Conservation Division (NMOCD) on June 2, 2015 along with a site reclamation safe digging plan.

CEMC excavated soils from the former tank battery location and collected soil samples. In some locations, analytical results from the base of the excavation exhibited concentrations of hydrocarbons and chlorides that exceeded applicable regulatory criteria. The current excavation is approximately 75 feet by 60 feet

with depth at the base ranging from 8 to 10 feet. The sides are benched towards the base of the excavation.

In March 2016, five grab samples were collected beginning approximately 2 feet below the base of the excavation at Locations C, D, E, F, and I above using the bucket of a long reach excavator. A subset of the soils from each bucket grab sample were field screened for possible organic vapors in parts per million (ppm) using a photo-ionization detector (PID) and another subset of the soils were collected in laboratory supplied bottleware and immediately placed on ice.

Based on the results of the PID screening and visual observations of the soils, the excavator advanced the depth in Locations D, E, and F and additional grab samples were collected and screened with a PID prior to selecting the samples to be submitted the analytical laboratory.

Benzene was not detected above the laboratory method detection limit (MDL) for any of the five soil samples. Benzene, toluene, ethylbenzene, and total xylenes (BTEX) was detected in the samples collected from Locations E and F at adjusted depth ranges of 13-16 ft below ground surface (bgs) and 16-20 ft bgs, respectively. However, detected concentrations did not exceed the recommended remediation action levels (RRAL) of 50 milligrams per kilogram (mg/Kg).

Total petroleum hydrocarbons gasoline range organics (TPH-GRO) was only detected at Location F (16-20 ft bgs) at a concentration of 1,920 mg/Kg, which exceeds the RRAL of 100 mg/Kg. No other samples detected TPH-GRO at or above the laboratory MDL. Total petroleum hydrocarbons diesel range organics (TPH-DRO) was detected in all five soil samples with concentrations ranging from 3.59 mg/Kg to 3,930 mg/Kg. Only Locations F (16-20 ft bgs) and I (10-12 ft bgs) exceeded the RRAL of 100 mg/Kg with concentrations of 3,930 mg/Kg and 120 mg/Kg, respectively. Total petroleum hydrocarbons oil range organics (TPH-ORO) was detected in all five soil samples with concentrations ranging from 1.63 mg/Kg to 1,060 mg/Kg. Locations C (10-12 ft bgs), F (16-20 ft bgs), and I (10-12 ft bgs) exceeded the RRAL of 100 mg/Kg with concentrations of 158 mg/Kg, 1,060 mg/Kg, and 132 mg/Kg, respectively.

Though chloride was detected in all five soil samples, none of the concentrations exceeded the NMOCD's regulatory practice guideline of 250 mg/Kg. The detected concentrations ranged from 3.22 mg/Kg to 27.6 mg/Kg.

Utility Determination Survey

Prior to mobilization, Arcadis will coordinate the submittal of a utility locate request for One Call. Arcadis will conduct oversight of the utility locating of the proposed work area utilizing a private locating service and will prepare a dig plan to the Mid-Continent Business Unit (MCBU) Functional Operations Team (FOT) for approval.

Excavation Backfill, Subsurface Investigation and Liner Installation

Arcadis will subcontract Talon out of Artesia, New Mexico to perform backfill work at the site. Talon will level the former tank battery to an overall depth of 4 feet 1-inch below ground surface (ft bgs).

Based on the analytical results from the stockpile samples collected in January 2017, the existing excavation will be backfilled and compacted with a combination of the existing stockpile material onsite and imported clean soil. It is estimated that a maximum of 250 cubic yards (cy) of imported clean soil will be required to backfill the excavation in addition to the existing soil stockpile material. The existing excavation will be backfilled and compacted in 12-inch lifts to verify the ground surface integrity is suitable for drill rig operations. Compaction will be completed by repeatedly rolling over the backfill material and/or bucket back dragging using onsite equipment (i.e. backhoe/loader). A minimal amount of water may be applied to aid in compaction.

Talon will provide a hollow stem auger rig to advance one soil boring at Location F. The total borehole depth is not anticipated to exceed 50 linear feet. An Arcadis geologist will oversee and direct the drilling work, conduct air monitoring in the work zone, screen and log the soil core for organic vapors and lithology, and collect four confirmation soil samples. The samples will be collected from the highest PID interval, below the highest PID interval where organic vapors are no longer detected, and the third and fourth samples will be collected 5 and 10 feet below the second sample depth, respectively. Soil samples will be provided to a New Mexico certified laboratory under chain of custody protocol and analyzed for the following constituents:

- BTEX by EPA Method 8260B;
- TPH GRO, DRO, ORO by EPA Method 8015M;
- Chloride by EPA Method 300; and
- Percent moisture by SM 2540B.

Following completion of the drilling activities, the borehole will be backfilled with bentonite grout.

Upon receiving analytical results confirming the site is a candidate for closure, Talon will remobilize to the site for the installation of a 40-millimeter polyethylene liner. Once installed, all seams will be welded together if needed. Talon will level the former tank battery from 3 feet 11 inches bgs to grade. Imported clean soil will be utilized and compacted in 12-inch lifts to verify the ground surface integrity. Compaction will be completed by repeatedly rolling over the backfill material and/or bucket back dragging using onsite equipment (i.e. backhoe/loader). A minimal amount of water may be applied to aid in compaction.

Following execution of remedial activities, a letter report will be submitted to the NMOCD summarizing the results of all subsurface investigations and excavation and liner placement activities.

If you have any questions or comments, please contact Brett Krehbiel at 916.786.5382 or by email at brett.krehbiel@arcadis.com or Greg Cutshall at 859.287.0242 or by e-mail at greg.cutshall@arcadis.com.

Sincerely,

Arcadis U.S., Inc.

Greg Cutshall
Program Manager

Brett Krehbiel
Certified Project Manager

Constituent Abbreviations		Regulatory Limit
Benzene	Benzene	10
BTEX	Total Benzene, Toluene, Ethylbenzene, and Xylenes	50
Chloride	Chloride	250
TPH GRO	Total Petroleum Hydrocarbons Gasoline Range Organics	100
TPH DRO	Total Petroleum Hydrocarbons Diesel Range Organics	100
TPH ORO	Total Petroleum Hydrocarbons Oil Range Organics	100

D @ 8-10 ft bgs	3/8/2016
Benzene	<0.000217
Total BTEX	<0.000108
Chloride	3.22
TPH GRO	<0.842
TPH DRO	3.59
TPH ORO	1.63

C @ 10-12 ft bgs	3/8/2016
Benzene	<0.000257
Total BTEX	<0.000128
Chloride	18
TPH GRO	<0.980
TPH DRO	82.2
TPH ORO	**158**

I @ 10-12 ft bgs	3/8/2016
Benzene	<0.000266
Total BTEX	<0.000132
Chloride	27.6
TPH GRO	<1.01
TPH DRO	**120**
TPH ORO	**132**

E @ 13-13 ft bgs	3/8/2016
Benzene	<0.000264
Total BTEX	0.00173
Chloride	26.8
TPH GRO	<1.02
TPH DRO	28.5
TPH ORO	12.6

F @ 16-20 ft bgs	3/8/2016
Benzene	<0.00641
Total BTEX	16.5
Chloride	19.1
TPH GRO	**1,920**
TPH DRO	**3,930**
TPH ORO	**1,060**

N

0 40 80 Feet

GRAPHIC SCALE

Legend:

- Approximate Sample Location
- **Moran No. 2-6** Lat/Long: 32.599290, -103.181621
- T Pole-Mounted Transformers
- Fenceline
- Plains Pipeline
- Excavation
- Stockpile
- #### Analytical Value is ≥ Regulatory Limit
- ft bgs Feet Below Ground Surface
- Proposed Boring Location

Notes:

1. Samples collected on March 8, 2016.
2. Regulatory limits are based on the New Mexico Oil Conservation Division's "Guidelines for Remediation of Leaks, Spills, and Releases" dated August 13, 1993.
3. All analytical results are presented in milligrams per kilogram (mg/Kg).

CHEVRON U.S.A. INC.
LEA COUNTY, NEW MEXICO
FORMER MORAN NO. 2-6 TANK BATTERY

SOIL ANALYTICAL RESULTS

WEST NADINE FIELD
MARCH 2016

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

City: Houston Div/Group: Remediation West - Air Group Created By: W Berry Last Saved By: wberry Client (Project #)
D:_Arcadis\Land Services\Chevron\Moran No. 2-6\GIS\Moran No 2-6 Analytical.mxd 3/29/2016 4:12:26 PM