



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  
Jicarilla Contract #147-6  
Environmental Order #3RP-325-0  
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 Jicarilla Contract #147-6/Environmental Order #3RP-325-0. This work plan is intended to delineate impacted groundwater at the Jicarilla Contract #147-6 natural gas production well (Site) located in Unit C, Section 6, Township 25 North, Range 5 West located adjacent to a tributary to Tapacito Creek, which drains into Largo Canyon in Rio Arriba County, New Mexico.

## **BACKGROUND**

Groundwater at the Site is impacted by petroleum hydrocarbons exceeding the New Mexico Water Quality Control Commission (NMWQCC) standards for benzene, toluene, ethylbenzene, and total xylenes (BTEX) due to a release from a former unlined dehydrator pit operated by the former operator, Gas Company of New Mexico. Approximately 12,000 cubic yards of source material were excavated in 1998. Impacted groundwater was encountered at 26 feet below ground surface (bgs) and ten monitoring wells were installed in the locations depicted on Figure 1. Over time, three monitoring wells (MW-4, MW-5, and MW-7) were destroyed by erosion in the adjacent wash. Williams purchased the asset in 2000 and installed monitoring wells MW-11 and MW-12 in 2013. Since then, Williams has monitored groundwater quality in all wells. Results of the monitoring events are available in annual reports submitted to the New Mexico Oil Conservation Division (NMOCD).

Monitoring wells MW-1, MW-2, MW-8, and MW-9 were monitored for eight quarters documenting BTEX concentrations in compliance with NMWQCC standards. Monitoring well MW-10 is upgradient and has never contained concentrations of BTEX exceeding standards. MW-11 was sampled upon installation in 2013 and laboratory analytical results were in compliance with NMWQCC standards. Monitoring wells MW-3 and MW-6 consistently contain BTEX constituents exceeding standards and MW-12 contains benzene near the standard of 10 micrograms per liter. The most recent (June 2016) monitoring results are presented on Figure 1.





## **PROPOSED DELINEATION**

LTE proposes to install two new monitoring wells to delineate the dissolved-phase plume. The monitoring wells will be located downgradient of MW-3 and MW-6 as presented on Figure 1. Because monitoring wells at the Site have already been destroyed by water flowing in the adjacent wash, LTE has located the new wells outside of the main tributary of the wash.

Each new monitoring well will be installed by 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 20 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.

## **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.



Monitoring wells MW-1, MW-2, MW-8, and MW-9 are considered to be upgradient wells that have never been or are no longer impacted by the original source. Those wells will not be sampled. Monitoring well MW-11 will be sampled as an upgradient compliance point. Monitoring wells MW-3, MW-6, MW-12, and both new monitoring wells will be sampled to delineate the dissolved-phase plume.

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. Additional recommendations will be made based on results of sampling 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](mailto:bherb@ltenv.com) or Aaron Galer at Williams at (801) 584-6746 or [Aaron.Galer@Williams.com](mailto: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**



