



March 21, 2018

Reference No. 11103552

Mr. Bradford Billings
Energy, Minerals, and Natural Resources Department
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Dear Mr. Billings:

**Re: WT-1 Compressor Station
Eddy County, New Mexico
2018 Work Plan
AP-105**

On behalf of Transwestern Pipeline Company, LLC (Transwestern), GHD Services Inc. (GHD) submits 2018 work scope for tasks to be performed at the WT 1 Compressor Station site (hereafter referred to as the "Site") in Eddy County, New Mexico. The Site is located about 29 miles east of Carlsbad, New Mexico in the northwest quarter of Section 31, Township 20 South, Range 32 East (Figure 1). Site coordinates are 32.531549 North, 103.807904 West. The Site is regulated by the New Mexico Oil Conservation Division (NMOCD).

1. Project History

The Site consists of an active compressor station and associated equipment and installations. The Site has been in active assessment and remediation since 1994.

The Site consists of two historically impacted areas, the former Engine Room Drain Pit (ERDP) located in the north central portion of the Site and the dehydration area (DEHY) located in the southwest portion of the Site. A Site Plan is included as Figure 2.

The contaminants of concern (COCs) in the ERDP area consist of light non aqueous phase liquid (LNAPL), benzene, toluene, ethylbenzene, and xylene (BTEX), and the chlorinated solvents 1,1 dichloroethylene (1,1 DCE) and 1,1 dichloroethane (1,1 DCA). The COCs in the DEHY area consist of LNAPL and BTEX only.

A soil vapor extraction (SVE) system was installed in the DEHY area in 1996 and operated until 2013. The system was taken out of service due to significant reductions in volatile organic compound (VOC) mass removal.

In 2003, approximately 1,826 cubic yards of impacted soil were excavated from two locations in the ERDP area. The excavations extended up to 15 feet below ground surface (bgs). A 30 mil polyethylene liner was placed in the bottom of each excavation prior to backfilling.



Site consulting duties were transferred to GHD in August 2015. GHD installed an active skimmer in monitoring well MW 1 and hydrocarbon absorbent socks in MW 10, SVE 11, SVE 12, SVE 13, and SVE 14 during October and November 2015. The socks were changed throughout 2016 as needed. Additionally, GHD performed monthly gauging events of the Site wells from October 2015 to September 2016 in order to obtain data on how or if seasonal changes in the groundwater may affect LNAPL thicknesses.

GHD sampled 17 wells including SVE-1, SVE-1A, SVE-5 through SVE-10, SVE-12 through SVE-14 and MWs 4 through 8 and MW-14 between April 13 and 15, 2016.

During May 2016, GHD supervised well abandonment activities for recovery wells RW-1 through RW-12 and MW 2. The recovery wells were initially constructed as borehole wells and did not contain a well screen and casing with a proper seal. Monitoring well MW 2 has been dry since November 2011.

Based on a review of the existing Site data, the GHD Innovative Technology Group (ITG) reviewed two remedial options for the Site that included in situ chemical oxidation (ISCO) treatment and In situ enhanced biodegradation (ISEB) treatment. A summary of each option is presented in the 2017 work plan.

Based on a cost comparison, GHD selected ISEB based on the lower cost and the lack of immediate receptors. The use of ISEB would consist of increasing the available sulfate to the existing anaerobic hydrocarbon degrading microbes. This will be performed by injecting magnesium sulfate into the Site groundwater using existing wells to stimulate biodegradation.

The ITG estimated that treatment would be complete within 4-5 years with injection of sulfate occurring every 6 months. Non aqueous phase liquid (NAPL) was not found in this area at the most recent monitoring events; however, it has historically been observed in this area. If NAPL is present, it will increase the treatment time.

Two injection events were performed in 2017 (April and October) that included wells SVE-5, SVE-8, SVE-12, SVE-13, and MW-10. Approximately 1,250 gallons of water and magnesium sulfate solution was injected into each well.

Two monitoring events were performed in 2017 (late April/early May and October) and one in February 2018. Analytical results from the sampling events were mixed. Wells that were monitored during this period included SVE-5, SVE-13, SVE-14, and MW-10. The analytical results from these wells are as follows:

- Analytical results from SVE-5 indicated a decrease in benzene and xylene concentrations (1400 mg/l and 810 mg/l pre-injection to 250 mg/l and 550 mg/l post-injection, respectively). However, an increase in total naphthalenes was observed (33 mg/l to 153 mg/l). Sulfate concentrations had increased to 5700 mg/l in October 2017, but had dropped to 250 mg/l by February 2018, indicating that the anaerobic bacteria are using the available sulfate to degrade constituents.
- Analytical results from SVE-13 indicated a significant decrease in benzene from April 2017 to February 2018 (3300 mg/l to 450 mg/l). However, the February 2018 results were consistent with April



2016 results (450 mg/l compared to 430 mg/l). Reductions in xylene (630 mg/l to <15 mg/l) and total naphthalene (115 mg/l to <100 mg/l) were also observed. Sulfate concentrations were 700 mg/l in February 2018, a slight increase from April 2016 (400 mg/l).

- Analytical results from SVE-14 indicated a significant decrease in benzene from April 2017 to February 2018 (210 mg/l to 83 mg/l). However, the February 2018 results indicated an increase in benzene from the April 2016 results (83 mg/l compared to 37 mg/l). Total naphthalene concentrations remained approximately unchanged (17.8 mg/l versus 18.7 mg/l). However, sulfate concentrations were relatively low in this well (160 mg/l) in February 2018.
- Analytical results from MW-10 indicated an increase in benzene from April 2017 to February 2018 (5550 mg/l to 5900 mg/l) and a slight decrease in xylene (2400 mg/l to 2000 mg/l). Total naphthalene concentrations decreased (830 mg/l versus 116 mg/l). Sulfate concentrations increased from 13 mg/l to 900 mg/l during this time period.

While the analytical data indicate mixed results, in general, concentrations of benzene, xylene, and total naphthalenes have been decreasing. GHD believes that the decreasing concentrations indicate that ISEB is successfully degrading the COCs. Based on this, GHD proposes the following scope of work for 2018:

- Perform the annual site-wide groundwater monitoring event in April 2018 and include sulfate analysis.
- If the annual event indicates the need, perform two additional magnesium sulfate injections in the DEHY area.
- Monitor a limited number of wells in the DEHY area on a quarterly basis to assess effectiveness.
- Perform two magnesium sulfate injections in the ERDP area.
- Monitor a limited number of wells in the ERDP area on a quarterly basis to assess effectiveness.
- Compile the data into a 2018 Annual Groundwater Monitoring Report.

2. Proposed Scope of Work

GHD proposes to perform ISEB injection events in the DEHY and ERDP areas, annual groundwater monitoring, quarterly groundwater monitoring to assess remedial effectiveness, and annual reporting. Details of each task to be completed in 2018 are presented below:

Task 1: 2018 Annual Groundwater Monitoring

GHD proposes to perform annual groundwater monitoring at the Site. An oil/water interface probe will be used to measure groundwater depths and assess the LNAPL thickness, if any. Before and after each use, the oil/water interface probe will be cleaned with an Alconox®/de ionized water solution and rinsed with de ionized water.

Monitoring wells will be purged and sampled using dedicated, disposable polyethylene bailers. Wells will be purged until field parameters including groundwater temperature, pH, and conductivity stabilize to



within 10 percent. Field parameters will be collected using an appropriate multi parameter groundwater quality meter.

The sampling program will include collecting groundwater samples from the following wells:

- ERDP area: MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-14, and SVE-1A. Monitoring wells MW-15, MW-16, and MW-17 have not been included in this sampling event because a COC has not been detected in any of these wells since they were initially installed in 2004.
- DEHY area: SVE-1, SVE-2 (if it can be found), SVE-5, SVE-6, SVE-7, SVE-8, SVE-9, SVE-10, SVE-11, SVE-12, SVE-13, SVE-14 and MW-10.

If any of the proposed wells to be sampled are found to contain LNAPL, they will not be sampled. Monitoring wells MW-9, MW-11, MW-12, and MW-13 will not be sampled because a COC has not been detected in any of these wells since they were initially installed in 2004. Purge water generated during the monitoring events will be discharged to the on-Site concrete pad located in the DEHY area and allowed to evaporate.

Following collection, groundwater samples will be labeled, placed on ice, and submitted to Hall Environmental Analysis Laboratory (HEAL) for analyses of VOCs by Environmental Protection Agency (EPA) Method SW 846 8260B, and sulfate by EPA Method 300.0. The information obtained from this sampling event will be included in the 2018 Annual Report.

Task 2: ISEB Injections in DEHY and ERDP Area

ISEB treatment would be performed in the following wells:

- DEHY area: SVE-5, SVE-12, SVE-13, and MW-10
- ERDP area: SVE-1A and MW-8

Approximately 1400 gallons of a magnesium sulfate solution containing 1,170 pounds of magnesium sulfate will be injected into each well. An additional 200 gallons of fresh water will be injected to flush the solution into the formation. Assuming approval of this work plan, injections would be performed in April and November 2018.

Task 3: Remediation Monitoring

Groundwater monitoring of specific wells will be performed to assess the effectiveness of the ISEB injections. Two groundwater monitoring events would be performed: July and December 2018.

Groundwater samples will be collected from the following wells:

- DEHY area: SVE-1, SVE-10, SVE-9, and MW-14
- ERDP area: SVE-1A, MW-1, MW-7, and MW-8



Groundwater samples would be collected as previously described above for the annual groundwater monitoring event. The analytical data would be added to the data tables and reviewed by GHD's ITG for effectiveness.

Task 4: 2018 Annual Groundwater Monitoring Report

GHD will prepare a report summarizing the activities that were performed in 2018. The report will include a Site description, project history, description of field events, appropriate maps, tabulation of field and analytical data, and a discussion of results and recommendations.

3. Schedule

GHD submits this work plan to the NMOCD for their review and files. Field work will be scheduled pending NMOCD and Transwestern approval.

GHD appreciates the opportunity to submit this work plan to assist in the management, assessment and closure of the WT-1 Compressor Station site. Please feel free to contact either of us at 505-884-0672 if you have questions or comments.

Sincerely,

GHD

A handwritten signature in black ink that reads "Alan Brandon". The signature is written in a cursive, flowing style.

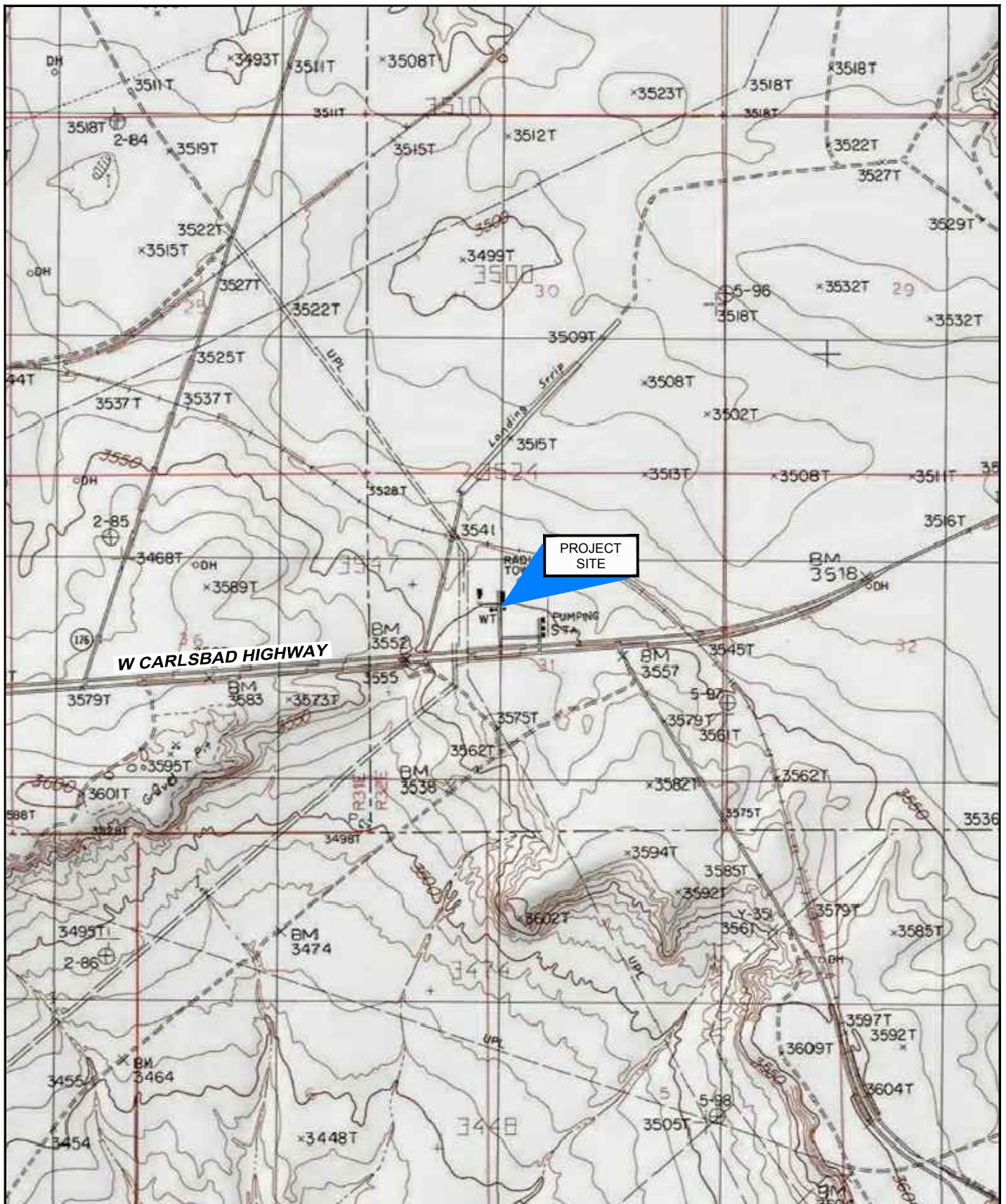
Alan Brandon
Senior Project Manager

AB/md/1

Encl.

A handwritten signature in blue ink that reads "Bernard Bockisch". The signature is written in a cursive, flowing style.

Bernard Bockisch, PMP
Senior Project Manager



Source: USGS 7.5 Minute quad "Williams Sink, New Mexico"

Lat/Long: 32.531549° North, 103.807904° West

0 1000 2000ft

Coordinate System:
NAD 83 STATE PLANE -
NEW MEXICO EAST (US FEET)



TRANSWESTERN PIPELINE COMPANY
LEA COUNTY, NEW MEXICO
WT-1 COMPRESSOR

SITE LOCATION MAP

11103552-00

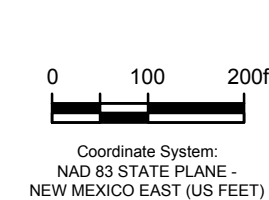
Feb 20, 2018

FIGURE 1



Source: USDA FSA Imagery, May 10, 2014

Lat/Long: 32.531549° North, 103.807904° West



TRANSWESTERN PIPELINE COMPANY
LEA COUNTY, NEW MEXICO
WT-1 COMPRESSOR
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CONCENTRATION MAP 2017 & FEBRUARY 2018

11103552-00
Mar 20, 2018

FIGURE 2