



Advanced Technologies
Waste Management Support
Environmental Services
Staff Augmentation

Native American and Women Owned
8(a) Small Business

Report Name: Site-Specific Background Levels and Groundwater Monitoring Work Plan

Date: August 5, 2022

Project Name: Facility #4 AE2 (UPRR 42 Pan Am AE Manifold 2)

Client: KP Kauffman

MarCom Report:
RPT-KPK-22.11

A release of unknown origin and volume was discovered at the Facility #4 AE2 site (or UPRR 42 Pan Am AE Manifold 2) by a third-party contactor on March 9, 2022. In addition, Yes! Communities of Denver, Colorado, is planning to re-develop the site into a residential community. A site map and a proposed development drawing are provided in the attached Form 27 supplemental.

Between April 5 and April 25, 2022, Marcom, LLC (MarCom) oversaw the excavation of approximately 420 tons of exploration and production (E&P) waste. Confirmation soil samples were collected by MarCom from the excavation sidewalls on April 28, 2022, and the bottom of the hole on July 6, 2022. Six samples were collected from the sidewalls (SW) at 7 feet below ground surface (bgs) and one sample was collected from the bottom of the hole (BH) at 10 feet bgs. Soil sample locations are shown on the attached Soil Sample Location Figure. Soil samples were submitted to Summit Scientific and analyzed for the contaminants of concern listed in Colorado Oil and Gas Conservation Commission (COGCC) Table 915-1, including the Soil Suitability for Reclamation, Organic Compounds in Soils, and Metals in Soils. Organic compounds concentrations were less than the applicable clean-up concentration for all samples submitted for analysis. Soil analytical data is summarized in the attached Soil Analytical Summary Table.

On May 25, 2022, MarCom oversaw the installation of background soil borings BK-1 through BK-4 at the location shown on the attached Soil Sample Location Figure. Background soil samples were collected from 4 feet bgs and from 8 feet bgs and submitted for analysis of the inorganic constituents listed on COGCC Table 915-1. Background soil analytical data is summarized in the attached Soil Analytical Summary Table.

pH was measured in the side walls and bottom hole samples at levels that exceeded the Soil Suitability for Reclamation limit listed in COGCC Table 915-1. Based on that, pH levels in the sidewall and bottom hole samples were compared to background levels. The average pH level between 4 feet and 8 feet bgs was calculated by removing the maximum and minimal values and calculating the average of the remaining six samples. **Table 1** below presents the minimum and maximum levels for the background, sidewall, and bottom hole samples for pH. Based on the

Idaho Falls, ID
525 Park Avenue, Suite 2E
Idaho Falls, ID 83402
Phone: 208-538-1782

Butte, MT
65 E Broadway, Suite 200
Butte, MT 59701
Phone: 208-390-8301

Fort Collins, CO
1811 E. Mulberry Street
Fort Collins, CO 80524
Phone: 208-201-8280

data in **Table 1**, pH levels in soil samples collected from the site are below average background levels. No additional excavation is needed to address pH.

Table 1: Facility #4 AE2 (UPRR 42 Pan AM AE Manifold) pH Data

Soil Suitability Reclamation Parameters	pH		
	Minimum	Maximum	Average
Background	7.74	8.56	8.22
Side Wall	7.93	8.32	8.05
Bottom Hole	7.97	7.97	7.97

Arsenic, barium, cadmium, lead, and and/or selenium concentrations in sidewall samples SW-1@7', SW-2@7', SW-3@7', SW-4@7', SW-5@7', and SW-6@7' exceeded the applicable Protection of Groundwater Soil Screening Level Concentration listed in COGCC Table 915-1. Groundwater was encountered between 8 feet and 9 feet bgs during excavation activities and the groundwater migration pathway is considered complete.

To determine a site-specific concentration for each of the above metals, the average background metal concentration between 4 feet and 8 feet bgs was calculated by removing the maximum and minimal values and calculating the average of the remaining six samples. **Table 2** below provides the site-specific background concentrations for arsenic, barium, cadmium, lead, and selenium and compares the data to the sidewall and bottom hole sample analytical data.

Table 2: Facility #4 AE2 (UPRR 42 Pan AM AE Manifold) Inorganic Data

Inorganic	Arsenic	Barium	Cadmium	Lead	Selenium
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Minimum	3.24	89.8	ND (≤0.212)	8.1	0.722
Maximum	4.27	154	0.327	14.1	1.07
Average	3.83	136.8	0.273	10.7	0.85
Number of samples (N)	6	6	6	6	6
1.25x Average	4.79	171	0.38	13.4	1.06
Number of exceedances over background (N)	0	1	1	0	0
Highest Concentration	4.27	437	16.5	12.7	0.915

Note: the cadmium average defaulted to the Protection of Groundwater Soil Screening Level Concentration.

The 1.25 times the background is the COGCC-approved method of comparing constituent concentrations to background data. Based on data collected from the site, barium and cadmium concentrations in soil samples collected from the exceed the applicable site-specific limit.

MarCom recommends that the excavation be backfilled and that a site reclamation plan be prepared that incorporates the redevelopment as proposed by Yes! Communities. Following the redevelopment, four groundwater monitoring wells will be installed at the locations shown on the attached Well Location Figure. Quarterly groundwater sampling will then be conducted. Groundwater samples will be collected from each well and analyzed for the Organic Compounds in Groundwater listed in COGCC Table 915-1 and for barium and cadmium concentrations. If needed, additional groundwater assessment will be conducted.

If you have any questions regarding this report, please contact Kevin Tautkus at ktautkus@marcomllc.net.

Thank you,

Kevin Tautkus, P.G.

Senior Project Manager