



ERM

1200 17th Street
Floor 10
Denver, CO, 80202

T +1 303 741-5050
erm.com

20 December 2024

Ries #3-19

Remediation #24968

Operator #100322

This Supplemental Site Investigation Summary has been prepared by Environmental Resources Management, Inc. (ERM), on behalf of Chevron, for the Ries #3-19 (Remediation #24968) Site. As detailed in the third quarter 2022 Supplemental Site Investigation and Remediation Workplan (Form 27) Document #403160810 submitted by Eagle Environmental Consulting, Inc and received by the Colorado Energy and Carbon Management Commission (ECMC) on 9 September 2022, soil sample WH-FS-01@6' exceeded the Colorado ECMC Table 915-1 regulatory standard for pH, and soil sample FL01-I@3' exceed the standard for sodium adsorption ratio (SAR). These exceedances require further action to delineate and assess pH and SAR at the Site related to background levels.

In September 2024, ERM performed shallow delineation and background soil sampling via hand auger around the former wellhead (west) and flowline (east) as depicted in **Figure 1**. The analytical results from the recent Site investigation activities are summarized in the following sections.

SITE INVESTIGATION ACTIVITIES

SOIL SAMPLING

On 10 September 2024, ERM advanced four wellhead delineation soil borings (WH-01-N, WH-01-S, WH-01-E, and WH-01-W) within the former operations boundary of the Ries #319 -wellhead to delineate the exceedance of pH in sample WH-FS-01@6'. ERM collected samples from the 4-, 6-, and 8-feet below ground surface (bgs) interval at each boring location.

Four delineation soil borings (FL-01-N, FL-01-S, FL-01-E, FL-01-W) were advanced around the Ries #3-19 flowline to delineate SAR exceedance in sample FL01-I@3. Samples were collected at the 1-, 3-, and 5-feet bgs intervals at each respective boring location.

Six soil borings (BG-01 through BG-06) were advanced to evaluate background concentrations of target analytes with samples collected from the non-impacted area of the Site. Samples were collected at 4-feet bgs at all background sampling locations. Sample locations and relevant features are depicted on **Figure 1**.

A total of 30 soil samples, including the 12 samples associated with the former wellhead and three background samples, were collected for analysis of pH by United States Environmental Protection Agency (EPA) Method 9045D. Additionally, 12 flowline soil boring samples and three background

samples were collected for analysis of SAR by EPA Method 6020B/USDA60 6(2). All samples were submitted to Summit Scientific Laboratory, an accredited laboratory located in Golden, Colorado.

RESULTS

Analytical results for pH and SAR are summarized in **Table 1** and the laboratory analytical report is included in **Attachment A**. Sampling locations and corresponding analytical results for the 10 September 2024 sampling event are illustrated on **Figure 1**.

Upon receipt of laboratory analytical results, data were reviewed for general quality assurance and quality control measures. The following notable observations and data qualifiers were associated with this data set:

- Soil samples at the time of laboratory receipt were 13.6 degrees Celsius (°C), which is outside the acceptable range of 0 to 6°C. The samples were received 6 hours after the last sample was collected. The samples were delivered on the same day of sampling, in a cooler on bagged ice and controlled by the laboratory upon receipt. Samples delivered to the laboratory on the same day as sampling are deemed acceptable if it appears cooling has begun.
- All sample bottles were received intact, and samples analyzed within their respective hold times.
- No data qualifier codes were flagged in the analytical results for any of the samples. A data qualifier (QLCS-02) was flagged for the laboratory quality control sample for being out of range. The laboratory deemed this acceptable and finalized the analytical report.

Laboratory analytical results were compared to the Colorado ECMC Table 915-1 regulatory standards for Soil Suitability for Reclamation, the 12 wellhead soil samples and the three background soil samples exceed the pH standard, and one of the 15 samples associated with the flowline exceeds the SAR regulatory standard.

WELLHEAD DELINEATION SOIL SAMPLES

- Wellhead delineation borings WH-01-N, WH-01-S, WH-01-E, and WH-01-W exceed the Colorado ECMC Table 915-1 pH range of 6.0 to 8.3 standard units (SU) in all samples collected from the 4-, 6-, and 8-foot bgs intervals. The pH values for all the samples collected range from 8.4 to 9.6 SUs.

FLOWLINE DELINEATION SOIL SAMPLES

- The sample collected from the flowline delineation boring FL-01-N from the 3-foot bgs interval exceeds the Colorado ECMC Table 915-1 SAR value of <6.0 SUs with an analytical result of 6.41 SUs. The SAR values from all the samples range from 0.295 to 6.41 SUs.

BACKGROUND SOIL SAMPLES

- Background borings BG-01, BG-02, and BG-03 sampled for the analysis of pH exceed the Colorado ECMC Table 915-1 pH range in all three samples. The background pH values ranged from 8.6 to 8.9 SUs.

- Background borings BG-05 and BG-06 sampled for the analysis of SAR exceed the Colorado ECMC Table 915-1 SAR values with analytical results of 10.1 and 6.31 SUs, respectively. The background SAR values ranged from 2.26 to 10.1 SUs.

SOIL SUITABILITY FOR RECLAMATION STATUS

The analytical results for pH in 13 of the 24 soil samples collected from the delineation borings associated with the Ries #3-19 wellhead area exceed the ECMC Table 915-1 range of 6.00 to 8.30 SUs.

The analytical results for SAR in one of the soil samples collected from the flowline borings associated with the Ries #3-19 site exceed the ECMC Table 915-1 value of <6.00 SUs.

ERM recommends conducting further assessment of pH and SAR on-Site and the background samples from non-impacted portions of the Site in 1st Quarter 2025.



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TABLE

TABLE 1
SUMMARY OF SOIL SUITABILITY FOR RECLAMATION CHEMISTRY DATA
OPERATOR: 100322
Ries #3-19, Weld County, Colorado
REM# 24968

			Analyte	pH (Standard Units)	SAR (Standard Units)
			CO-ECMC Table 915-1 Limits	6.0-8.3	< 6.0
			Maximum Background Concentration	9.6	10.1
			Mean Background Concentration	8.7	6.22
Sample ID	Sample Date	Depth (ft bgs)	Sample Results		
Background Soil Samples					
BG-01	09/10/2024	4	8.7		NA
BG-02	09/10/2024	4	8.9		NA
BG-03	09/10/2024	4	8.6		NA
BG-04	09/10/2024	4	NA		2.26
BG-05	09/10/2024	4	NA		10.1
BG-06	09/10/2024	4	NA		6.31
Delineation Boring Soil Samples					
FL-01-E	09/10/2024	1	NA		2.74
FL-01-E	09/10/2024	3	NA		3.3
FL-01-E	09/10/2024	5	NA		5.3
FL-01-N	09/10/2024	1	NA		1.16
FL-01-N	09/10/2024	3	NA		6.41
FL-01-N	09/10/2024	5	NA		5.35
FL-01-S	09/10/2024	1	NA		1.5
FL-01-S	09/10/2024	3	NA		5.34
FL-01-S	09/10/2024	5	NA		3.8
FL-01-W	09/10/2024	1	NA		0.295
FL-01-W	09/10/2024	3	NA		4.63
FL-01-W	09/10/2024	5	NA		4.16
WH-01-E	09/10/2024	4	9.2		NA
WH-01-E	09/10/2024	6	9.3		NA
WH-01-E	09/10/2024	8	8.9		NA
WH-01-N	09/10/2024	4	8.5		NA
WH-01-N	09/10/2024	6	8.8		NA
WH-01-N	09/10/2024	8	8.8		NA
WH-01-S	09/10/2024	4	8.9		NA
WH-01-S	09/10/2024	6	9.6		NA
WH-01-S	09/10/2024	8	9.0		NA
WH-01-W	09/10/2024	4	8.4		NA
WH-01-W	09/10/2024	6	8.8		NA
WH-01-W	09/10/2024	8	9.2		NA

Notes:

ft bgs = feet below ground surface

NA = Not Analyzed

pH = pH Standard Units

SAR = Sodium Adsorption Ratio

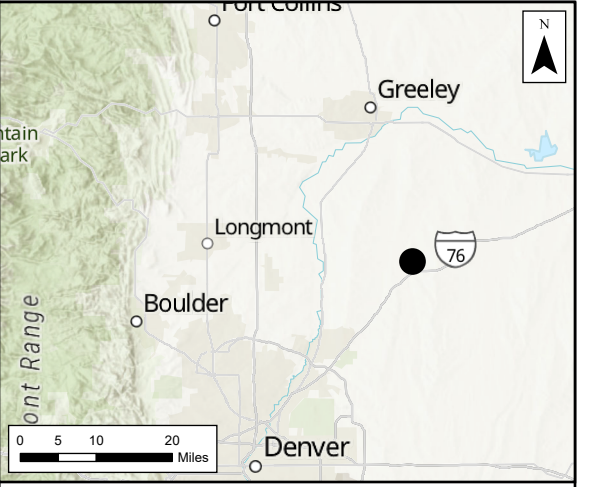
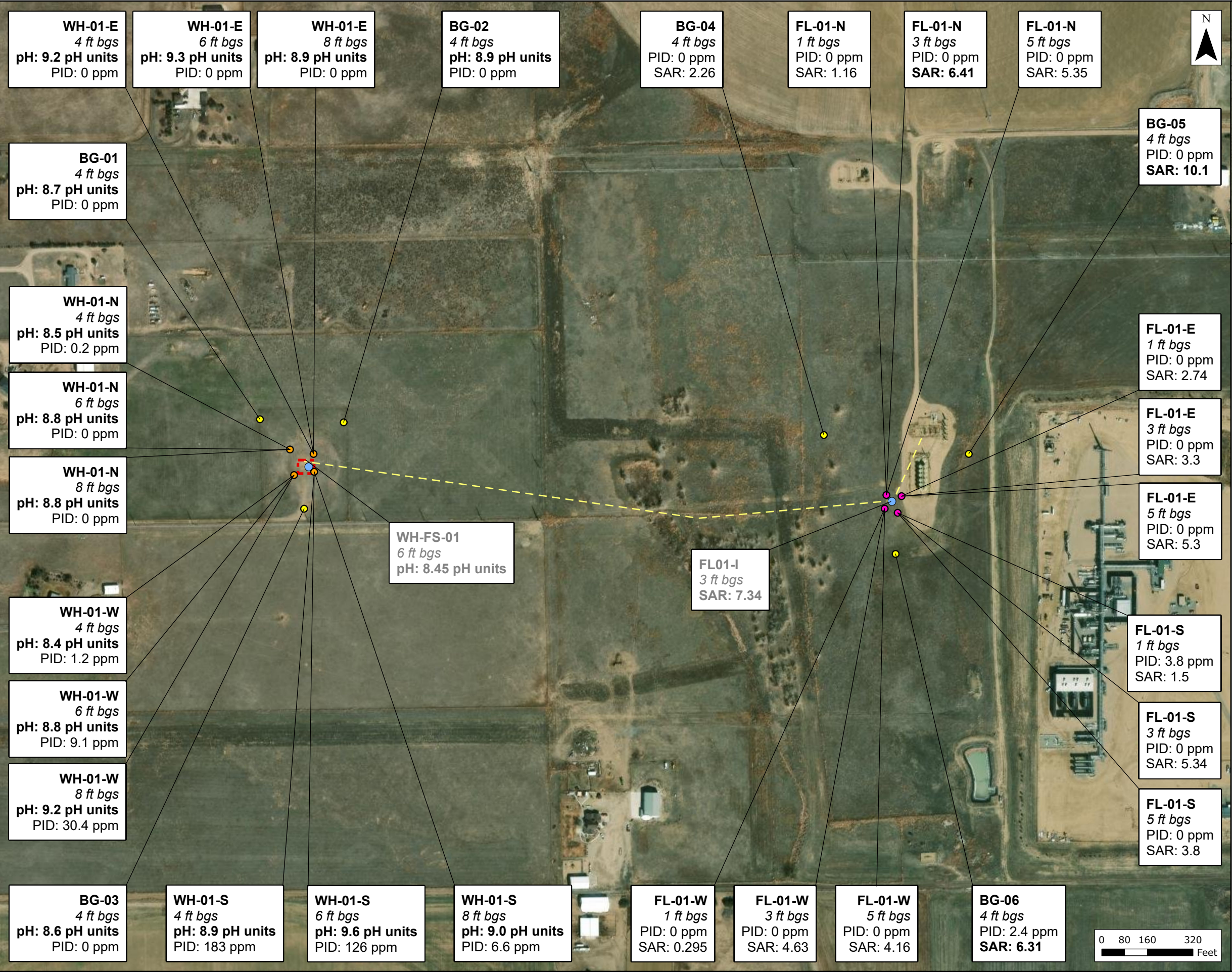
CO-ECMC = Colorado Energy and Carbon Management Commission

Bold and blue analytical result values exceed the ECMC Table 915-1 limit(s)



FIGURE

DRAWN BY: GIS
 FILE: M:\US\Projects\VA-C\Chevron\RBUR Remediation Field Survey\ArcGIS\Scripting\Chevron_Scripted_SoilSites_KB_BH.aprx, REVISED: 12/17/2024, SCALE: 1:4,080 when printed at 11x17



- Legend**
- Former Sample Location
 - Background
 - Flowline Delineation
 - Wellhead Delineation
 - Former Flowline
 - Former Wellhead

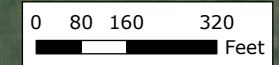
Notes:

Bold values exceed the ECMC criteria for soil suitability.
 ft bgs = feet below ground surface

ECMC = Energy and Carbon Management Commission
 PID = Photo Ionization Detector
 ppm = parts per million
 SAR = Sodium Adsorption Ratio (standard units)

ECMC Table 915-1 limit(s)
 pH = 6.0-8.3 pH units
 SAR = 6.0 standard units

Figure 1
Soils Analytical Data
10 September 2024
Ries #3-19
REM# 24968
Operator: 100322
 RBUR Remediation Field Survey
 Chevron
 Weld County, Colorado



Source: Esri - World Aerial Map; NAD 1983 2011 StatePlane Colorado North FIPS 0501 Ft US



ATTACHMENT A LABORATORY ANALYTICAL REPORT