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Accepted for record
for 1RP-2642.

July 25, 2018

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

Re: Chevron Central Vacuum Unit 106/136
2017 Interim Remediation and Reclamation Report
Case No. 1RP-2642-0
Lea County, New Mexico

Dear Ms. Yu,

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

- Central Vacuum Unit 106/136 – 2017 Interim Remediation and Reclamation Report, Unit N, Section 6, Township 18 South, Range 35 East; Lea County New Mexico.

The report was prepared by GHD Services (GHD) on behalf of Chevron Environmental Management Company (CEMC) to document interim remediation and reclamation activities conducted throughout 2017 at the Site.

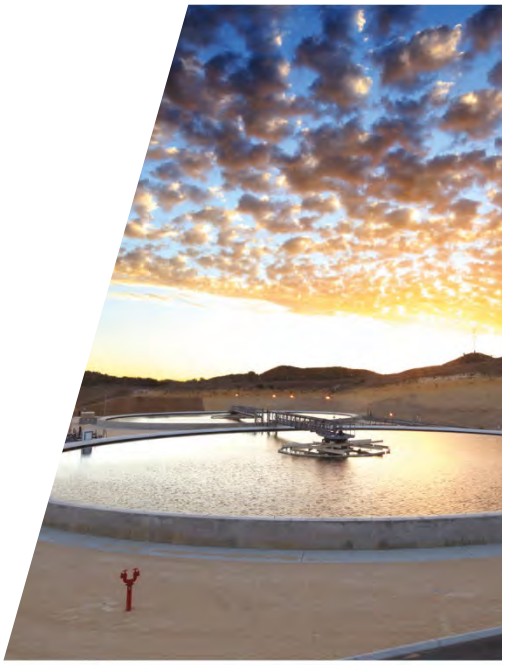
Please do not hesitate to call Scott Foord with GHD at 713-734-3090 or myself at 713-372-0289, should you have any questions.

Sincerely,

Jason Michelson

Encl. Central Vacuum Unit 106/136 – 2017 Interim Remediation and Reclamation Report

C.C. Amy Barnhill, Chevron/MCBU



2017 Interim Remediation and Reclamation Report

CVU 106/136
Lea County, New Mexico
1R-2642-0

Chevron Environmental Management Company

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1. Introduction

1.1 Introduction

This report provides a description of interim remediation activities that were performed at the Central Vacuum Unit (CVU) #106/136 site in 2017. The Chevron CVU 106/136 site (hereafter referred to as the "Site"), is located in Section 6 (Unit N),Township 18 South, Range 35 East, in Lea County, New Mexico (Figure 1). The Site is situated on land leased to Chevron by the New Mexico State Land Office (NMSLO).

The interim remediation work that was performed at the Site was performed to immunize the downward migration of chlorides in the subsurface. The interim remediation was proposed by Chevron Environmental Management Company (CEMC) and approved by the New Mexico Oil Conservation Division (NMOCD) and New Mexico State Land Office NMSLO. GHD Services Inc. (GHD) performed project management, general oversight of the assessment activities, soil sampling, and documentation of the field work. Diamondback Services of Hobbs, New Mexico performed the interim remedial activities.

1.2 Regulatory Requirements

Based on information available from the Petroleum Recovery Research Center Pit Rule Mapping Portal (PPRC Mapping Portal), the depth to groundwater at the Site is estimated to be between 60 and 103 feet bgs. GHD is currently working on two sites (Buckeye Compressor Station and Buckeye Vacuum) located less than a mile from the Site. The depth to groundwater at these sites is approximately 130 feet bgs.

Although the nearest private domestic water and public/municipal water sources are greater than 200 feet and 1,000 feet respectively from the release site, the Site is located within 200 horizontal feet of a playa feature. Consequently, the preliminary total ranking score is 20 (see table below). Based on this, the site-specific RRAL to be applied by NMOCD for chlorides at the Site is 250 ppm.

Table 1.1 New Mexico Oil Conservation Division Site Assessment

Ranking Criteria	Score
Depth to Ground Water (> 100 feet)	0
Wellhead Protection Area (< 1000 feet from water source, < 200 feet from domestic source)	0
Distance to Surface Body Water (200 feet - 1000 feet)	20
Ranking Criteria Total Score	**20**
*Because the ranking criteria total score is 20, NMOCD established RRALs are 10 ppm for benzene, 50 ppm for benzene, toluene, ethylbenzene, and xylene (BTEX), 100 ppm for total petroleum hydrocarbons (TPH), and 250 ppm for chlorides[1].	

1. NMOCD Guidance for Release Reporting and Corrective Action, August 13, 1993

2. Site History

Central Vacuum Unit No. 106 (CVU-106) and Central Vacuum Unit No. 136 (CVU-136) are both located in Unit E, Section 6, Township 18S, Range 35E of Lea County, approximately 15 miles southwest of Lovington, New Mexico, along Highway 238 (Figure 1).

GHD has combined the CVU-106 and CVU-136 release sites into a single area for investigation and delineation. Consolidation of these two units into a single Site delineation effort was based on:

- Their co-located nature (release sites are comingled).
- Similar nature of released material (produced water with reported chloride concentrations of 53,000 ppm).
- Identical New Mexico Oil Conservation Division (NMOCD) Recommended Remedial Action Levels (RRALs) for chloride of 250 ppm.
- Near-contemporaneous release dates.

The first consultant to evaluate the Site was Crain Environmental (Crain). Crain conducted field assessment activities at the CVU-106 and CVU-136 sites between August and November 2010. Crain's assessments included Site visits, soil sample collection, analytical laboratory analyses, and preliminary determinations of impacts to environmental media. In addition, remedial activities were conducted at the CVU-106 release site. GHD met with Ms. Crain on April 21, 2011 to review and transfer the file material for each Site and discuss Site histories. Additional information regarding the Crain Assessments is provided below. A Site visit was performed on October 22, 2013 by GHD. During the Site visit, boring locations were flagged for utility locating purposes. In addition, the Site was walked to observe Site features. During the Site visit, it appeared that a drilling pit was located to the north of the comingled release area (see Figure 2).

2.1 Central Vacuum Unit #106 (CVU-106) Injection Line Release

Chevron submitted a C-141 Release Notification and Corrective Action Form (C-141) to the NMOCD dated August 5, 2010. The NMOCD assigned a Remediation Permit number of 1RP-2642-0 to the CVU-106 release. A release of 300 barrels (bbls) of produced water from a corroded buried injection line occurred on August 2, 2010. None of the released fluid was reported to have been recovered. The C-141 reported that the released produced water had a concentration of 53,000 ppm and impacted an area of surface soils approximately 200 feet by 30 feet.

Crain collected three surface soil samples on August 12, 2010 to a depth of approximately 6 inches across the length of the apparent impacted area. These samples were laboratory-analyzed for chloride (Cl-) concentrations. Chloride results ranged from 5,040 mg/Kg (ppm) to 27,600 ppm.

The apparent impacted area was subsequently excavated to a depth of approximately 2 feet. The dimensions of the irregularly-shaped excavation area were approximately 263 feet by 106 feet. An additional 17 soil samples were collected at a depth of approximately six inches across the floor of the excavation. They were taken from different locations than those sampled in August. Two background samples were also collected at a depth of 6 inches and at 1 foot below grade from a location southwest of the excavation area. Samples were collected on September 16, 2010 and analyzed for chlorides. Results ranged from <16 ppm to 27,200 ppm with only five samples having

chloride concentrations below 250 ppm located at the northeast, northwest and southeast corners of the existing excavation.

Additional samples were also collected by hand in the floor of the excavation, ranging from 6 inches to 8 feet in depth. Chloride concentrations in these samples ranged from 16 ppm to 13,600 ppm with the majority of the samples having concentrations above 250 ppm. Finally, soil boring BH-1 was advanced in the floor of the excavation to a depth of 30 feet below ground surface (bgs) at soil sample location SS-5, located just north of the CVU-106 well pad. Samples were collected on 5 foot vertical intervals. Samples analyzed from this boring had chloride concentrations of 250 ppm or greater with the exception of the sample collected at 30 feet bgs which had a reported chloride concentration of 96 ppm.

During excavation of the produced water-impacted soils, an undefined area was encountered exhibiting visible evidence of hydrocarbon contamination. The indicated depth and extent of this contamination suggested the release may have occurred, at least in part, within the area of an abandoned pit that had not been identified previously. No assessment of this pit was performed.

2.2 Central Vacuum Unit #136 (CVU-136) Injection Line Release

Chevron submitted a C-141 Form to NMOCD dated November 5, 2010, describing a release of 276.56 bbls of produced water. The release occurred on October 30, 2010 from a corroded buried injection line. Approximately 200 bbls of the release were reported to have been recovered. The C-141 reported the dimensions of stained soil to be approximately 200 feet by 200 feet. Additionally, it was noted that the CVU-136 injection line released fluid directly adjacent to, and comingled with, the CVU-106 release area. It should be noted that the release did not originate from the CVU-136 well, but from an injection line leak that occurred near the CVU-106 injection well.

Crain collected four surface soil samples to a depth of approximately 6 inches across the apparent stained soil area. These samples were submitted for laboratory analysis of chloride. Chloride results ranged from 11,000 ppm to 13,600 ppm.

The apparent stained soil area was described by Crain to be roughly 300 feet by 208 feet, and the release was described as having comingled with the CVU-106 chloride impacted area.

3. 2013 – 2015 Site Assessment Summary

Assessment work performed at the Site between 2013 and 2015 included the following:

- Advancement of fifteen soil borings (B-1 through B-15) in or around the CVU-106 and CVU-136 release sites and former excavations to total depths between 20 and 51.5 feet bgs in 2013.
- A geophysical investigation was performed at the Site in 2014.
- Two additional soil borings, B-1(2) and B-2(2), were advanced at the Site in 2014.

One soil boring, MW-1, was advanced at the Site in 2015. This boring was intended to be a monitor well. However, after reaching a depth of 70 feet bgs, groundwater was not encountered.

- In addition, chloride concentrations at a depth of 60 feet bgs were below the RRALs. As a result, the boring was plugged.

The data from these assessments indicated the following:

- The geophysical survey assessed the horizontal extent of the chlorides in the soil.
- The soil borings that were advanced at the site appears to confirm the horizontal extent of chlorides in the soil.
- The soil boring advanced to 70 feet bgs (MW-1) indicated that chloride concentrations in the soil did not extend beyond 60 feet bgs. Based on the data from this boring, it does not appear that the chloride concentrations extended to the groundwater table, estimated at greater than 100 feet bgs.

Soil sample and geophysical survey assessments provide evidence that chloride concentrations above the RRAL did not reach the groundwater table. Consequently, GHD recommended the installation of a liner to prevent further lateral and vertical migration of chlorides (see Figure 3 for liner location). After a discussion with the NMOCD on November 10, 2015, the agreed plan of action for the Site was the installation of a plastic liner in the area of impacted soil.

4. 2017 Interim Remediation and Reclamation Activities

4.1 Scope of Work and Regulatory Approval

A finalized work scope outlining interim remedial and reclamation activities based on the previously discussed soil assessment work was submitted to the NMOCD and the NMSLO in September of 2016. Approval for the proposed scope of work was received from the NMOCD and the NMSLO on December 15 and December 22, 2016, respectively. The interim remedial and reclamation work scope was approved as an interim means to address current chloride concentrations in the soil. Excavation of chloride impacted soil is made precarious due to the presence of active pipelines located within the release area. At the point in time when underground pipelines at the Site are no longer used, the need for further remediation will be reviewed by the NMOCD and NMSLO.

Interim remediation and reclamation activities were performed during September and October of 2017. Work was performed by SDR Services and overseen by GHD. A summary of the completed tasks are outlined below. A photo log is included as Appendix A.

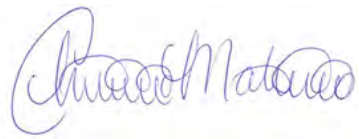
- An application for a Right of Entry (ROE) for Remediation permit to the NMSLO was completed and submitted prior to the start of work.
- The area to be lined (see Figure 3) was marked on the ground with flagging and NM811 was contacted to have underground utilities in the area pre-marked prior to physically locating the lines. Active lines in the vicinity were depressurized/shut down prior to being located by means of ground penetrating radar and day lighted by hydro excavation. Soils generated from hydro excavation were thin spread on site. Located lines can be referenced on Figure 3. All physical line locating was completed by September 14, 2017.

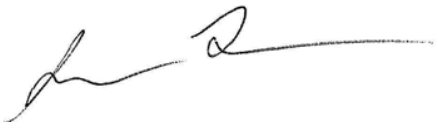
- Once pipelines were physically located, the exposed lines were re-covered with borrow pit material consisting primarily of caliche. The surface was returned to grade and the remainder of the area to be lined was cleared, grubbed and leveled in preparation for liner placement. Work was completed on September 14, 2017.
- The area that had been excavated in 2010 was backfilled to grade with clean caliche.
- Prior to placement of the liner, perforated PVC pipe was placed at ground surface along the length of each buried pipeline and extended at least ten feet past the edge of the cap material. The perforated PVC pipe was installed at the request of the NMOCD to act as leak detection. In the event that a release occurred from any of the buried pipelines, the perforated pipe would allow for leaking liquids to flow through the PVC to the edge of the cap where it could be observed. Signs were posted at the ends of the PVC pipe indicating that if liquids were present, Chevron should be contacted.
- The identified area of impact was lined with 20 mil polyethylene. The liner was placed to overlap the impacted area approximately ten feet at the edges. Once the area was lined, approximately one foot of caliche was placed to hold the liner down. Approximately one foot of topsoil was placed above the caliche to allow for reseeding of the area. Approximately 2,680 yards of caliche and 1,720 yards of topsoil were placed on top of the liner. Placement of the cover soil was completed on September 22, 2017.
- On October 3 and 4, 2017, the disturbed area associated with the remediation efforts was reseeded. A T-post and barbwire fence was put in place surrounding the seeded area. Seed was broadcast in the area and disked following spreading. The seed mix placed was BLM No. 2 without lovegrass. If after one growing season the vegetation has not taken hold, seeding may be repeated until revegetation is successful.

In follow up to the remedial and reclamation activities, the site will be visited on a quarterly basis to assess the establishment of vegetative growth and look for erosion issues. Personnel performing the site visit will also look for the presence of noxious weeds at the site as indicated on the New Mexico Noxious Weeds List specified on the United States Department of Agriculture website. If a noxious weed is observed at the site, NMSLO will be contacted to determine the most effective manner to eradicate it.

Submitted by:

GHD

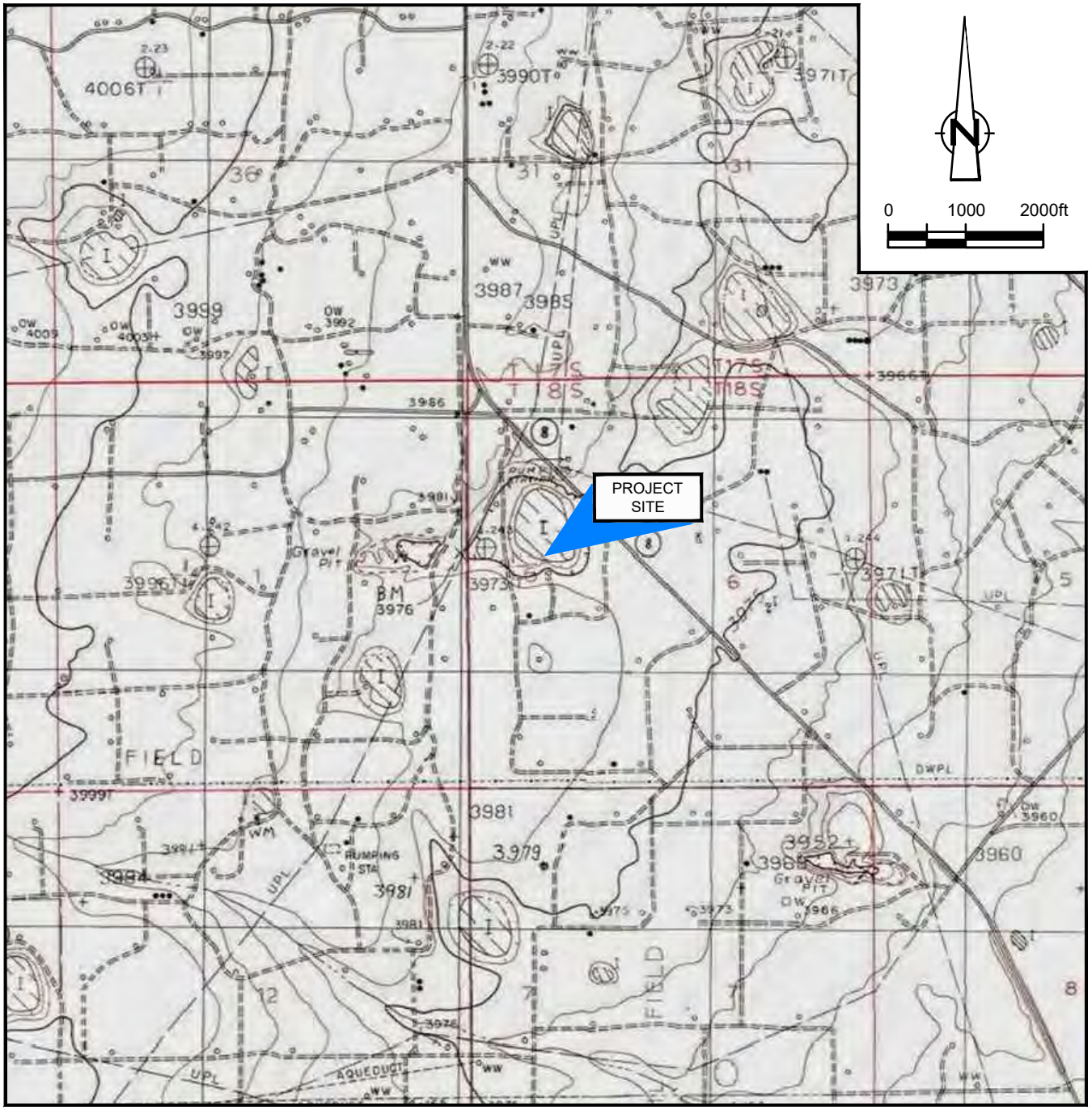




Christine Mathews
Project Scientist/Coordinator

Scott Foord, P.G.
Project manager

Figures



SOURCE: USGS 7.5 MINUTE QUAD
"BUCKEYE AND LOVINGTON SW, NEW MEXICO"

LAT/LONG: 32.7779° NORTH, 103.5021° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO EAST

Figure 1

SITE LOCATION MAP
CVU No.136 AND CVU No.106
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

GHD

074636-00(004)GN-DL001 APR 11, 2018

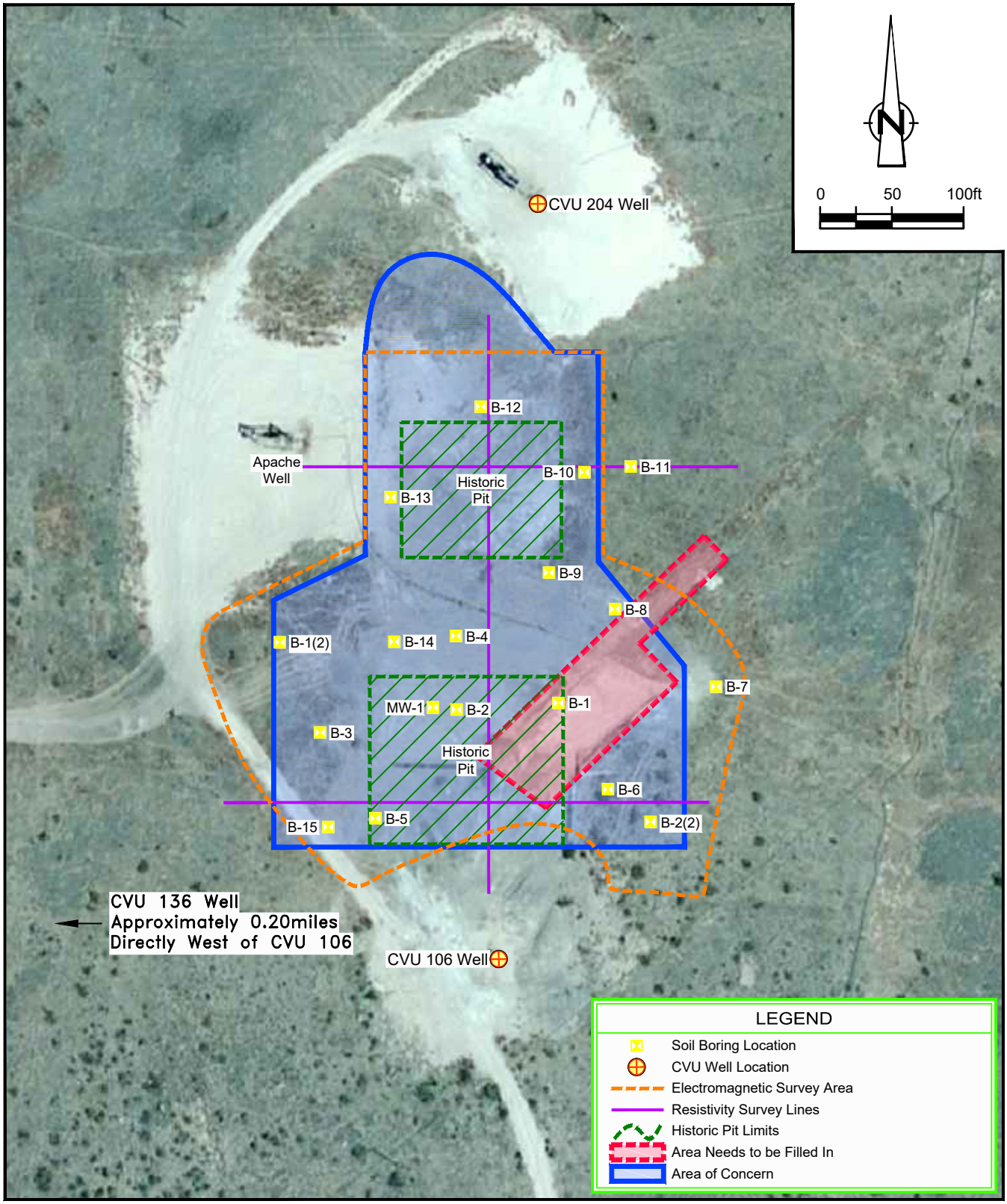


Figure 2

PROPOSED REMEDIATION ACTIVITY MAP
CVU No.136 AND CVU No.106
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

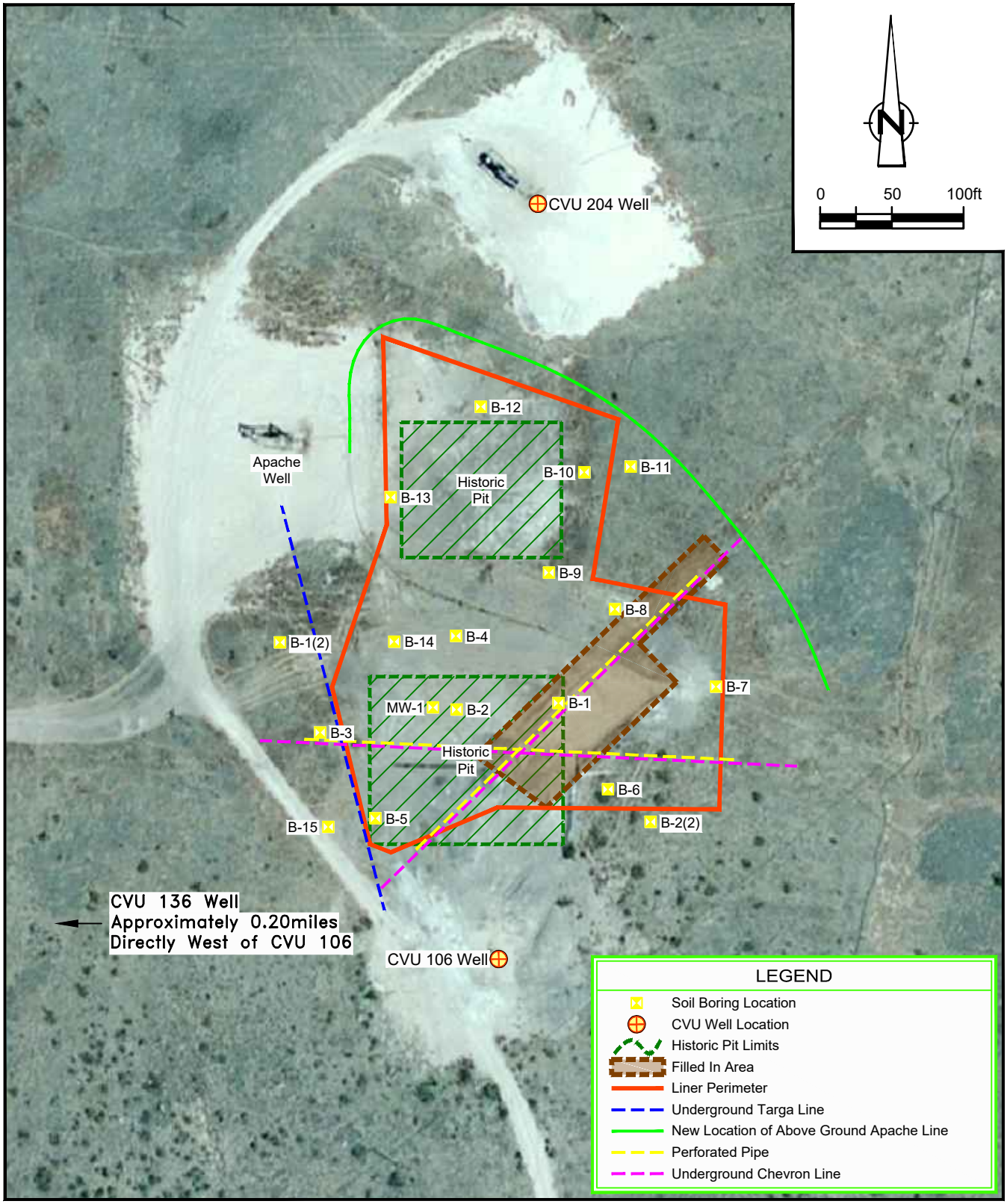


Figure 3

REMEDIATION ACTIVITY MAP
CVU No.136 AND CVU No.106
LEA COUNTY, NEW MEXICO
Chevron Environmental Management Company

Appendices

Appendix A
Photo Log

Photo 1 - Locating underground pipelines via hydrovac

Photo 2 - Locating underground pipelines via hydrovac

Site Photographs

Photo 3 - Clearing, grubbing, and leveling the area to be lined

Photo 4 - Area to be lined is cleared and leveled

Site Photographs

Photo 5 - Liner being placed

Photo 6 - Perforated pipe placed on top of underground pipelines and underneath the liner for leak detection

Site Photographs

Photo 7 - Liner is placed over the entire cleared area

Photo 8 - Caliche placed on top of the liner to secure in place

Site Photographs

Photo 9 - Approximately one foot of caliche placement complete

Photo 10 - Placement of topsoil on caliche

Site Photographs

Photo 11 - A foot of topsoil placed and reclaimed area fenced off for seeding

Photo 12 - Native seed mix BLM #2 broadcasted across the reclaimed area

Site Photographs

Appendix B
2018 Scope of Work

July 13, 2018 Reference No. 074636

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

Re: 2018 Scope of Work
Chevron CVU 106/136 – (1RP-2642-0)
Lea County, New Mexico

Dear Ms. Yu:

GHD Services, Inc. (GHD) is pleased to provide the New Mexico Oil Conservation Division (NMCOD) this scope of work for 2018 project activities at the Central Vacuum Unit (CVU)106/136 site (hereafter referred to as the "Site") on behalf of our client, Chevron Environmental Management Company (CEMC). The Site is located in Section 6 (Unit N), Township 18 South, Range 35 East, Lea County, New Mexico. The proposed scope of work and associated tasks for the 2018 calendar year include:

- Task I – Semi-Annual Site Monitoring
- Task II – Reporting

1. Project Information

Central Vacuum Unit #106 (CVU-106) Injection Line Release:

Chevron submitted a C-141 Release Notification and Corrective Action Form (C-141) to the NMOCD dated August 5, 2010. The NMOCD assigned a Remediation Permit number of 1RP-2642-0 to the CVU-106 release. A release of 300 barrels (bbls) of produced water from a corroded buried injection line occurred on August 2, 2010. None of the released fluid was reported to have been recovered. The C-141 reported that the released produced water had a concentration of 53,000 ppm and impacted an area of surface soils approximately 200 feet by 30 feet.

The apparent impacted area was subsequently excavated to a depth of approximately 2 feet. The dimensions of the irregularly-shaped excavation area were approximately 263 feet by 106 feet. Samples were collected on September 16, 2010 and analyzed for chlorides. Results ranged from <16 ppm to 27,200 ppm with only five samples having chloride concentrations below 250 ppm located at the northeast, northwest and southeast corners of the existing excavation.

Additional samples were also collected by hand in the floor of the excavation, ranging from 6 inches to 8 feet in depth. Chloride concentrations in these samples ranged from 16 ppm to 13,600 ppm with the majority of the samples having concentrations above 250 ppm. Finally, soil boring BH-1 was advanced in

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the floor of the excavation to a depth of 30 feet below ground surface (bgs) at soil sample location SS-5, located just north of the CVU-106 well pad. Samples were collected on 5 foot vertical intervals. Samples analyzed from this boring had chloride concentrations of 250 ppm or greater with the exception of the sample collected at 30 feet bgs which had a reported chloride concentration of 96 ppm.

During excavation of the produced water-impacted soils, an undefined area was encountered exhibiting visible evidence of significant hydrocarbon contamination. The indicated depth and extent of this contamination suggested the release may have occurred, at least in part, within the area of an abandoned pit that had not been identified previously.

Central Vacuum Unit #136 (CVU-136) Injection Line Release:

Chevron submitted a C-141 Form to NMOCD dated November 5, 2010, describing a release of 276.56 bbls of produced water. The release occurred on October 30, 2010 from a corroded buried injection line. Approximately 200 bbls of the release were reported to have been recovered. The C-141 reported the dimensions of stained soil to be approximately 200 feet by 200 feet. Additionally, it was noted that the CVU-136 injection line released fluid directly adjacent to, and comingled with, the CVU-106 release area. It should be noted that the release did not originate from the CVU-136 well, but from an injection line leak that occurred near the CVU-106 injection well.

Crain collected four surface soil samples to a depth of approximately 6 inches across the apparent stained soil area. These samples were submitted for laboratory analysis of chloride. Chloride results ranged from 11,000 ppm to 13,600 ppm.

The apparent stained soil area was described by Crain to be roughly 300 feet by 208 feet, and the release was described as having comingled with the CVU-106 chloride impacted area.

2013-2015 Site Assessment Summary

GHD combined the CVU 106 and CVU 136 sites into a single area to simplify management of the releases. Assessment work performed at the Site between 2013 and 2015 included the following:

- Advancement of fifteen soil borings (B-1 through B-15) in or around the CVU-106 and CVU-136 release sites and former excavations to total depths between 20 and 51.5 feet bgs in 2013.
- A geophysical investigation was performed at the Site in 2014.
- Two additional soil borings, B-1(2) and B-2(2), were advanced at the Site in 2014
- One soil boring, MW-1, was advanced at the Site in 2015. This boring was intended to be a monitoring well. However, after reaching a depth of 70 feet bgs, groundwater was not encountered. In addition, chloride concentrations at a depth of 60 feet bgs were below the RRALs. As a result, the boring was plugged.

The data from these assessments indicated the following:

- The geophysical survey assessed the horizontal extent of the chlorides in the soil;

- The soil borings that were advanced at the Site appear to confirm the horizontal extent of chlorides in the soil; and
- The soil boring advanced to 70 feet bgs (MW-1) indicated that chloride concentrations in the soil did not extend beyond 60 feet bgs. Based on the data from this boring, it does not appear that the chloride concentrations extended to the groundwater table, estimated at greater than 100 feet bgs.

The NMOCD typically requires that soil above the RRALs be excavated to a depth of four ft bgs and a liner placed in the bottom of the excavation. The excavation is then backfilled with clean soil and revegetated. However, excavation over the majority of the site would be difficult and dangerous due to the large amounts of buried active piping. GHD discussed the situation with both the NMOCD and New Mexico State Land Office (NMSLO) in November 2015. The regulatory agencies agreed that in areas with significant amounts of buried piping, an interim remediation could be performed by placing a cover over the impacted area.

In 2017, GHD oversaw lining and backfilling of an existing excavation in the southwest corner of the Site and installation of the interim remediation cover over the impacted area. The cover consists of a 20 mil liner with edges overlapping two feet, with a two-foot thick soil cover placed over the liner. The entire cover was revegetated with an approved seed mix. Pipelines located within the lined area were marked on either side with a warning to repair the liner if disturbed.

Perforated pipe was placed over the areas of buried lines to act as leak detection in the event that a buried line release occurs within the covered area. The interim remediation requires periodic inspections to look for the presence of releases and cover erosion. The excavation of impacted soil to a depth of four ft bgs with a liner and backfilled to grade will be required when the buried lines are no longer needed and are abandoned.

2. 2018 Scope of Work

2.1 Task I – Semi-Annual Site Monitoring

The site will be visited on a semi-annual basis to assess the establishment of vegetative growth and to look for the presence of releases and erosion issues. Staff personnel performing the site visit will also look for the presence of noxious weeds at the site as indicated on the New Mexico Noxious Weeds List specified on the United States Department of Agriculture website. If a noxious weed is observed at the site, NMSLO will be contacted to determine the most effective manner to eradicate it.

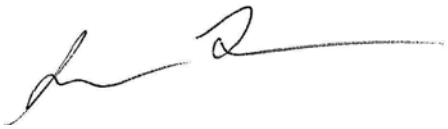
2.2 Task II – Reporting

Following completion of the field activities detailed above, a letter report summarizing the results of the additional assessment will be prepared for submittal to NMOCD and NMSLO on behalf of CEMC. The report will include a Site description, project history, description of field events, a discussion of results, photographic documentation, and recommendations (if any).

If you have any questions, please contact us at 713-734-3090.

Sincerely,

GHD



Scott Foord, P.G.
Project Manager

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