



July 14, 2017

Mr. Randolph Bayliss
Hydrologist, Districts III and IV
New Mexico Oil Conservation Division
1220 South Street Francis Drive
Santa Fe, New Mexico 87505

**RE: Proposed Groundwater Delineation and Product Recovery Work Plan
Dogie Compressor Station East Pit
Environmental Order #3RP-312-0
Williams Four Corners LLC
Rio Arriba County, New Mexico**

Dear Mr. Bayliss:

LT Environmental, Inc. (LTE), on behalf of Williams Four Corners LLC (Williams), proposes the following work plan in response to the requirements of your letter dated May 26, 2017, following review of the 2016 Annual Groundwater Monitoring Report for the Dogie Compressor Station East Pit/Environmental Order #3RP-312-0. This work plan is intended to address impacted groundwater at the Dogie Compressor Station (Site) located in Unit D, Section 4, Township 25 North, Range 6 West, which is in Largo Canyon in Rio Arriba County, New Mexico.

BACKGROUND

The original source of impacted groundwater at the Site is a former lined pit used to collect drip gas and water from a condensate tank. Source material was excavated in 1997 and nine groundwater monitoring wells were installed after observing groundwater at approximately 14 feet below ground surface (bgs) in the excavation. Williams purchased the asset in 2000 and installed four new downgradient monitoring wells (MW-10 through MW-13) in 2013. The locations of all monitoring wells are depicted on Figure 1, except for MW-4, which was destroyed prior to 2013, and MW-9, which was plugged and abandoned in 2013. Williams has monitored groundwater quality in all existing wells and passively recovered light non-aqueous phase liquid (LNAPL) from MW-6 since the acquisition occurred.

Impact to groundwater in the original source area at monitoring well MW-2 appears to have either attenuated or migrated, as concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX) in the monitoring well have been below the laboratory reporting detection limits since January 2012. The current groundwater impact is characterized by minor accumulation of LNAPL in MW-6 and dissolved phase constituents in other downgradient monitoring wells. Monitoring well MW-6 contained as much as 0.85 feet of LNAPL in 2013, but since passive recovery began, LNAPL accumulations have decreased. No LNAPL was detected during the last monitoring event on March 28, 2017. Laboratory analytical results indicate BTEX constituents historically have





exceeded the New Mexico Water Quality Control Commission (NMWQCC) standards in monitoring wells MW-3, MW-7, MW-11, and MW-12. Benzene concentration exceeded the NMWQCC standard in MW-13 only once since it was installed. Monitoring wells MW-1, MW-2, SVE-4", and MW-8 have either never contained BTEX in excess of NMWQCC standards or have eight documented quarters of BTEX concentrations compliant with NMWQCC standards. The 2016 Annual Report documents historical sampling results and results from the most recent monitoring event (March 28, 2017) are presented on Figure 1.

PROPOSED DELINEATION

LTE proposes to install new monitoring wells to delineate the dissolved phase plume: one west of monitoring well MW-6 and one west of monitoring well MW-12 (Figure 1). Subsurface piping will restrict locations inside of the plant. LTE has placed proposed wells near fencing, but locations will likely need to be adjusted based on utility locates.

Each new monitoring well be installed via a track-mounted Geoprobe® direct push drilling rig. Continuous soil samples will be logged by an LTE geologist and described using the Unified Soil Classification System (USCS) to delineate hydrocarbon impacts. The intervals from immediately beneath the ground surface and then every five feet thereafter will be screened for volatile aromatic hydrocarbons as well as any soil that is stained or has a hydrocarbon odor using a photo-ionization detector (PID). If PID concentrations exceed 1,000 parts per million (ppm) in any of the soil samples, the sample will be submitted to a certified laboratory for analysis of BTEX by United States Environmental Protection Agency (EPA) Method 8021 and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO), diesel range organics (DRO), and motor oil range organics (MRO) by EPA Method 8015. Additional soil borings will be advanced radially in approximately 50-foot steps from any soil boring demonstrating significant evidence of hydrocarbon impacts.

The monitoring wells will be installed to depth of approximately 15 feet bgs. Monitoring wells will be constructed of schedule 40, 2-inch diameter polyvinyl chloride (PVC) and include 10 feet of 0.01-inch machine slotted flush-threaded PVC well screen. LTE will set at least 5 feet of screen beneath the water table and approximately 5 feet above to allow for seasonal fluctuations and a proper seal during well construction. A clean 10-20 grade silica sand gravel pack will be placed from the bottom of the boring to one foot above the top of the screen. At least two feet of 3/8-inch natural bentonite chips will be set above the gravel pack to the ground surface.

At least 24 hours after installation, the new monitoring wells will be developed utilizing an electrical submersible pump. LTE personnel will remove a minimum of 10 saturated well casing volumes of water while monitoring the pH, electrical conductivity, and temperature until these parameters stabilize and turbidity is reduced to the greatest extent possible.

LTE will complete all work in accordance with industry-accepted practices. LTE will survey the new groundwater monitoring wells after construction with a Trimble® GeoExplorer® 3000 series Global Positioning System (GPS) to determine the latitude and longitude. Top-of-casing elevations will be surveyed to an accuracy of no less than plus or minus (\pm) 0.01 feet so that groundwater



flow direction and gradient can be determined. Field activities will be documented in a bound field book and soil descriptions will be documented on a boring log. Observations to be noted on the boring log will include, but not be limited to, lithology, moisture content, staining, soil boring depth, latitude, longitude, project number, and comments. Monitoring well construction details will be documented on a well completion log. All down-hole drilling equipment will be thoroughly decontaminated prior to each use. If impacted soil is identified within a borehole, cuttings will be drummed and transported to the Envirotech, Inc. Landfarm in Hilltop, New Mexico.

PROPOSED LNAPL RECOVERY

Over the last two years, LNAPL accumulations in monitoring well MW-6 have reduced to the extent that no LNAPL or only a thin accumulation (0.1 feet or less) has been detected with an oil-water interface probe. The combination of manual recovery every site visit with use of oil-absorbent socks in the interim has shown to be effective in this particular well. Based on the current state of LNAPL accumulation, LTE proposes to continue application of manual bailing and oil absorbent socks with the understanding that delineation is forthcoming. Once delineation is complete, Williams will evaluate the full extent of the LNAPL plume and propose an appropriate remediation strategy that will include addressing any residual LNAPL in monitoring well MW-6 as well as the dissolved-phase contaminant plume.

MONITORING AND REPORTING

At least two weeks after completion of monitoring well installation and development, groundwater sampling will be conducted using a peristaltic pump with dedicated tubing for low-flow sampling. All new wells and existing monitoring wells MW-3, MW-5, MW-6 (assuming no LNAPL is present), MW-7, MW-8, MW-10, MW-11, MW-12, and MW-13 will be sampled. Monitoring wells near the original source area that have been below NMWQCC standards for years (MW-1, MW-2, and SVE-4") will be measured for depth to groundwater, but will not be sampled. Any monitoring wells containing LNAPL will not be sampled.

LTE will measure depth to groundwater and total depth of the monitoring wells with a Keck[®] oil/water interface probe prior to sampling. As water is removed from the monitoring wells, pH, electric conductivity, and temperature will be monitored utilizing an in-line flow cell. Biological process parameters will also be monitored, including dissolved oxygen, oxidation-reduction potential, and ferrous iron.

Once monitoring wells are properly purged, groundwater samples for laboratory analysis will be collected by filling pre-cleaned vials with zero headspace to prevent degradation of the sample and plastic bottles with appropriate preservatives. All groundwater samples will be labeled with the date and time of collection, well designation, project name, collector's name, and parameters to be analyzed. The samples will be immediately chilled by placing them in a cooler with ice. The cooler will be delivered to a certified laboratory following proper chain-of-custody procedures for analysis of BTEX according to United States Environmental Protection Agency Method 8021 and attenuation parameters including nitrate, sulfate, alkalinity, and dissolved manganese.



All activities and results will be included in the annual report required for 2017. The report will include a description of well installation methods and all sampling and analysis results. Product recovery activities will be described, and include tracking of volumes recovered. Additional recommendations will be made based on results of sampling and recovery activities.

LTE appreciates the opportunity to provide this proposed work plan to the NMOCD. If you have any questions or comments regarding this plan, do not hesitate to contact me at (970) 385-1096 or via email at bherb@ltenv.com or Aaron Galer at Williams at (801) 584-6746 or Aaron.Galer@Williams.com.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink that reads 'Brooke Herb'. The signature is written in a cursive, flowing style.

Brooke Herb
Project Geologist

A handwritten signature in black ink that reads 'Ashley L. Ager'. The signature is written in a cursive, flowing style.

Ashley L. Ager, M.S., P.G.
Senior Geologist

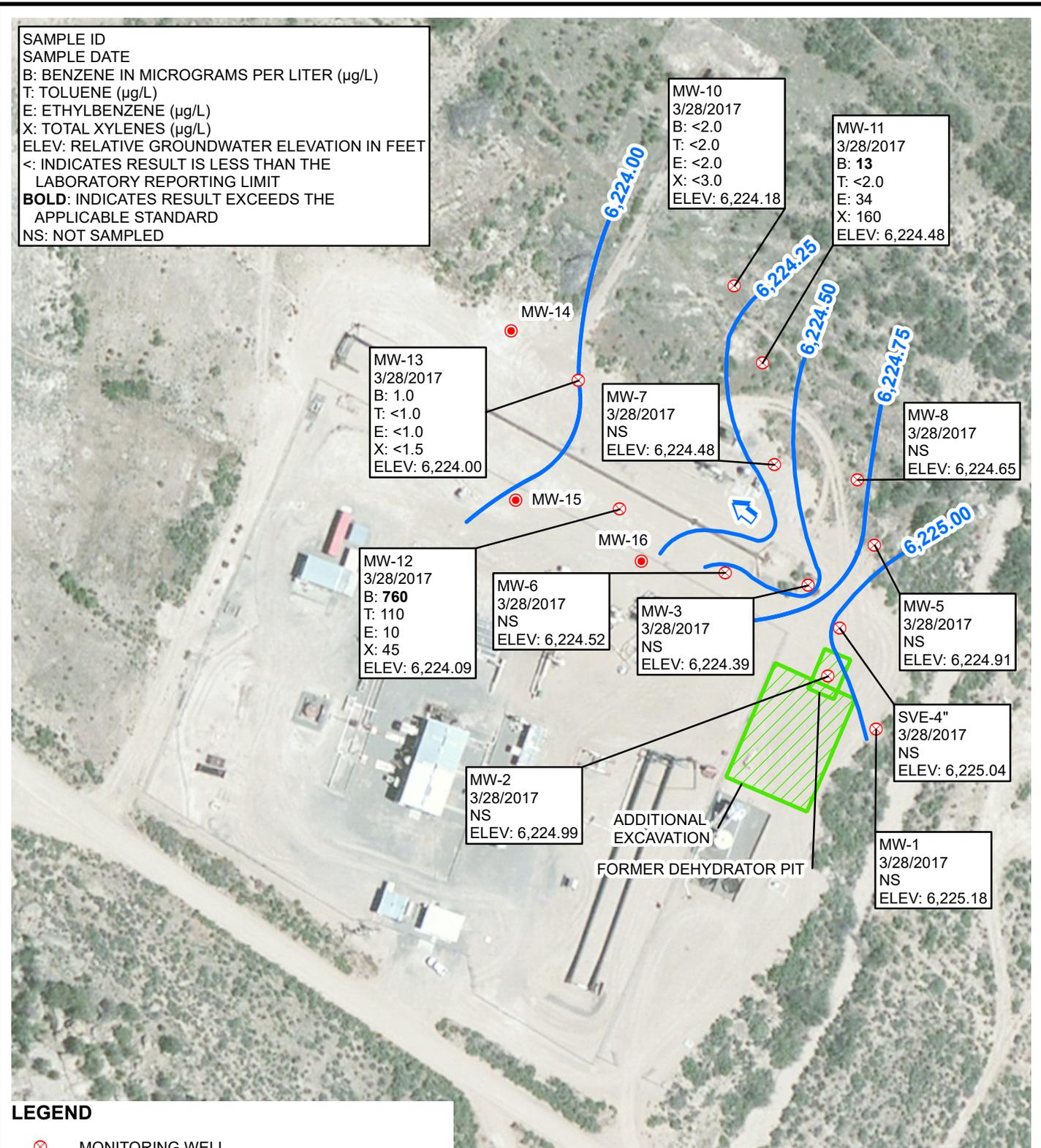
Attachments:

Figure 1 – Proposed Work Plan Site Map

FIGURE



SAMPLE ID
 SAMPLE DATE
 B: BENZENE IN MICROGRAMS PER LITER (µg/L)
 T: TOLUENE (µg/L)
 E: ETHYLBENZENE (µg/L)
 X: TOTAL XYLENES (µg/L)
 ELEV: RELATIVE GROUNDWATER ELEVATION IN FEET
 <: INDICATES RESULT IS LESS THAN THE LABORATORY REPORTING LIMIT
BOLD: INDICATES RESULT EXCEEDS THE APPLICABLE STANDARD
 NS: NOT SAMPLED



LEGEND

- ⊗ MONITORING WELL
- PROPOSED REPLACEMENT/DELINEATION MONITORING WELL
- WELLHEAD
- M METER HOUSE
- ↑ ESTIMATED GROUNDWATER FLOW DIRECTION
- RELATIVE GROUNDWATER ELEVATION CONTOUR
CONTOUR INTERVAL = 0.25 FEET

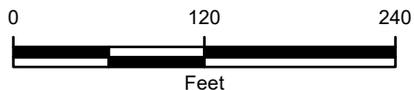


IMAGE COURTESY OF ESRI



FIGURE 1
 PROPOSED WORK PLAN SITE MAP
 DOGIE EAST PIT
 RIO ARRIBA COUNTY, NEW MEXICO

WILLIAMS FOUR CORNERS, LLC

