Fort Hall Mine Landfill
1500 North Fort Hall Mine Road
Pocatello, Idaho

FINAL

2024 Spring Semiannual Cell 1, 2, and 4
Groundwater Monitoring and Remediation System Operation and Maintenance Report

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Acronyms and Abbreviations

%	percent
2,3,7,8-TCDD	2,3,7,8-tetrachloro-p-dibenzodioxin
amsl	above mean sea level
bgs	below ground surface
CAS	compliance agreement schedule
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethene
City	the City of Pocatello
cm/s	centimeter per second
CO	Consent Order
COC	chemical of concern
CSM	conceptual site model
DO	dissolved oxygen
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
feet/day	feet per day
FHML	Fort Hall Mine Landfill
GCL	geocomposite clay liner
gpm	gallon per minute
HDPE	high-density polyethylene
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDGW	Idaho Groundwater Rule
IDWR	Idaho Department of Water Resources
J	estimated result
LCL	lower confidence limit
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
LFG	landfill gas
LPRV	Lower Portneuf River Valley
MCL	maximum contaminant level
MDL	method detection limit
µg/L	microgram per liter
µS/cm	microSiemen per centimeter
mg/L	milligram per liter
MS/MSD	matrix spike/matrix spike duplicate
MSW	municipal solid waste
MW	monitoring well
O&M	operations and maintenance
ORP	oxidation-reduction potential
Paragon	Paragon Consulting, Inc.
PCA	principal component analysis
PCB	polychlorinated biphenyl
PCE	tetrachloroethene

PVA	Portneuf Valley Aquifer
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
RPD	relative percent difference
RW	remediation wells
S	summation statistic
S/D	shallow/deep (well)
SOP	standard operating procedure
SVOC	semivolatile organic compound
TCE	trichloroethene
TOC	total organic carbon
UJ	estimated nondetect result
UCL	upper confidence limit
UPL	upper prediction limit
VC	vinyl chloride
VOC	volatile organic compound

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Section 1

Introduction

CDM Smith implemented groundwater sampling at select monitoring wells and remediation system extraction wells at the Fort Hall Mine Landfill (FHML) during the spring 2024 sampling event (April 29 through May 7, 2024) under Amendment No. 1 to Task Order No. 12 of the Bannock County Master Services Agreement contract executed July 24, 2018. CDM Smith presented the sampling results in this groundwater monitoring report to satisfy monitoring requirements associated with the following:

- Idaho Department of Environmental Quality (IDEQ) Consent Order (CO) pursuant to the Idaho Environmental Protection and Health Act, Idaho Code §39-101 et seq. and the Idaho Solid Waste Facilities Act, §39-7401 et seq., to address chemicals of concern (COCs) (e.g., trichloroethene [TCE] and tetrachloroethene [PCE]) known to originate in Cell 1, the historical landfill operated before land disposal regulations were promulgated.

- IDEQ Compliance Agreement Schedule (CAS) pursuant to the Idaho Environmental Protection and Health Act, Idaho Code §39-101 et seq. and the Idaho Solid Waste Facilities Act, §39-7401 et seq., to bring FHML into compliance with Idaho Code §39-7401 and the Subtitle D requirements in Title 40 Code of Federal Regulations (CFR) Part 258 et seq. for monitoring of municipal solid waste (MSW) landfills (Criteria for Municipal Solid Waste Landfills, 40 CFR, §258, Subpart E, Appendices I and II, Federal Register Volume 56, Issue 196 [October 9, 1991]).

The groundwater sampling was completed under the *Final Fort Hall Mine Landfill, Groundwater Monitoring Program Plan Quality Assurance Project Plan* (QAPP), dated May 25, 2021 (CDM Smith 2021b). A summary of planned sampling is provided in **Appendix A**.

1.1 Purpose of Report

CDM Smith conducted the spring 2024 groundwater sampling event in accordance with the current CO and CAS between Bannock County and IDEQ. To comply with both the remedy performance monitoring for Cell 1 and the Resource Conservation and Recovery Act (RCRA) monitoring requirements for Cells 2 and 4, samples were collected from the Cell 1, 2, and 4 monitoring wells, and select offsite monitoring wells.

The purposes of this report are the following:

- Present analytical and field data that were collected during the spring 2024 groundwater sampling event.

- Update PCE and TCE groundwater plume extents and groundwater elevation potentiometric contour maps for the FHML Cell 1 source area and downgradient plume.

- Evaluate the current remediation system performance.

- Report operations and maintenance (O&M) activities for the remediation system.
- Update COC trend data and statistical analysis of COC trends.
- Provide the status of RCRA compliance monitoring at Cells 2 and 4 and the statistical analysis of detected parameters from Appendices I and II of 40 CFR §258, *Criteria for Municipal Solid Waste Landfills* (Federal Register 1991) against background levels and promulgated standards.
- Provide recommendations for operating the groundwater treatment system.

1.2 Report Organization

This report is organized into the following sections:

1.0 Introduction: This section describes the purpose and organization of the report and provides a summary of site background information and the conceptual site model (CSM), which includes the site location, sources of contamination, geologic and hydrogeologic framework, nature and extent of contamination, and a description of the remediation system.

2.0 Field Activities: This section presents a summary of the spring 2024 sampling activities and analysis, including private property notifications, groundwater sampling and analysis, decontamination and handling of investigation-derived waste, and deviations from the QAPP (CDM Smith 2021b). This section also summarizes the remediation system O&M, including well rehabilitation and equipment replacement.

3.0 Groundwater Monitoring Results: This section presents the results of the spring 2024 groundwater sampling activities and summarizes data quality and usability, potentiometric surface data, groundwater analytical results, and the performance of the remediation system.

4.0 Groundwater Data Analysis: This section presents the current nature and extent of the FHML TCE and PCE plumes and an updated evaluation of the COC trends and statistical analyses.

5.0 Conclusions and Recommendations: This section presents the conclusions of the data analysis and provides recommendations according to the decision criteria developed in the QAPP (CDM Smith 2021b) for treatment system maintenance activities at FHML.

6.0 References: This section presents references used to prepare this report.

The following appendices are also included:

Appendix A – Sampling Plan

Appendix B – Field Documentation

Appendix C – Historical Groundwater Data

Appendix D – Data Usability Assessment Report

Appendix E – Laboratory Reports (Data Packages)

Appendix F – Time Series Charts

Appendix G – Statistical Methods, Approach, and Analysis

1.3 Background

The following sections briefly describe the site history and CSM, which are described further in the QAPP (CDM Smith 2021b). These sections include brief descriptions of the site location and history, sources of contamination, the geologic and hydrogeologic framework, previous investigations, and ongoing remediation system operations.

1.3.1 Site History and Description

FHML is located on North Fort Hall Mine Road in Bannock County, Idaho, approximately 7 miles southeast and hydrologically upgradient of Pocatello, Idaho (**Figure 1-1**). The landfill is alternately known as the Fort Hall Canyon Landfill or Bannock County Landfill (IDEQ 2016a), and it has received hazardous and nonhazardous waste since 1943.

1.3.1.1 Landfill Construction and Use

FHML currently consists of four cells, as shown in **Figure 1-2** (IDEQ 2016a). Cell 1 is closed and unlined and has historically received hazardous waste. Cells 2 and 4 are lined and currently receive waste under RCRA Subtitle D regulations. Cell 3 began operations around 1993 and receives construction and demolition waste (IDEQ 2016a).

Cell 1 received domestic and MSW, construction and demolition debris, and unknown commercial and industrial waste during active operation from 1943 to 1993 (Brown and Caldwell 1992; Maxim 2000a, 2000b). There is no leachate collection system for Cell 1, but a final cover was installed in 1993 (Maxim 2000b). In 2012, landfill gas (LFG) extraction wells and associated piping were installed (Paragon Consulting, Inc. [Paragon] 2015).

Cell 1 started operating in 1943 as an unpermitted valley-fill dump. No information is available regarding landfill base construction, but because of the nature of the dump, it is assumed that no base preparation was constructed. Based on LFG collection system record drawings for wells in the Old Landfill Well Field (Paragon 2015) and discussions in the geotechnical investigation for the LFG-to-energy project (American Geotechnics 2012), the thickness of waste in Cell 1 varies from minimal (less than 5 feet) at the fill area edges to greater than 85 feet. Based on observations from the LFG extraction well installations, the bottom of waste ranges from approximately 4,900 feet above mean sea level (amsl) in the southern and central portions of the cell to approximately 4,730 feet amsl in the northern and western portions. Cell 1 area encompasses approximately 60 acres (**Figure 1-2**).

Landfill operations in Cell 1 ceased in 1993. Based on closure plans provided in the *Final Revisions to Preliminary Engineering Report, Bannock County, Idaho* (Brown and Caldwell 1993), the landfill was proposed to be closed with a cover consisting of 12 inches of onsite loess material excavated from the Cell 2 area followed by an 18-inch barrier layer of compacted fill with a permeability of less than or equal to 10^{-5} centimeters per second (cm/s). The barrier layer was to consist of 12 inches of soil plus another 6 inches of topsoil. The cover was designed to prevent, via evapotranspiration, approximately 90 percent (%) of precipitation from infiltrating the cover during a normal precipitation and evaporation year (Brown and Caldwell 1993). No as-built information was available regarding the actual placement of the Cell 1 cover.

Cell 2 began operating in 1993 and currently receives compost and MSW as a Subtitle D cell, complete with a leachate collection system that gravity drains to a collection pond (IDEQ 2016b). Under RCRA, assessment-level monitoring is currently required at Cell 2. In 2012, LFG extraction wells were installed (Paragon 2015).

The Cell 2 area is approximately 24 acres (**Figure 1-2**). The first phase of Cell 2 (Phase 1A-P1) was constructed in 1993 and began receiving waste shortly thereafter. Cell 2 was constructed under the Subtitle D regulations. According to the *Preliminary Engineering Report* (Brown and Caldwell 1993), the landfill base was constructed with a 60-millimeter high-density polyethylene (HDPE) membrane liner above 2 feet of compacted soil with a permeability less than or equal to 10^{-7} cm/s. There is a 2-foot-thick sand/gravel drainage layer above the liner that directs leachate to the leachate collection system. A heavy nonwoven geotextile was placed between the liner and the drainage layer (Maxim 2000a). This liner design was used for the first two phases (1A-P1 and 1A-P2) of the Cell 2 landfill (Maxim 2003).

Reportedly, during construction of the 1A-P1 landfill, the liner was ripped during placement of the leachate drainage layer. The rip was repaired during construction of the 1A-P2 landfill by placing the 1A-P2 liner over the ripped area and welding to the 1A-P1 liner below the rip (Maxim 2000a).

An alternative liner demonstration was submitted in 2000 for Phase 3 (1A-P3) construction (Maxim 2000a). The alternative liner demonstration recommended the use of a 0.25-inch geocomposite clay liner (GCL) as a replacement for the 2 feet of compacted soil below the HDPE liner. The GCL is reported to have a hydrated hydraulic conductivity of approximately 5×10^{-9} cm/s (Maxim 2000a). IDEQ approved the alternative liner prior to construction of the Phase 3 expansion (1A-P3) (elevation from 5,110 to 5,150 feet amsl). The alternative liner is reported to be constructed with 1 foot of compacted silt or native soil, GCL, 60-millimeter textured HDPE, a nonwoven geotextile, and 1.5 to 2 feet of well-graded sand (Maxim 2003). The Phase 4 expansion (1A-P4) was constructed with the same alternative liner as Phase 3 (1A-P3).

Leachate in the Cell 2 landfill is collected via a gravity drain system. The leachate collection system gravity drains from the cell sump to the Cell 2 lined leachate collection pond. Based on hydrologic evaluation of landfill performance models completed by Brown and Caldwell during the Cell 2 design, leachate generation is anticipated to be minimal (between zero and 100,000 gallons per year) (Brown and Caldwell 1993). Leachate that discharges to the Cell 2 leachate pond is managed by evaporation. According to Bannock County personnel, during higher-than-normal precipitation, excess generated leachate is pumped from the leachate pond and reapplied to the Cell 2 landfill working areas for promotion of LFG generation and dust control. Current monthly leachate generation estimates are unknown.

As originally designed, Cell 2 was intended to operate through 2012; however, evaluation of the side slopes indicated that substantial permitted airspace was not being used. Recovery of the unused airspace extended the landfill life. Further slope stability and capacity analysis performed by Paragon indicated that the final landfill elevation buildout could be increased, thereby extending the landfill life (Paragon 2017). Currently, Cell 2 receives MSW but is nearing the end of its operational life.

Cell 4 opened in 2016 and receives MSW (IDEQ 2016a). It was constructed with an alternative base liner similar to the last two phases of the Cell 2 landfill. The liner construction consists of the following components (starting from the uppermost layer):

1. A 2-foot operations layer of native material provides liner protection,
2. A 1-foot drainage gravel layer provides lateral drainage to the cell sump,
3. A woven geotextile provides separation between the operations layer and the drainage gravel layer,
4. A 16-ounce nonwoven geotextile, placed directly under the gravel layer, provides puncture protection for the HDPE geomembrane.
5. A composite barrier layer consisting of a textured 60-mil HDPE geomembrane and a GCL provides leachate containment.
6. A prepared subgrade with a cushion material layer provides a smooth and uniform surface for the composite barrier layer.

A gravity drain system collects leachate. The leachate collection system gravity drains from the cell sump to the Cell 4 lined leachate collection pond, where leachate is managed by evaporation. Leachate generation quantities are not measured at FHML.

Currently, the Cell 4 landfill expansion is under construction and will provide airspace through 2025. Final design and buildout reportedly will provide landfill airspace through 2048. All stormwater is diverted to channels that ultimately discharge to a containment basin for evaporation. Under RCRA, detection-level monitoring is currently required at Cell 4.

1.3.1.2 Historical Contamination and Regulatory Actions

In October 1991, volatile organic compound (VOC) contamination was identified in monitoring wells installed immediately downgradient of Cell 1 (Brown and Caldwell 1992). By 1993, high concentrations of TCE were detected in downgradient domestic wells within the Portneuf Valley Aquifer (PVA), and two municipal supply wells #14 and #33 (shown in **Figure 1-3**) were subsequently closed because of high TCE concentrations (Brown and Caldwell 1994).

In May 1993, Bannock County entered into a CO with the Idaho Department of Health and Welfare (now IDEQ) pursuant to the Idaho Environmental Protection and Health Act, Idaho Code §39-108, to assess and mitigate the impacts of TCE, PCE, and other VOCs originating from Cell 1 of FHML (IDEQ 2016a). In 2002, Bannock County installed a groundwater remediation system downgradient of Cell 1, at the mouth of Fort Hall Canyon. The purpose of the remediation system has been to capture and treat groundwater impacted by the unlined Cell 1 before the groundwater enters the PVA. The PVA is the sole source of drinking water for the Pocatello and Chubbuck, Idaho, communities, as well as the surrounding unincorporated Bannock County land.

In March 2015, IDEQ reviewed the remediation system and found it to be ineffective at removing environmental contamination. Concentrations of COCs were reported to be trending upward in wells located both upgradient and downgradient of the remediation system. The CSM for FHML was determined to not accurately represent the nature and extent of groundwater contamination associated with FHML (IDEQ 2016a). Therefore, in November 2016, IDEQ and Bannock County terminated the 1993 CO and entered into a new CO for the systemic development of a revised remediation plan for Cell 1 (IDEQ 2016a). Separately, in November 2016, IDEQ and Bannock County entered into a CAS to address groundwater contamination and groundwater monitoring in compliance with RCRA at landfill Cells 2 and 4 (IDEQ 2016b).

Since 2018, CDM Smith has been conducting a groundwater monitoring program in accordance with the CAS and CO and reporting data in semiannual monitoring reports. In addition, site characterization activities, including surface and borehole geophysics, and a Cell 1 cap evaluation were performed under the *Final Site Characterization Plan* (CDM Smith 2019) to fill data gaps and improve the CSM. Ultimately, the remedy will be optimized to achieve containment of the COC plume. An injection pilot study and tracer study were conducted in 2023 in accordance with the *Pilot Study Work Plan* (CDM Smith 2023c) to evaluate potential technologies for remedy optimization. Performance monitoring and data analysis are ongoing.

1.3.1.3 Groundwater Monitoring Well Network

An extensive monitoring well network has been established throughout FHML and the PVA to evaluate the impacts of FHML on groundwater (**Figures 1-3** and **1-4**).

The data quality objectives (DQOs) of the groundwater monitoring well network are the following:

- Monitor the Cell 1 impacts to groundwater within the FHML and the offsite plume.
- Monitor and report in accordance with RCRA Subtitle D MSW requirements for Cells 2 and 4, according to Idaho Solid Waste Rules (Idaho Code §39-74) and 40 CFR §258.
- Monitor remediation system performance.

To satisfy these DQOs, the monitoring well network consists of multiple well groups, as follows:

- Cell 1 Source and Offsite Plume Wells:
    - **Cell 1 Monitoring Wells**. The Cell 1 monitoring well group currently consists of approximately 30 Bannock County groundwater monitoring wells sampled semiannually. These wells are downgradient of Cell 1 on FHML property (**Figure 1-4**) and are monitored to assess the extent of COCs immediately north-northeast of the Cell 1 boundary. Although Cell 1 is not regulated under the Subtitle D requirements in 40 CFR §258, a subset of monitoring wells is monitored for the parameters in Appendices I and II to evaluate whether the substantive requirements are being met and whether other COC impacts are observed downgradient from Cell 1. Additionally, the offsite monitoring well group comprises eight offsite monitoring wells located outside the FHML property boundary, three of which are monitored semiannually to assess the extent of offsite groundwater COC impacts.

- **Domestic Wells**. There are at least 46 domestic groundwater wells in the PVA that have been monitored at various frequencies between 1992 and 2023 to assess the extent of the offsite groundwater plume and monitor COC concentrations within and surrounding impacted domestic water wells.

- **Pocatello City Monitoring Wells**. The City of Pocatello (City) installed 16 groundwater monitoring wells to evaluate groundwater quality and track the COC plume migrating toward the municipal supply wells.

- **Pocatello City Municipal Supply Wells**. The City has 21 municipal supply wells. The City uses some of these wells to monitor the extent of the plume and the presence of COCs in the City's drinking water supply. Municipal supply wells #33 and #14 are the closest to FHML that have historically observed COC impacts. Neither well is currently operated for municipal supply.

- **Remediation System Wells**. Nine groundwater extraction wells and two injection wells (**Figure 1-4**) were installed as part of the remediation system for Cell 1. RW-16 was drilled but never hooked up to the remediation system.

- **Cell 2 and 4 Monitoring Well Network**. The Cell 2 monitoring well group consists of five Bannock County groundwater monitoring wells, and the Cell 4 monitoring well group consists of five groundwater monitoring wells. Nine wells were installed to evaluate compliance with RCRA Subtitle D requirements. Monitoring well MW-4 was originally a part of the monitoring network for Cell 1; however, upon IDEQ request, it was transferred to the Cell 4 monitoring network. MW-4 (Cell 4) and MW-7 (Cell 2) were impacted by waste originating from Cell 1 (AEEC 2018b); therefore, they are not used to evaluate RCRA compliance for Cells 2 and 4. MW-7 is no longer sampled. The monitoring wells in Cells 2 and 4 are sampled semiannually for the parameters listed in Appendices I and/or II from 40 CFR §258.

1.3.2 Site Geology

Mapped by Rodgers et al. (2006), the FHML site is underlain by four geologic units. In order from youngest to oldest, these units are as follows:

- Alluvial fan deposits (Qfp): Alluvial fan deposits consist of poorly consolidated mud, silt, sand, and gravel deposited by the Fort Hall Canyon Creek as it exits Fort Hall Canyon. This unit is up to 100-feet thick. The alluvial fan deposits extend northward from the mouth of Fort Hall Canyon, thinning toward the Portneuf River. The alluvial fan deposits grade into the Lower Portneuf River Valley (LPRV) fill deposits that predate upper gravels from the Bonneville Flood event and form the benches along the southwestern edge of the LPRV (AEEC 2018a).

- Alluvium (Qal): Alluvium consists of unconsolidated mud, silt, sand, and gravel deposited in the Fort Hall Canyon Creek valley and is up to 80-feet thick. Alluvium is found in the bottom of the canyon adjacent to Fort Hall Creek. These deposits grade into the alluvial fan deposits (Qfp) at the north end of the canyon.

- Loess (Ql): Loess is unconsolidated silt. Loess mantles the canyon hillsides, can be up to 70-feet thick, and overlies the Starlight Formation Conglomerate unit (Tsuc) in places onsite.

Lewis and Fosberg (1982) classified the loess in the Fort Hall Canyon area as the Fort Hall Geosol, consisting of more than 75% silt.

- Starlight Formation Conglomerate unit (Tsuc): This is a clast-supported, moderately indurated cobble conglomerate with clasts derived from pre-Tertiary rocks in the region. The matrix supporting the clasts is reddish orange to reddish brown and is typically sandy but locally tuffaceous. The Starlight Formation Conglomerate unit (Tsuc) contains two persistent but discontinuous air-fall tuff beds (Tsur3 and Tsur4) and other lenses of air-fall tuff (e.g., Tsur). The rhyolite air-fall tuff unit (Tsur), mapped by Rodgers et al. (2006), is laminated to thick-bedded, white to light-gray air-fall tuff, up to 18-feet thick in several outcrops in the canyon south of the landfill and dips 20 degrees east-northeast.

In September 2019, boring MW-1903 was advanced to a depth of 198 feet below ground surface (bgs) to characterize the Starlight Formation below the existing remediation system extraction wells, which are typically 100 feet deep or less. Boring MW-1903 is in the canyon bottom near existing well pairs MW-104 shallow/deep (S/D) screened intervals, MW-105S/D, and the remediation wells (**Figure 1-4**).

In September and October 2019, boring MW-1902, located near the existing well pair MW-111S/D, was advanced to 258 feet bgs to characterize the Starlight Formation on the western flank of the canyon at the northeast toe of Cell 1 (**Figure 1-4**). In September 2020, the boring for MW-123 was completed on the east bank of the Fort Hall Canyon Creek (inset on **Figure 1-4**), and MW-122 was completed on the west bank.

The Starlight Formation Conglomerate unit (Tsuc) observed in boreholes MW-1902, MW-1903, MW-122, and MW-123 consisted of loose-to-cohesive, moist-to-saturated, and sandy gravel and gravelly sand with silt and some clay with intercalated dry rhyolitic tuff. Saturated intervals of sandy gravel and gravelly sand were infrequent (13 were observed over 450 feet of drilling in the borings for MW-1092 and MW-1093) and thin (ranging from 1- to 5-feet thick, with most 1- or 2-feet thick). Rock was not observed in any of these four borings. **Section 2.3** includes additional information about the completion of the borings for wells MW-122 and MW-123.

As part of the initial site investigations at the mouth of the Fort Hall Canyon in 1992 and 1993, Brown and Caldwell (1992 and 1994) observed the Fort Hall Canyon fault in the seismic refraction geophysical surveys. In this survey, Brown and Caldwell (1992 and 1994) estimated the fault was located 100 to 200 feet bgs at the mouth of the canyon and was approximately 180-feet wide. Trimble (1976) mapped the Fort Hall Canyon fault as a thrust fault. Rodgers et al. (2006) determined that the fault was a normal fault, with the Fort Hall Canyon on the downthrown side, and mapped it trending north through the Fort Hall Canyon and then west-northwest as it exits the canyon. The fault is estimated to have a dip of 15 to 20 degrees southwest, and it has a surface exposure on the west-facing slope of the canyon.

Fort Hall Canyon intersects the LPRV. The following six lithologic groups have been defined in the southern portion of the LPRV by Welhan et al. (1996):

- Bedrock, of variable composition, dominated by pink to white quartzite and varicolored shale or argillite, predominantly of Proterozoic age (Caddy Canyon Formation)

- Middle to late Tertiary basin-filling sediments and volcaniclastics of the Starlight Formation
- Quaternary valley-fill and alluvial deposits composed of nonindurated silty gravels and cobbles with lenses of sand, silt, and intercalated clays
- Portneuf Basalt deposited along the eastern edge of the LPRV
- Coarse-grained clean gravel and cobbles in the center of the LPRV, known as the Upper Gravels (equivalent to the Michaud Gravels in the northern LPRV), deposited by the Bonneville Flood event that compromised the most productive portion of the underlying PVA
- Silt "mantle" of variable thickness (0 to 43 feet) that overlies the Upper Gravels, originating from overbank flood material from periodic Portneuf River flooding

1.3.3 Site Hydrogeology and Water Balance

1.3.3.1 Hydrogeology

The aquifer system beneath FHML consists of loess, alluvium (associated with Fort Hall Canyon Creek), the alluvial fan extending to the north of the canyon, and the underlying Starlight Formation. The aquifer system is primarily unconfined beneath FHML, but some areas have evidence of confined conditions, particularly on the west side of Fort Hall Canyon Creek near the landfill and on the east side of the creek near MW-123. The water table is situated within the Starlight Formation in some areas and in the alluvium or loess in other areas. Units in the aquifer system are hydraulically connected and chemicals likely migrate between them. Groundwater in the alluvium and the Starlight Formation discharges into the PVA near monitoring well pair MW-103S/D, MW-118D, and MW-116S, downgradient of the remediation system.

Groundwater flowing through the mouth of Fort Hall Canyon discharges to the PVA. The PVA comprises northern, eastern, and southern subaquifers and is the sole source of drinking water for the communities of Pocatello and Chubbuck. In the southern portion of the PVA, wells have high yields because they are completed in coarse, clean, upper gravels at depths less than 100 to 150 feet bgs. The transmissivity of the upper gravels was estimated at approximately 10 square feet per second, with aquifer storage estimated at 0.005 (unitless), based on constant discharge pumping tests of municipal wells (CH2M HILL 1994).

Observations of borings in MW-1902, MW-1903, MW-122, and MW-123 showing thin and infrequent saturated intervals in the Starlight Formation are separated by dry rhyolitic tuff and loose-to-cohesive, dry-to-moist, sandy gravel and gravelly sand with silt and some clay. Similar lithology was observed in other borings completed into the Starlight Formation, which indicates that the vertical downward movement of groundwater near the remedy wells is limited by the lithology of the Starlight Formation. Therefore, groundwater flow near the remediation wells is predominately in the higher transmissivity alluvium and shallow Starlight Formation. During the spring, when recharge to the Starlight Formation from upgradient sources increases, the dry-to-moist sandy gravel and gravelly sand with silt units may become saturated, thereby increasing flow. At the same time, flow in the overlying alluvium and shallow Starlight Formation will also increase.

Seventeen wells were slug tested in 2020 to estimate hydraulic conductivity within the alluvium and Starlight Formation. Of the 17 wells tested, 1 is screened completely within the alluvium, 6 are screened in the shallow Starlight Formation, 1 is screened in the deeper Starlight Formation, and 9 are screened across portions of the alluvium and shallow Starlight Formation. Wells screened across both the alluvium and Starlight Formation include MP-1, MP-2, MP-3, and MP-9 near the treatment system, three remediation extraction wells, and downgradient wells MW-118D and MW-120D.

Hydraulic conductivity estimates from slug tests conducted in these wells ranged from 0.3 to 20.5 feet per day (feet/day). The highest hydraulic conductivity was recorded at RW-15, which has historically been the most productive of the remedy wells. Hydraulic conductivity at nearby wells RW-17, MP-1, and RW-16 were estimated at 5.0, 9.7, and 6.2 feet/day, respectively. The hydraulic conductivity on the west and east sides of the site were estimated to be lower than in the central portion where RW-15 is located. The hydraulic conductivity at MP-2—the westernmost well screened within the alluvium that was tested—was estimated to be 0.3 feet/day, which was consistent with historically low yields from the colocated RW-3. On the eastern side of the canyon, MP-3 was estimated to have a hydraulic conductivity of 0.6 feet/day. Of the seven wells screened exclusively within the Starlight Formation, low hydraulic conductivity of 0.004 to 0.3 feet/day, with an average of 0.18 feet/day, was observed at all six locations.

During a site walk in 2020, CDM Smith observed that groundwater springs to the south, and at higher elevations, discharges along a line across the entire hillside. The line of springs corresponds to the contact between the Quaternary loess (Ql) and Starlight Formation (Tsuc) on the Inkom geologic map (Rodgers et al. 2006). These observations suggest that the up-canyon springs are discharging along an aquitard, which was also observed from 58.3 to 68 feet bgs at MW-123. It is reasonable to assume that a tuff unit might serve as an aquitard because in the borings completed in 2019 and 2020, the tuff units are weakly cemented and dry. Moreover, tuffs are laterally extensive because they form from volcanic ash falls that cover large areas.

To assess if the upper aquitard observed in the MW-123 boring corresponds to the line of springs, a plane was inserted into the Leapfrog Works 3D model, and the orientation was adjusted to intersect the aquitard observed from 58.3 to 68 feet bgs at MW-123 and the contact between the Quaternary loess and Starlight Formation up-canyon from MW-123. This plane strikes north 80 degrees east (N80E) and dips 7 degrees north. The orientation of the rhyolite air-fall tuff, Unit 3 (Tsur3) at three locations and the rhyolite air-fall tuff (Tsur) at one location, are reported on the Inkom geologic map (Rodgers et al. 2006). The strike of the rhyolite air-fall tuff, Unit 3 is about N30E with dips ranging from 21 to 31 degrees east-southeast. The strike of the rhyolite air-fall tuff at one location is about N30W with a dip of 29 degrees east-northeast. Strike and dip data for the tuff along Fort Hall Canyon Creek and closer to the monitoring well network is necessary to determine whether the plane inserted in the model coincides with a mapped tuff unit.

1.3.3.2 Water Balance

Inflows to the aquifer system underlying the FHML area include direct recharge from precipitation, seepage from Fort Hall Canyon Creek, and seepage through portions of Cell 1. Outflows from the aquifer system underlying the FHML area include evapotranspiration and extraction via the pumping wells.

Recent average precipitation recorded at the landfill weather stations were approximately 12 inches per year. Total precipitation recorded at the weather station located onsite and the National Oceanic and Atmospheric Administration station at the Pocatello Regional Airport (Station USW00024156) are shown in **Figure 1-5**.

Maxim (2000b) observed that nearly all the surface water flows within Fort Hall Canyon Creek seeped into the underlying aquifer upgradient of the mouth of the Fort Hall Canyon upgradient of the remedy wells and Cell 1 waste area. As noted, observation of surface water discharge via Fort Hall Canyon Creek downgradient of the remediation system is rare; however, this discharge occurred as recently as 2024. Seepage in the Cell 1 area is currently being investigated; results will be presented in a forthcoming report.

Welhan (1996) estimated that evapotranspiration loss from the system was approximately 80% of precipitation in nearby watersheds, with evapotranspiration loss assumed to be inversely proportional to altitude. If 80% of rainfall evapotranspires (Welhan 1996) and surface runoff downstream of the pumping and treat system is minimal or rare, approximately 3 inches of recharge would be estimated to have occurred annually in the area upgradient of the pump-and-treat system.

A portion of the recharge is concentrated along the creek bed where surface water seepage is known to occur. Data collection continues to better understand this relationship and will be described in an upcoming report.

1.3.4 Nature and Extent of Chemicals of Concern

As discussed in **Section 1.3.1.3**, the nature and extent of groundwater contamination are monitored via an extensive well network, which includes multiple well groups (shown in **Figures 1-3** and **1-4**). The primary COCs at the FHML and associated groundwater plume are VOCs, specifically PCE and TCE. The following sections briefly summarize the nature and extent of these COCs and select inorganic parameters in each well network. More detailed summaries and the extent of various contaminants, including metals, semivolatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), and dioxins/furans throughout FHML and the surrounding area can be found in recent CDM Smith monitoring reports (e.g., CDM Smith 2023b).

1.3.4.1 Cell 1 Source and Offsite Plume

PCE and TCE are frequently detected throughout the Cell 1 source area and offsite plume. Recent sampling results are summarized briefly below and are generally representative of site conditions over the past 5 years:

- In Cell 1 monitoring wells, PCE and TCE are detected at higher concentrations than elsewhere within or downgradient of FHML, with TCE commonly detected above 100 micrograms per liter (µg/L) in some wells. In sampling events over the last 5 years, TCE and PCE have been detected in all sampled Cell 1 Monitoring Wells except for MW-111S and FW-1. PCE and TCE have exceeded the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 5 µg/L in most monitoring wells (except for MW-1 [PCE], MW-102S [PCE/TCE], MW-110D [PCE], MW-111D [PCE], and MW-121[PCE/TCE]).

- In remediation system extraction wells, TCE and PCE have frequently exceeded the MCLs.
- In offsite monitoring wells, TCE frequently exceeds the MCL in MW-103S and MW-116S. PCE has exceeded the MCL in MW-103S and MW-116S.
- In domestic wells in the PVA, PCE and TCE are detected frequently and have exceeded the MCLs in the following wells: RW-2076F, RW-2140H, RW-2151H (TCE only), RW-2172H, RW-2203H, RW-2237H (TCE only), RW-7677P (TCE only), and RW-8030P (TCE only).
- In City municipal supply wells #14 and #33, PCE and TCE have been detected; however, there has been no MCL exceedance since May 2018 (TCE in municipal supply well #33).

Reductive daughter products of PCE and TCE, such as cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene, and vinyl chloride (VC), were also frequently detected, with some detections exceeding the MCLs for drinking water in the Cell 1 monitoring area.

Inorganic parameters are frequently detected throughout Cell 1 and the offsite plume when analyzed. Inorganic parameters are not analyzed in these wells for every sampling event. Recent results are as follows:

- Arsenic and barium have frequently exceeded MCLs, with the highest concentrations occurring in MW-111S/D.
- Mercury has exceeded the MCL in recent sampling (2018, 2019, and 2021). However, mercury has not been detected in Cell 1 monitoring wells since 2021. Cyanide and sulfide have been detected below the MCL in several wells.
- Elevated levels of major and trace elements (iron, manganese, barium, arsenic, chromium, cobalt, and/or nickel) have also been observed throughout the Cell 1 monitoring network.
- In offsite and domestic wells, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, lead, nickel, vanadium, and zinc have recently been detected, although no concentrations have exceeded the MCL.

1.3.4.2 Cell 2

From 2020 to spring 2024, PCE and TCE were detected at low concentrations in Cell 2 compliance monitoring well MW-13. Results were below 1 µg/L and J-flagged (estimated). Other VOCs have also been detected at low concentrations in this well, MW-9, and MW-12. MCL exceedances for metals are rare and have not occurred in recent sampling.

1.3.4.3 Cell 4

From 2020 to spring 2024, several VOCs were detected in Cell 4 compliance monitoring wells. TCE was detected at low concentrations in MW-3A and MW-4A in 2020 and 2021, respectively. Several other VOCs were also detected in MW-3A in 2021. In new compliance monitoring well MW-5AR, carbon disulfide was detected in 2021 and 2022 and toluene was detected in 2021. VOCs are regularly detected at low concentrations in MW-4, which is not a compliance well. No metals have recently exceeded MCLs in the current Cell 4 network.

1.3.5 Fate and Transport of Chlorinated Ethenes

Natural biodegradation of chlorinated ethenes such as PCE and TCE is well established in peer-reviewed literature and is shown to occur most efficiently under anaerobic (without oxygen) conditions. PCE is considered recalcitrant (i.e., it does not degrade biologically) under aerobic conditions, and TCE degradation is very slow. This is part of the reason these chemicals persist in aerobic aquifers and tend to form relatively large plumes in transmissive aquifers.

Under anaerobic conditions, however, PCE and TCE can undergo biotic transformation via anaerobic reductive dechlorination, where bacteria use them as alternate electron acceptors in the absence of oxygen. During anaerobic dechlorination, sequential transformation most commonly occurs from PCE to TCE to cis-1,2-DCE to VC to ethene (**Figure 1-6**). At each step in this process, the organic molecule loses a chloride anion. A less common pathway includes the generation of 1,1-DCE or 1,2-trans-DCE in addition to 1,2-cis-DCE. Ethene is commonly transformed to ethane after reductive dechlorination.

In addition to the anaerobic pathway, other degradation mechanisms for the lower chlorinated ethenes and ethanes, such as cis-1,2-DCE and VC, include anaerobic oxidation coupled with sulfate or iron reduction and aerobic oxidation (i.e., use as a food source for aerobic microorganisms), generating carbon dioxide and water. These alternate degradation mechanisms are important when there is significant sulfate or iron available anaerobically, in redox transition zones where anaerobic groundwater comes into contact with aerobic groundwater in the downgradient/distal plumes, or there is periodic infiltration of aerobic precipitation during rain events. Areas where these alternate degradation mechanisms occur can be either downgradient or cross-gradient from the anaerobic source zone or below the anaerobic source zone if there is a vertical gradient resulting in vertical mixing with aerobic groundwater.

In addition to the chlorinated ethenes, reductive daughter products ethene and ethane can be oxidized (i.e., used as food sources) by aerobic and/or anaerobic sulfate-reducing or iron-reducing microorganisms. Under conditions in which reductive daughter products are directly oxidized, a complete mass balance to cis-1,2-DCE, VC, ethene, and/or ethane is not observed.

1.3.6 Mobilization of Redox-Sensitive Metals

Redox processes (oxidation and reduction) control the chemical speciation and subsequent mobility of many major and trace elements, including arsenic, barium, chromium, copper, iron, manganese, mercury, molybdenum, selenium, sulfur, and vanadium. The mobility of other redox-sensitive elements (e.g., sulfate) can be indirectly affected by redox transformations of organic matter and minerals, particularly iron and manganese oxyhydroxides, clays, and sulfur minerals. The oxidized form of iron (Fe[III]) is insoluble in near-neutral pH environments, and trace elements strongly sorb to Fe(III) (i.e., ferrous iron) minerals. Under reducing conditions, Fe(III) can be reduced to Fe(II), thereby dissolving iron minerals and releasing trace elements. Barium, as the insoluble salt barium sulfate ($BaSO_4$), can be mobilized under reducing conditions as sulfate is reduced to sulfide. Furthermore, many redox-sensitive elements are more mobile in their reduced speciation state (e.g., arsenic As[III] is more mobile than As[V]).

In environments with sources of carbon (e.g., landfill leachate), redox conditions become reduced and anaerobic reductive dechlorination is observed, resulting in increased concentrations of redox-sensitive major and trace elements. Conversely, where redox conditions become more oxidized, the redox-sensitive major and trace element concentrations are reduced. For example, arsenic and ferrous iron are typically observed in anaerobic groundwater environments (e.g., anaerobic areas impacted by landfill leachate) and concentrations are quickly reduced once oxidized (i.e., aerobic) conditions are reestablished downgradient from the landfill leachate discharge area.

1.3.7 Geochemical Conditions in the Cell 1 Source Area and Offsite Plume

The following geochemical parameters have been collected from wells in the Cell 1 source area and offsite plume: dissolved gases (methane, ethane, ethene), sulfate, alkalinity, total organic carbon (TOC), field parameters (dissolved oxygen [DO], pH, and oxidation-reduction potential [ORP]), and ferrous iron. These geochemical parameters and the concentrations of chlorinated ethenes (PCE, TCE, cis-1,2-DCE, and VC) were used in a principal component analysis (PCA). PCA enables the reduction of large data sets by revealing patterns in the data through identifying the principal components of the data. Only wells that have results for each of these geochemical parameters can be used in the PCA; therefore, only a subset of onsite and offsite wells were used in the analysis.

The PCA revealed groundwater sampled from monitoring wells at the site grouped in four distinct geochemical conditions:

- Methanogenic conditions were identified in the Cell 1 source area on the west side of the remediation system (MW-111S/D, MW-113S/D, and MW-105S).
- Iron- and sulfate-reducing conditions were identified in the Cell 1 source area near the remediation system (MW-119S, MW-120S/D, MW-110S, MW-104S/D, MW-118D, RW-3, RW-4, RW-9R, RW-15, and RW-17).
- Aerobic conditions were identified on the east side of the remediation system (MW-101S, MW-112M/D, MW-109S/D, RW-10, MW-119D) and in the PVA (MW-103 and RW-8030P).
- Aerobic conditions and low concentrations of chlorinated ethenes were identified in the PVA (RW-2203H, PA-1, PA-3, MW-38, RW7677P, and RW-2140H) and upgradient of the treatment system (MW-110D and MW-7).

1.3.8 Remediation System

The purpose of the remediation system is to extract groundwater contaminated by chemicals leaching from the old, unlined landfill area (Cell 1), remove VOCs, and then reinject the treated groundwater into the aquifer. The CO requires that the system remain in operation until otherwise directed by IDEQ. The system includes the following major components:

- A network of groundwater remediation wells currently consists of six pumping wells (RW-4, RW-5, RW-9R [replaced RW-9], RW-10, RW-15, and RW-17) and four non-pumping wells (RW-1, RW-2, RW-3, and RW-16). Each operating well is equipped with a submersible pump and a pressure transducer set above the pump. The pressure transducer monitors the water level in the well and allows the pump controller to tell the pump to speed up or slow down to maintain a water level setpoint. Maxim installed the first seven wells with the intent of intercepting as much of the contaminated groundwater as possible before it flowed through the mouth of the Fort Hall Mine Canyon and into the PVA. RW-15 and RW-17 were installed in 2012 to improve system performance. In 2018, RW-1 was taken offline, and in 2020, RW-2 and RW-3 were taken offline. The pumps in these wells were also removed. RW-16 was never connected to the treatment system.

- The monitoring well network includes wells within the groundwater remediation area located both upgradient and downgradient to the area. The network allows for evaluation of the system performance.
- Individual conveyance piping from the remediation wells directs water back to the remediation shed.
- A climate-controlled remediation shed contains all the ex situ treatment equipment.
- The influent manifold with pressure gauges, flowmeters, and sample ports allows for collecting process data and water samples from each of the remediation wells.
- A shallow tray air stripper volatilizes dissolved VOCs and discharges them to the atmosphere.
- A metering pump pulls antiscalant from a drum and injects it into the water to reduce inorganic buildup in the air stripper and injection wells.
- The shed houses the system’s power distribution, control panels, variable frequency drives for each Remediation Well pump, and other associated equipment.
- Two injection wells and an overflow evaporation pond are downgradient of the remediation zone.

Periodic monitoring of the remediation wells and the air stripper influent is necessary to understand trends in VOC concentrations and the overall loading into the remediation system, respectively. Samples must be collected quarterly from the air stripper effluent to confirm that the air stripper is removing VOCs from the extracted groundwater prior to injection and that the effluent injection remains compliant with the injection permit.

The Injection Well Permit No. 29W-006-001 for INJ-1 and 29W-006-002 for INJ-1R, expiring March 15, 2025, specifies the following:

- Violating the water quality standards stated in Idaho Administrative Procedures Act (IDAPA) 37.03.03.070.05, degrading the quality of the groundwater, or impacting a beneficial use of the groundwater resource through the use of this injection well is prohibited and cause for cancellation of this permit.
- If the Idaho Department of Water Resources (IDWR) suspects existing or future points of diversion for beneficial use to be contaminated by injection activities at this well, IDWR will require injection activities at this well to cease immediately. The injection well owner is responsible for providing burden of proof that injection activities at this well are not contaminating existing or future points of diversion.

Currently, treated groundwater is only being injected via INJ-1R.

The IDAPA regulation specified in the permit, Class V Shallow Injection Well Requirements, includes the following general requirements:

- Compliance with all groundwater quality standards for injected water.
- No impact relative to the temperature, color, odor, turbidity, conductivity, pH, or other characteristics that may result in a reduction of suitability for beneficial uses of groundwater.
- Routine monitoring of the injection flow rate, volume, and injection pressure.

Given these general requirements, the air stripper effluent is sampled quarterly for site COCs and semiannually for other chemicals to compare against groundwater quality standards, as outlined in Worksheet #20 of the QAPP (CDM Smith 2021b).

Section 2

Field Activities

This section describes field activities that were completed at the site in spring 2024, including groundwater sampling and remediation system O&M. Spring groundwater sampling was performed in May. Twelve-month pilot study monitoring was also conducted in May 2024. Data and interpretation from these wells will be presented under a separate cover.

2.1 Groundwater Sampling

During the spring 2024 monitoring event, groundwater samples were collected from 51 locations from the Cell 1, Cell 2, Cell 4, and offsite monitoring well networks; the remediation extraction wells; and the air stripper effluent (INJ-1R). **Figure 2-1** presents the spring 2024 sample locations, and **Table 2-1** provides a summary of samples collected. **Table 2-2** presents a summary of well construction information. The spring 2024 sampling activities were consistent with the QAPP (CDM Smith 2021b) and sampling plan (**Appendix A**), except as described in **Section 2.1.6**.

Appendix B contains the field documentation for the spring 2024 groundwater monitoring events, including equipment calibration forms, groundwater purge forms, synoptic water level forms, and the field logbook. The following sections describe groundwater sampling in further detail.

2.1.1 Private Property Access

Consent to access and collect samples or water levels from groundwater wells on private property was obtained from property owners prior to the spring 2024 sampling event via signed consent forms or verbal agreement. Unrestricted access was granted previously to the following wells:

- MW-103S/D
- MW-106S/D
- MW-115S/D

Restricted access to MW-116S/D is granted by arranging an appointment with the property owner. During the spring 2024 event, CDM Smith was able to make an appointment to access and sample the wells.

2.1.2 Water Level Measurement

Synoptic water levels were collected following procedures outlined in Standard Operating Procedure (SOP) 1-6, “Groundwater Level Measurement” (CDM Smith 2021b). Manual water level measurements were recorded for the wells at the landmark indicated on the casing (or, in the absence of a mark, the northern edge) using electronic water level meters. Water levels from domestic wells are not collected because of well construction.

On April 30, 2024, water levels were measured while the treatment system was operational, as discussed in Section 3.2.

2.1.3 Groundwater Sampling Procedures

2.1.3.1 Monitoring Wells

All monitoring wells and offline remediation system wells RW-1, RW-2, and RW-3 were sampled according to the procedures outlined in SOP 1-12, "Low-Stress (Low-Flow) Groundwater Sampling" (CDM Smith 2021b) or according to the HydraSleeve passive sampling procedure (CDM Smith 2024a). For wells sampled via the low-flow sampling procedure, a pump was positioned within the screened interval and set to pump at flow rates of 50 to 500 milliliters per minute. Minimal drawdown and/or stabilized drawdown was used to ensure that the water to be sampled was representative of the formation surrounding the screened interval and not the stagnant water column. Purge volumes were calculated based on water column height, inner diameter of tubing and inner diameter of casing. Water quality parameters were monitored continuously using a water quality meter with a flow-through cell, and when stabilization was achieved, a groundwater sample was collected. Bladder pumps were used when numerous analyses were being performed and therefor a high (greater than 1 liter) volume of sample was needed.

The HydraSleeve passive sampling method was used at locations without a dedicated bladder pump and, when possible given sufficient water, at locations that had previously been bailed because of minimal water column. This method was first introduced in fall 2023, where 11 monitoring wells were sampled using both HydraSleeves and low-flow passive sampling in a comparability study (CDM Smith 2024a). It was determined that HydraSleeve passive sampling was an acceptable substitute for low-flow sampling via bladder pumps.

2.1.3.2 Remediation System Wells and Effluent

The online remediation system wells were sampled according to the procedures outlined in SOP 1-9, "Tap Water Sampling" (CDM Smith 2021b). Because extraction wells cycle on and off at varying intervals and the influent and effluent production are continuous, a set purge volume prior to sampling is not necessary. All remediation system well grab samples were collected from taps within the treatment building.

2.1.4 Sample Analysis

Samples were analyzed according to the sampling plan in **Appendix A**, except as noted in Section 2.1.6. As shown in the table, all wells are analyzed for VOCs, Cells 2 and 4 are sampled for RCRA Subtitle D parameters, and select Cell 1 monitoring wells were sampled for supplemental parameters for the pilot and tracer studies performance monitoring.

Water quality parameters were collected at each location prior to collecting groundwater samples using a YSI Pro Digital Sampling System (ProDDS) or YSI ProPlus multiparameter meter. Turbidity was measured using a stand-alone HACH turbidity meter. Water quality parameters included the following:

- DO

- ORP
- pH
- Turbidity
- Temperature
- Specific conductance

All groundwater analytical samples were submitted to Eurofins TestAmerica (Denver, Colorado) for analysis.

Field quality control (QC) samples, including trip blanks, rinsate blanks, field duplicates, and extra volume for matrix spike/matrix spike duplicate (MS/MSD) samples, were collected per the QAPP. QC sample results were evaluated as part of the data validation effort and are discussed in the data usability assessment in **Section 3.1**.

2.1.5 Decontamination and Investigation-Derived Waste

All nondedicated sampling equipment (e.g., bladder pump equipment, water level meters) were decontaminated following the procedure outlined in SOP 4-5, "Field Equipment Decontamination at Nonradioactive Sites" (CDM Smith 2021b). A triple-wash system was used, following decontamination procedures for groundwater sampling equipment. The first wash used potable water and laboratory-grade detergent, the second wash used potable water, and the third wash used distilled water for rinsing. Before use, reuse, and at the end of the sampling event, all bladder pump equipment was disassembled, scrubbed, and decontaminated using this triple-wash system. Decontamination water and purge water from monitoring well sampling were contained and disposed of onsite at the Cell 2 leachate pond. Disposable personal protective equipment was disposed of onsite at the landfill.

2.1.6 Deviations

Except where noted below, sampling did not deviate from the sampling plan (**Appendix A**). **Section 3.1** provides information on any analytical data quality deviations.

2.1.6.2 Cell 1 and Offsite Monitoring Wells

MW-111S and MW-117R were originally planned to be bailed if not dry; however, there was sufficient water above the screen (greater than 3 feet above the bottom of the screen) to deploy HydraSleeves for passive sampling instead. MW-122 was not sampled because the well had insufficient water level for sample collection.

2.2 Remediation System Maintenance Activities

Remediation system maintenance activities were conducted during and prior to the current reporting period to support O&M of the remediation system. The following sections describe these field activities.

2.2.1 Remediation Well Rehabilitation

No record exists of rehabilitation of the remediation system wells prior to 2020. Based on an evaluation of remediation well performance and potential for fouling, a rehabilitation program was implemented in 2020 to optimize the performance of the extraction wells (CDM Smith 2020 and 2021a). Remediation well performance continues to be monitored to evaluate future well rehabilitation needs. No rehabilitation was performed during this reporting period (December 7, 2023, through June 17, 2024).

2.2.2 Remediation System Operation and Maintenance

The following activities describe and list the frequency of system O&M activities.

2.2.2.1 Operations

Daily inspection of mechanical and electrical equipment at the remediation shed was generally conducted daily by Bannock County staff. The following items were verified during the inspections:

- Water pipes inside the building were not leaking.
- The metering system was operational.
- Recovery well pumps were cycling as expected.
- The air stripper blower was operating.

Inspection of mechanical and electrical equipment at the remediation shed was generally conducted weekly by Bannock County staff. The following items were verified or recorded during the inspections:

- Operating pressure of the air stripper.
- Flow totals from each of the individual flowmeters and the system totalizer.
- Adequate antiscalant in the metering pump drum.

2.2.2.2 Maintenance

Each recovery well-level transducer was checked for proper pumping operations monthly. Each level transducer self-adjusts for variations in atmospheric pressure through the desiccant tube. The desiccant protects the transducer's electrical elements from moisture and if nearly exhausted must be replaced. Failure to do so will degrade the quality of the level data provided by the transducer and reduce the functionality of the associated recovery well pump. When CDM Smith staff visited the site, they inspected the desiccant within the tubes (it changes color when exhausted).

2.2.2.3 System Upgrades and Repairs

During January 2024, RW-17 continually shut down because of sensor alarms and faults. When this happened, RW-17 was shut off until maintenance could be performed. Ultimately, the transducer was determined to need replacement, and RW-17 was shut off from January 26, 2024, through February 20, 2024, when a replacement could be made. In addition to the RW-17 transducer, the RW-4 transducer was also replaced on February 20, 2024.

On February 21, 2024, the ball valve on the RW-17 leg was cracked during system maintenance. The well was turned off until a fix could be made the following day.

On April 10, the software for the extraction well system was updated from Grundfos Remote Management to Grundfos Connect. Connection issues to the new system software were observed, but the system continued under normal operations.

The system was shut off from May 1, 2024, through May 2, 2024, to replace a CIM280 (an interface for data transmission to the cloud) interface. After the replacement, there was an unknown issue preventing the system from turning back on. Bear River Electric was able to inspect the system and turn it back on, citing an issue with the main breaker.

The RW-17 flowmeter stopped working and was replaced several times throughout the current reporting period. RW-17 was shut off while the flowmeter was being replaced.

Section 3

Groundwater Monitoring Results

This section presents the groundwater monitoring results from the February 2024 remediation system effluent and spring 2024 sampling events. **Figure 3-1** presents the updated potentiometric surface map, and **Table 3-1** presents the corresponding water level measurement data. **Figures 3-2** through **3-5** and **Tables 3-2** through **3-6** present groundwater sampling results and updated treatment system monitoring data. **Appendix C** contains all groundwater analytical results.

3.1 Groundwater Data Usability Assessment

Data validation was performed in accordance with the analytical methods, *National Functional Guidelines for Inorganic Superfund Methods Data Review* (EPA 2020a), *National Functional Guidelines for Organic Superfund Methods Data Review* (EPA 2020b), and *National Functional Guidelines for High-Resolution Superfund Methods Data Review* (EPA 2020c), as applicable.

The review included holding times, sample preparation blanks (method, equipment, source, trip), duplicates (field), surrogate compound recovery, MS/MSDs, laboratory control sample/ laboratory control sample duplicates (LCS/LCSDs), interferences, reporting limits (RLs), and compound identification and quantification. The review for the 2,3,7,8-tetrachloro-p-dibenzodioxin (2,3,7,8-TCDD) included initial calibration and continuing calibration data.

CDM Smith validated laboratory analytical data using the EQuIS Data Quality Module for VOCs, SVOCs, organochlorine pesticides, PCBs, organophosphorus compounds, chlorinated herbicides, dioxin/furans (2,3,7,8-TCDD), total metals, total cyanide, and total sulfide. **Appendix D** provides the validation narrative, and **Appendix E** includes the final laboratory data packages for each laboratory sample delivery group. All data were received from the laboratory in final form, and validation was performed on the final data.

For the February and May 2024 remediation system effluent well sampling events and the spring semiannual sampling event in May 2024, all data are suitable for their intended use with the following exceptions:

- Fifty-one VOC results for sample MW-111D-20240501 were rejected because of insufficient preservation and the analysis being run beyond the 7-day holding time.

Some of the usable results should be used with caution, as noted by the "J/J-/J+/UJ" qualifiers applied during the data validation process, as discussed in **Appendix D**.

3.1.1 Precision

Precision was assessed by comparing the relative percent differences (RPDs) or absolute differences for laboratory duplicate samples, field duplicate samples, MS/MSD analyses, and LCS/LCSD analyses. Laboratory in-house limits were used for laboratory duplicate samples, LCS/LCSD, and MS/MSD duplicate analyses. An RPD field duplicate criterion of 30% was used for field duplicates. For field duplicates in which results were greater than five times the level of quantification, the RPD was calculated and compared with the 30% precision criterion. Where results were less than five times the RL, the absolute difference was calculated and compared with a precision criterion of less than or equal to the RL. **Table D-4** (**Appendix D**) presents comparisons of results for primary samples and associated field duplicates. All duplicate RPDs and absolute differences met their respective control limits, as noted in **Appendix D**.

3.1.2 Accuracy

Accuracy was assessed with percent recoveries in MS/MSD, LCS/LCSD, surrogate recoveries, and calibration data (2,3,7,8-TCDD only). Laboratory in-house control limits and EPA Method 8290A were used for evaluation of these parameters. All percent recoveries in LCS/LCSDs met the control limit criteria, with the exceptions noted in **Appendix D**; exceptions that required qualification of data ("J," "J-," "J+," or "UJ") are noted in **Appendix D**. All percent recoveries in MS/MSDs and LCS/LCSDs met the control limit criteria, when applicable, with the exceptions noted in **Appendix D**; exceptions that required qualification of data ("J," "J-," "J+" or "UJ") are noted in **Appendix D**. All surrogate recoveries met the control limit criteria. All 2,3,7,8-TCDD calibration data met the control limit. Selected semivolatile compounds and metals data were qualified as not detected at the RL because of blank contamination, as noted in **Appendix D**.

3.1.3 Comparability

Comparability from one sampling event to another is achieved by structuring the field sampling program and protocol for sample collection and analyses. CDM Smith follows technical SOPs to ensure consistent sampling techniques. In addition, EPA-approved analytical methods and RLs are defined and used to ensure comparability of data.

All data included in this report have been validated and are considered acceptable for use, except for the rejected data previously discussed. **Appendix D** provides the full validation narrative and results.

3.1.4 Completeness

An analytical completeness goal of 90% for each analytical group was used to determine completeness. Analytical completeness was evaluated for each analytical group through a comparison of the number of nonrejected data to the number of requested analyses. For the spring 2024 sampling event, all analyses for field samples that were submitted to the laboratory were successfully analyzed, except for the rejected data previously discussed. Fifty-one VOC non-detections were rejected in sample. A total of 3,999 VOC results were generated. This yields a completeness value of 98.7%, which meets the QAPP criterion of 90%.

3.1.5 Sensitivity

The RLs achieved for all samples were adequate to meet the DQOs.

3.1.6 Deviations

Shipping Deviations

- For the May 2024 spring onsite sampling, the laboratory noted one of three vials for the VOC analyses for samples MW-101S-20240503, MW-110D-20240503, and MW-4A-20240502 were received frozen. Sufficient vials remained for these samples and the volatiles analyses were successfully conducted.

- All three VOC vials were frozen when received for the initial samplings of samples MP-3-20240503, MW-110S-20240503, and MW-112M-20240503. No volatile analyses were possible. These samples were re-collected and successfully analyzed.

Analysis Deviations

- Eurofins TestAmerica Denver no longer analyzes for p-phenylenediamine and a, a-dimethyl phenethylamine as target analytes in the semivolatiles analyses, which means these compounds are not included in the calibration or included in matrix and LCS spikes. They now analyze for them as targeted tentatively identified compounds. Because they have analyzed these two compounds previously, they have information regarding what their retention time would be in their semivolatiles analyses. As a targeted tentatively identified compound, they could then compare spectra for compounds that met the retention time criteria of these two compounds, if present, to determine if these compounds were detected. These two compounds were reported as not detected in all the samples analyzed for SVOCs.
- One sample exceeded the analysis hold time for VOCs.

Deviations will be addressed in planning for upcoming sampling events to reduce the likelihood of similar deviations in the future. For samples from wells, where the preservative for the VOC analyses do not always achieve a low enough pH, samples will be collected in unpreserved vials and the laboratory will analyze the samples within the 7-day holding time.

3.2 Groundwater Elevations

During the spring 2024 sampling event, synoptic water levels were collected from monitoring wells following procedures outlined in SOP 1-6, "Groundwater Level Measurement" (CDM Smith 2021b). **Table 3-1** presents the water levels. Using data collected on October 9, 2023, **Figure 3-1** shows the potentiometric surface map, representing water levels while the treatment system was in operation.

3.2.1 Horizontal Gradient Evaluation

Groundwater flows in a northeastern direction through the valley of Fort Hall Mine Canyon, with a horizontal gradient of approximately 0.14 foot per foot between MW-4A (the furthest upgradient well with data) and MW-102S (the furthest downgradient well with data within the Fort Hall Mine Canyon), based on April 30, 2024, water level elevation data.

3.2.2 Vertical Gradient Evaluation

The spring 2024 synoptic water level survey completed on April 30, 2024, included several sets of nested monitoring wells while the remediation system was operational. **Table 3-1** includes calculated vertical gradients for this data set. A review of these calculated values shows the following:

- Downward vertical gradients were observed at most well pairs, ranging from 0.07 to 0.40 feet/foot, with the strongest downward vertical gradient observed at MW-109S/D. In each of these instances, the shallower well is screened exclusively within the alluvium and the deeper well is screened within the top of the Starlight Formation.

- Negligible upward vertical gradients were observed for MW-103S/D, MW-112M/D, and MW-113S/D at 0.02 feet/foot for all.

3.3 Cell 1 and Offsite Sampling Results

This section summarizes Cell 1 monitoring well sampling results from the spring 2024 groundwater monitoring event. Cell 1 is currently in corrective action monitoring (**Section 4.2**). **Appendix C** contains all groundwater analytical results. **Appendix F** presents time series plots for all chlorinated ethenes and corresponding field and redox parameter results for each well.

3.3.1 VOCs

Table 3-2 presents detections of VOCs screened against the EPA MCLs and Idaho Groundwater Rule (IDGW) primary and secondary standards for drinking water for wells in Cell 1, offsite monitoring wells, and remediation system extraction wells. **Figures 3-2** and **3-3** present results for PCE, TCE, cis-1,2-DCE, and VC.

3.3.1.1 Cell 1 Source and Dissolved Phase Plume

In the Cell 1 monitoring wells, the following chemicals exceeded their promulgated standard:

- PCE exceeds the MCL standard in most Cell 1 monitoring wells (detections ranging 0.69 J to 43 µg/L).

- TCE exceeds the MCL standard in most Cell 1 monitoring wells (detections ranging 2.1 J to 200 µg/L).

- VC, a product of reductive dechlorination, exceeds the MCL in eight wells (detections ranged from 0.31 J to 64 µg/L).

- Benzene exceeds the MCL standard in MW-111D (12 J µg/L), MW-111S (17 µg/L), and MW-113S (6.2 µg/L).

Additional reductive daughter products that were detected are shown in **Table 3-2**.

3.3.1.2 Remediation System Extraction Wells

In the remediation system extraction wells, the following exceedances were observed:

- PCE exceeds the MCL and IDGW standard in all remediation system extraction wells (detections ranging from 9.3 to 21 µg/L).

- TCE exceeds the MCL and IDGW standard in all remediation system extraction wells (detections ranging from 51 to 140 µg/L).

- VC exceeds the MCL in two wells (detections ranged from 0.36 J to 5.4 µg/L).

Additional reductive daughter products that were detected are shown in **Table 3-2**.

3.3.1.3 Offsite Monitoring Wells

MW-103D, MW-103S, MW-115S, and MW-116S were the only offsite monitoring wells sampled in spring 2024. The only VOC detections were the following:

- PCE was detected at MW-116S (1.4 µg/L).
- TCE exceeds the MCL standard at MW-116S (7.3 µg/L) and was detected in MW-103S (0.43 J µg/L) and MW-115S (0.79 J µg/L).
- cis-1,2-DCE, a reductive daughter product, was detected in MW-115S (0.42 J µg/L).

3.3.2 Field Purge Parameters

Table 3-2 presents field parameters (conductivity, pH, temperature, turbidity, DO, and ORP). As discussed in **Section 1.3.7**, these results are used to assess conditions in groundwater affected by the landfill leachate/waste and to evaluate conditions that facilitate COC degradation. This section provides an abbreviated summary of the spring 2024 geochemistry based on field purge parameter results. A comprehensive assessment of all geochemical results from spring 2024 sampling will be included in the forthcoming pilot study evaluation report.

Specific conductance was measured at all monitoring wells in Cell 1, offsite monitoring wells, and remediation system extraction wells (**Table 3-2**). Low specific conductance in Cell 1 wells ranged from 280 to 976 microSiemens per centimeter (µS/cm). Higher specific conductance ranged from 1,019 to 8,420 µS/cm in the Cell 1 wells.

MW-111D/S were the only wells where anaerobic conditions were observed with low DO (less than 1.5 milligrams per liter [mg/L]) and low or negative ORP. Ten wells exhibited a low DO (less than 1.5 mg/L) but had a positive ORP. Five wells exhibited a negative ORP but had a DO concentration above 1.5 mg/L. All other well locations in Cell 1 were aerobic, as indicated by DO greater than 1 mg/L and positive ORP (**Table 3-2**).

pH values ranged from 6.34 to 8.45 in wells in Cell 1, offsite monitoring wells, and remediation system extraction wells, as presented in **Table 3-2**.

3.4 Performance of the Remediation System

This section describes the performance of the remediation system as it relates to both main performance objectives of the system (Maxim 2001):

- Prevent further downgradient migration of contaminated groundwater through hydraulic containment and extraction of impacted groundwater.
- Treat extracted groundwater prior to reinjection in accordance with the injection permit (IDWR 2023).

The following sections provide additional information regarding the overall operation and functionality of the treatment system as it relates to these performance objectives.

3.4.1 Extraction Well Operations

The current reporting period for remediation system operation is December 7, 2023, through June 17, 2024. All permit compliance items summarized in **Section 1.3.8** were met for this reporting period.

The remediation well system and air stripper are inspected daily when operational and when Bannock County staff are onsite. Observations from daily inspections and weekly flowmeter readings are recorded on weekly operation and maintenance field forms. Flow data from these field forms are then entered into an online database to assess trends, identify abnormal data, and calculate overall groundwater extraction flow rates.

For the duration of the current reporting period, December 7, 2023, through June 17, 2024, the system was not shut down, except for routine maintenance and the activities listed in **Section 2.2.2.**

Table 3-4 presents well status and groundwater flow data.

Figure 3-4 shows injection, extraction, offline (not in use), and other monitoring wells near the remediation system. **Figure 3-5** shows calculated average extraction flow rates (Panel A), cumulative groundwater extraction volumes (Panel B), and cumulative TCE mass extracted (Panel C) for all wells and for the overall system influent.

The average of the weekly flow rates from December 7, 2023, through June 17, 2024, produced the following approximate data (Panel A):

- RW-4 – 1.0 gallons per minute (gpm)
- RW-5 – 5.5 gpm
- RW-9R – 1.7 gpm
- RW-10 – 9.4 gpm
- RW-15 – 11.7 gpm
- RW-17 – 6.7 gpm
- The average of the weekly combined air stripper influent flow rates from December 7, 2023, through June 17, 2024, was approximately 36.5 gpm.

Higher than average groundwater extraction flow rates for this period were due to the high precipitation (**Figure 1-5**) combined with system optimization and increased uptime. These increased flow rates resulted in temporary overflow of the injection well into the overflow pond.

Figure 3-5, Panel B shows the cumulative volume of groundwater extracted from each of the remediation wells and the system overall since September 26, 2018. Flowmeter data from prior to the replacement on April 2, 2019, are inaccurate and underrepresent the actual volume of water removed because of mechanical failure and fouling; therefore, the cumulative totals presented in this graph are low. Based on readings collected from December 7, 2023, through

June 17, 2024, the system treated approximately 10.2 million gallons. **Table 3-4** presents estimates of average flow rates and cumulative volumes of groundwater removed.

3.4.2 Mass Removal

Remediation well groundwater extraction rates, volumes, and COC concentrations were evaluated to understand the relationship between groundwater and COC mass discharge from the subsurface. Following each weekly inspection, the amount of water estimated to have been removed by each remediation well was multiplied by the closest TCE concentration data point, whether it was before or after that specific week's flow total. The resulting weekly mass totals for each remediation well were then summed to estimate the mass removal from the wells and the total mass removal for the remediation system (**Figure 3-5**, Panel C). Mass removal prior to September 2018 was estimated by multiplying totalizer readings collected in September 2018 by concentrations measured in remediation well samples collected in October 2018.

Issues with inaccurate flow measurements caused the total mass removal estimates to underestimate similarly the amount of mass removed from the remediation wells prior to the April 2, 2019, flowmeter replacement. **Figure 3-5** (Panel C) shows the recent mass removal extraction rates. As shown in the figure, from December 7, 2023, through June 17, 2024, mass removal rates range in TCE removal from 0.26 to 2.63 pounds. RW-15 extracts the most mass. The estimated TCE mass removed from December 7, 2023, through June 17, 2024, was approximately 6.33 pounds.

3.4.3 Performance of Remediation System

As noted in **Section 1.3.8**, the main purpose of the remediation system is to remove VOCs in extracted groundwater prior to injection. According to the permits, it is necessary to confirm that injected water remains compliant with groundwater standards, and to monitor flow rate, volume, and injection pressure.

Table 3-5 presents analytical results for the system effluent compared against the EPA MCLs and IDGW primary and secondary standards for drinking water. There was a detection of TCE in the May 5, 2024, result for INJ-1R at 0.35 J µg/L. The detection is below the MCL of 5 µg/L.

Measurement of the injection flow rate and cumulative volume is tracked using the system influent flowmeter and the individual remediation well flowmeters. **Section 3.4.1** presents these data.

The system does not include an injection pressure gauge, because the discharge of the air stripper is by gravity and flows down the hill toward the injection wells (INJ-1 and INJ-1R). However, the piping to the injection wells prevents the wells from being pressurized, because any water that is not able to infiltrate via the well overflows to Bannock County's stormwater retention ponds south of the wells.

3.5 Cell 2 and 4 Sampling Results

This section summarizes Cell 2 and 4 monitoring wells sampling results from the spring 2024 groundwater monitoring event. **Appendix C** presents all groundwater analytical results, and

Appendix F presents time series plots for all chlorinated ethenes and corresponding field and redox parameter results for each well.

3.5.1 Cell 2 Monitoring Wells

Cell 2 is in assessment monitoring (**Section 4.2**). Cell 2 monitoring wells include MW-8, MW-9, and MW-13, and background well MW-12. Cell 2 results are presented in **Table 3-6**.

3.5.1.1 VOCs

No detections of VOCs exceeded the EPA MCLs and IDGW standards in Cell 2. Detections included the following:

- TCE at MW-8 and MW-13 (0.3 J and 0.51 J µg/L, respectively)
- cis-1,2-DCE at MW-13 (1.3 µg/L)
- VC at MW-9 (0.68 J µg/L)
- Dichlorodifluoromethane at MW-9 and MW-13 (0.34 J and 1.3 J µg/L, respectively)
- Benzene at MW-9 (0.59 J µg/L)

3.5.1.2 Inorganics

There were no detections that exceeded MCLs or primary IDGW standards. Iron and manganese exceeded the IDGW secondary standard in MW-9. **Section 4** includes an analysis of background levels for inorganic chemicals.

3.5.1.3 Non-VOC Organics

No non-VOC organics were detected in Cell 2 wells.

3.5.1.4 Field Purge Parameters

Table 3-6 presents field parameters (conductivity, pH, temperature, turbidity, DO, and ORP). As discussed in **Section 1.3.7**, these results are used to assess conditions in groundwater affected by the landfill leachate/waste. This section provides an abbreviated summary of the spring 2024 geochemistry based on field purge parameter results.

Specific conductance was measured at all monitoring wells in Cells 2 (**Table 3-6**). Low specific conductance in Cell 2 wells ranged from 565 to 681 µS/cm. Higher specific conductance (5,510 µS/cm) was observed at MW-9.

MW-9 was the only well where anaerobic conditions were observed with low DO (less than 1.5 mg/L) and low or negative ORP. All other well locations in Cell 2 were aerobic, as indicated by DO greater than 1 mg/L and positive ORP (**Table 3-6**).

pH values ranged from 6.7 to 7.61 in Cell 2 monitoring wells, as presented in **Table 3-6**.

3.5.2 Cell 4 Monitoring Wells

Cell 4 is in detection monitoring (**Section 4.2**); Cell 4 monitoring wells include MW-3A, MW-5AR, and MW-6A, and background well MW-4A. MW-4 is monitored as a Cell 4 monitoring well but not as an RCRA compliance well because this well is impacted by waste originating from Cell 1.

3.5.2.1 VOCs

VC exceeded the EPA MCL and IDGW standard in MW-4, which is not a compliance well. Other VOCs were detected in this well. No VOCs were detected in Cell 4 compliance monitoring wells.

3.5.2.2 Inorganics

There were no detections that exceeded MCLs or primary IDGW standards. Manganese exceeded the IDGW secondary standards in MW-4, which is not an RCRA compliance well. **Section 4** includes an analysis of background levels for inorganic chemicals.

3.5.2.3 Field Purge Parameters

Tables 3-6 present field parameters (conductivity, pH, temperature, turbidity, DO, and ORP). Consistent with the sampling plan (**Appendix A**), TOC, anions, alkalinity, ferrous iron, and dissolved gases were not collected in Cell 4 monitoring wells.

Specific conductance was measured at all monitoring wells in Cell 4 (**Table 3-6**). Low specific conductance (668 to 895 µS/cm) was observed in Cell 4 wells MW-3A, MW-4A, and MW-6A. Higher specific conductance (1,353 to 1,731 µS/cm) was observed at the remaining Cell 4 wells.

All Cell 4 wells were aerobic, as indicated by DO greater than 1 mg/L and positive ORP (**Table 3-6**)

pH values ranged from 6.51 to 7.55 in Cell 4 monitoring wells, as presented in **Table 3-6**.

Section 4

Groundwater Data Analysis

Spring 2024 data were used to update the groundwater PCE and TCE plume extents (Section 4.1) and the statistical analysis of parameters analyzed at the site (Sections 4.3 through 4.5) according to specific monitoring requirements for each area (Section 4.2). **Appendix F** presents time series data plots for chlorinated ethenes, geochemical parameters, and inorganic parameters for wells sampled in spring 2024. **Appendix G** presents the statistical methods and comprehensive statistical results for wells sampled in spring 2024.

4.1 Updated Plume Extent

Groundwater sampling results from the spring 2024 semiannual monitoring event were used to update the lateral extents of PCE and TCE groundwater plumes via data interpolation with the modeling software Leapfrog Works, v.2021.2. The data used for isoconcentration interpolation include annual 2024 sampling results from domestic wells and municipal supply wells (#14 and #33) (to be presented under a separate cover), and spring 2024 sampling results from Cells 1, 2, and 4 (presented herein). Approximately 100 locations onsite and offsite contribute to the contouring. Data from wells not sampled during the spring 2024 event are presented in previous CDM Smith monitoring reports. Results for offsite domestic wells included in the contouring were reported under a separate cover (CDM Smith 2024b).

Figures 4-1 and **4-2** present the updated PCE and TCE plume extents, respectively, and show the spring 2024 analytical and statistical trends results for wells, where evaluated. Plume extents are presented as isoconcentration contours for 5 µg/L (both PCE and TCE) and 100 µg/L (TCE only).

As shown in **Figure 4-1**, PCE above 5 µg/L is present predominantly in the groundwater along the eastern boundary of Cell 1, throughout the remediation system area, and along the Fort Hall Mine Canyon into the PVA, extending north-northwest from the base of the landfill to MW-118D and eventually to MW-117R. The highest PCE concentration observed and used in the contouring through spring 2024 was 43 µg/L at MW-105D, upgradient of treatment system pumping wells.

As shown in **Figure 4-2,** the TCE plume greater than 5 µg/L has a similar footprint to PCE within the landfill boundary, but the isoconcentration contour is wider in the mouth of the canyon near the remediation system, and it extends farther to the northwest, offsite and along the PVA northwest toward the City of Pocatello. The highest TCE concentration observed and used in the contouring through spring 2024 was 200 µg/L in MW-105D, upgradient of the treatment system pumping wells. The 100 µg/L TCE plume extent is generally positioned in the vicinity of the treatment system at the throat of the canyon.

For both PCE and TCE plume extents, relatively higher concentrations are found at the base of Cell 1 near the remediation system. There are poor bounding data available west of the remediation system in the offsite area between the FHML property boundary and MW-116S because of (1) no access to the private properties located there, and (2) a steep slope on the northern boundary of Cell 1 with no monitoring or domestic wells.

A description of the model development is provided in the Final QAPP (CDM Smith 2021b). The PCE and TCE plume contours were estimated with a kriging algorithm to create a contour map of the most recent PCE and TCE plumes available through 2024. A three-dimensional representation of TCE concentrations in groundwater is shown at the 5 and 100 μg/L isoconcentration levels. Nondetect results are entered as one-tenth of the reporting detection limit, with some nondetect results omitted because of high RLs. Analytical data were log transformed as part of the interpolation process. The interpolations are accurate at each data point but are estimated between data points. Groundwater interpolations have a dynamic surface resolution of 50 feet, and horizontal-to-vertical anisotropy is 10:1. Model settings were revised according to site conditions, and contours were further revised manually in reported data figures. For instance, there are limited bounding data in the distal portions of the plume, on the western side of the plume as mentioned above, and to the east of the remediation system; therefore, the original interpolations were revised to adjust for this.

4.2 Landfill Monitoring Requirements

Monitoring requirements for landfills, including FHML Cell 2 and 4, are set forth by the *Criteria for Municipal Solid Waste Landfills* (40 CFR §258, Subpart E). Appendix I and Appendix II parameters mentioned herein correspond to the parameter lists provided in Appendices I and II of 40 CFR §258, Subpart E. There are three tiers of monitoring for RCRA compliance, briefly described in the following sections.

4.2.1 Detection Monitoring

Cell 4 is currently managed under detection monitoring requirements. Under detection monitoring, semiannual monitoring of Appendix I parameters is conducted. Appendix I parameters include VOCs and metals.

Background threshold values are developed for the parameters and periodically updated with ongoing data collection as appropriate. Detectable background concentrations of metals are expected, whereas background concentrations of anthropogenic organic compounds are typically considered to be the method detection limit (MDL).

If a statistically significant increase over background for an inorganic chemical or a statistically significant detection of an organic chemical is observed that cannot be attributed to sampling or analytical error, natural variation, or a source outside of the landfill cell, then assessment monitoring is initiated within 90 days.

4.2.2 Assessment Monitoring

Cell 2 is currently managed under assessment monitoring requirements. Under assessment monitoring, the analytical list is expanded to include the Appendix II parameters, which include SVOCs, mercury, tin, cyanide, sulfide, pesticides, herbicides, PCBs, and 2,3,7,8-TCDD, in addition to all Appendix I parameters required by detection monitoring. The monitoring is conducted semiannually; during one event (i.e., fall), all Appendix II parameters are analyzed, and during the other event (i.e., spring), all Appendix I parameters are analyzed, along with any additional Appendix II parameters detected during the prior event.

Background threshold values are developed for any detected Appendix II parameter. Detectable background concentrations of metals are expected, whereas background concentrations of anthropogenic organic compounds are typically considered to be the MDL. Groundwater protection standards are also established for any detected parameters; these are typically federal MCLs or state-specific standards.

If concentrations of all Appendix II parameters are at or below background for two consecutive sampling events, then the groundwater monitoring program for the area can revert back to semiannual detection monitoring. However, if concentrations of any of the Appendix II parameters are significantly greater than background but less than the groundwater protection standard, then assessment monitoring continues. If any parameter exceeds a groundwater protection standard and the exceedance cannot be explained as a statistical anomaly, alternate sources, or natural background, corrective measures must be initiated.

4.2.3 Corrective Action

Cleanup measures must be undertaken at that site. Rather than creating a rigid regulatory framework, the RCRA corrective action cleanup process focuses on results instead of specific steps and is flexible, depending on site-specific conditions. A typical cleanup may include steps such as initial site assessment, site characterization, interim actions, evaluation of remedial alternatives, and implementation of the selected remedy. Cell 1 is currently managed under corrective action requirements but is not regulated under RCRA.

4.3 Cell 1 Source Area

Cell 1 is currently in corrective action monitoring, which includes semiannual sampling of VOCs, metals, geochemical parameters, and other parameters sampled to support evaluation of the ongoing injection pilot study, which was conducted in April 2023 in accordance with the *Pilot Study Work Plan* (CDM Smith 2023c) to evaluate potential technologies for remedy optimization. Performance monitoring and data analysis are ongoing, and the preliminary outcomes of the pilot study will be presented under a separate cover. A pump-and-treat groundwater extraction system has been in operation since 2002.

This section presents the statistical analysis of VOCs and inorganics in wells sampled in spring 2024 that are located in and downgradient of the Cell 1 source area, which includes original Cell 1 monitoring wells, remediation system extraction wells (currently online or offline and repurposed as monitoring wells) and select offsite Bannock County monitoring wells. In online extraction wells, only PCE and TCE trends are statistically analyzed. Data sets for monitoring wells not sampled in spring 2024 have been previously analyzed and presented in respective groundwater monitoring reports and are not discussed herein.

Appendix F provides comprehensive time series plots for chlorinated ethenes, daughter products, geochemical parameters, and inorganics data collected in monitoring wells since 2002.

4.3.1 Statistical Approach

Appendix G presents the complete statistical approach (**Section G.2.1**) and analysis, which is summarized below.

- ***Cell 1 Statistical Tests***
  - Comparison of upper confidence limit (UCL) of the mean to standard if the standard is available.
  - Mann–Kendall trend analysis and Theil–Sen regression.
  - Parameters with data sets consisting entirely of MDL values were not analyzed and are not shown.
- ***Analyzed Data Range***: August 2017 through May 2024. At present, performance monitoring wells for the April 2023 injection pilot study are still statistically analyzed starting in August 2017 because there is not enough data since April 2023 to conduct meaningful statistics.
- ***Exceedance Criteria***: UCL of the mean of a COC exceeds the standard in Cell 1 or offsite monitoring well (does not apply to remediation system wells). Cell 1 is not regulated under RCRA; however, the organic and inorganic parameter lists match the RCRA Appendix I list.
- ***Source Background Data***: Not applicable to Cell 1 or offsite wells.
- ***Confidence Limits Criteria***: UCL of the mean is calculated with a 95% confidence interval for data sets at least two distinct detected results.
- ***Trend Analysis Criteria***:
  - Trends are only calculated for data sets with at least 50% detected results and at least six data points.
  - Trends are only calculated for data sets where the UCL of the mean exceeds the standard.
  - A statistically significant trend is present if the confidence level is greater than 95% for increasing and decreasing results, with a direction corresponding to the sign of the Mann-Kendall S statistic (S). As described in **Appendix G**, Mann–Kendall test results for Cell 1 wells use a range for alpha to define probably significant trends where the confidence level is between 90% and 95%. Additionally, the coefficient of variation is used to distinguish between no trend and no trend with stable concentrations (i.e., low variability) for data sets with confidence levels below 90% and for which no statistically significant trend has been identified (Connor et al. 2012).

The following sections provide a results summary for the statistical analysis of Cell 1, organized by parameter group.

4.3.2 VOCs

Tables G-1 through **G-3** present the complete statistical analysis for VOCs in Cell 1, offsite, and remediation system extraction wells. **Tables 4-1** through **4-3** summarize key statistical results.

4.3.2.1 Comparison Latest Value to Standard

Consistent with past results, benzene, PCE, TCE, and VC exceeded MCLs in one or more Cell 1 monitoring wells in spring 2024 (**Table 3-2**). The maximum concentrations were detected in the following wells:

- Benzene: MW-111S (17 µg/L)
- PCE: MW-105D (43 µg/L)
- TCE: MW-105D (200 µg/L)
- VC: MW-113S (64 µg/L)

4.3.2.2 Comparison of UCL to Standard

UCLs of the mean for PCE or TCE exceeded the standard in all Cell 1 monitoring wells currently sampled semiannually, except for MW-111S (**Table 4-1**).

Other parameters analyzed in spring 2024 with a UCL exceeding the standard were as follows:

- Benzene in MW-111S/D and MW-113S
- Chloroform in MW-105D and MW-113S
- VC in MP-1, MP-2, MW-105S, MW-110S, MW-113S/D, MW-124, MW-125, RW-1, and RW-2

Additionally, the UCL of the mean exceeded the standard for TCE in offsite wells MW-103S and MW-116S (**Table 4-2**).

These results are generally consistent with previous results presented in recent CDM Smith monitoring reports (e.g., CDM Smith 2023b).

4.3.2.3 Trend Analysis

The following VOC trends were evaluated in Cell 1 monitoring wells (**Table 4-1**):

- PCE exhibited increasing trends in MW-101S, MW-105D, and MW-119S/D and a probably increasing trend in MW-109D and MW-123. PCE exhibited decreasing trends in MP-2, MW-113S/D, MW-118D, MW-120S/D, and RW-2 and a probably decreasing trend in RW-3. PCE exhibited stable trends in MW-105S, MW-112D, and RW-1. The remainder of the evaluated data sets yielded no significant trends.

- TCE exhibited increasing trends in MW-101S and MW-119S and a probably increasing trend in MW-102S. TCE exhibited decreasing trends in MP-2, MW-105S, MW-113S/D, MW-118D, and MW-120S and probably decreasing trends in MW-117R, RW-2, and RW-3. TCE exhibited stable trends in MP-3, MW-109S, MW-112D/M, MW-123, and RW-1. The remainder of the evaluated data sets yielded no significant trends. In MW-109S, TCE concentrations have fluctuated over the last few years, where concentrations are lower in the spring than in the fall; however, supplemental statistical test called the Seasonal Kendall was applied to these data sets and found no significant trend (**Appendix G**).

- VC exhibited an increasing trend in RW-2; stable trends in MP-1 and MW-110S; and decreasing or probably decreasing trends in MP-2, MW-105S, and MW-113S/D. The remainder of the evaluated data sets yielded no significant trends.
- Benzene exhibited decreasing and probably decreasing trends in MW-111S/D and MW-113S.
- Chloroform exhibited a probably increasing trend in MW-105D and a decreasing trend in MW-113S.

The following trends were evaluated in offsite monitoring wells (**Table 4-2**):

- TCE exhibited no trend in MW-103S and a decreasing trend in MW-116S.

The following trends were evaluated in online remediation system extraction wells (**Table 4-3**):

- PCE exhibited probably increasing trends in RW-10 and RW-17. TCE exhibited probably increasing trends in RW-17.
- PCE and TCE exhibited no significant or stable trends in all other wells sampled.

In addition to the statistical results tables, **Figures 4-1** and **4-2** present a visual trend analysis summary for PCE and TCE in the Cell 1 source area wells.

Table 4-4 presents a comparison of Mann–Kendall trends results for PCE and TCE reported for the last three sampling events. About one-third of the data sets exhibiting increasing or probably increasing trends as of spring 2023 are no longer exhibiting statistically significant trends after spring 2024 sampling. Correspondingly, the number of decreasing or probably decreasing data sets for the same wells between spring 2023 and spring 2024 has nearly doubled. Additionally, nearly half of the data sets have different trend results in spring 2024 than in fall 2023.

There are several possible explanations for this shift in contaminant trends. First, the 2023 pilot study may be impacting concentrations such that overall data set trends are beginning to shift. The performance of the pilot study, and these shifts in concentrations and trends over time, will be evaluated in more detail in a forthcoming pilot study report. Second, as discussed in the spring 2023 report, the trendlines for many of these data sets are relatively shallow, as indicated by the Theil–Sen slope shown in **Appendix G** tables. Additionally, many of the p-values for Mann–Kendall trends are close to the significance level range (alpha between 0.1 and 0.05, corresponding to confidence levels of 90% and 95%, respectively). Finally, the evaluated time frame has lengthened over the last few reporting events. In Cell 1 monitoring wells, most data sets have higher concentrations prior to 2018, followed by lower concentrations around 2018, which have been slowly increasing in concentration in some wells. The statistical evaluation time frame starts mid-2017 or 2018, depending on available data for the well, and by now, the statistical confidence level for the Mann–Kendall trend analysis for some data sets has reached the level where a trend is considered statistically relevant for the evaluated time frame. Therefore, it is not unexpected that small shifts in concentrations from event to event influence the statistical confidence just above or below the threshold at which a trend is considered statistically significant. **Appendix F** includes all COC time series plots for visual context of concentration changes over time, and **Appendix G** provides more information about the statistical approach.

4.3.3 Inorganics

Comprehensive metals analysis has not been conducted since 2021. Select wells have been sampled of total and/or dissolved metals under pilot study performance monitoring. Consistent with prior statistical evaluations, this section focuses on total fraction metals analyzed from the current sampling event for spring 2024. **Table G-4** presents the complete statistical analysis for inorganics in Cell 1. **Table 4-5** summarizes key statistical results.

4.3.3.1 Comparison Latest Value to Standard

Arsenic exceeded the EPA MCL of 10 µg/L in MW-121 (120 µg/L). This is the relatively high result for most Cell 1 monitoring wells, except for MW-111S/D. A graph showing arsenic concentrations in MW-121, MW-111S/D, and other nearby wells is included in **Appendix G**.

In all five Cell 1 monitoring wells sampled for inorganics in spring 2024, both iron and manganese exceeded IDGW secondary standards.

4.3.3.2 Comparison of UCL to Standard

In MW-121, arsenic's UCL of the mean exceeded the EPA MCL. In all five Cell 1 monitoring wells sampled for inorganics in spring 2024, both iron and manganese UCLs of the mean exceeded IDGW secondary standards.

These wells (MP-2, RW-2, MW-121, MW-124, and MW-125) are near the April 2023 pilot study treatment area, which will be reported under a separate cover. The pilot study involved the injection of fermentable carbon and zero-valent iron amendments into the subsurface to enhance reducing conditions that facilitate degradation of COCs. Elevated iron concentrations are likely directly related to iron delivered to the aquifer, and elevated manganese concentrations are likely indirectly related to the more reducing conditions enhanced by the amendment. **Appendix F** includes inorganics time series plots of these metals.

4.3.3.3 Trend Analysis

Trend analysis was not performed for wells sampled in spring 2024 because there were not enough data points in each data set (i.e., fewer than six).

4.3.4 Cell 1 Statistical Summary

Cell 1 is currently managed under corrective action requirements. Cell 1 monitoring wells are located throughout the FHML site—upgradient, cross-gradient, and downgradient of the remediation system. If the remediation system effectively captured COC mass from Cell 1, downgradient Cell 1 monitoring wells would be expected to have lower concentrations of COCs than upgradient and cross-gradient wells. Furthermore, downgradient wells would be expected to have decreasing trends along the time period of effective remediation system operation.

However, although there are fewer increasing COC trends exhibited now than recently reported (CDM Smith 2024a, c), PCE and TCE exceedances above the MCL persist in Cell 1 monitoring wells to the west, east, and downgradient of the remediation system, and PCE and TCE exhibit statistically increasing trends in some Cell 1 monitoring wells, which indicates a continuing source of contamination and incomplete capture of the remediation system, consistent with previous interpretations (CDM Smith 2023a). As shown in **Figures 4-1** and **4-2**, decreasing trends are typically observed in wells on the west side of the canyon, and increasing trends are typically observed in wells on the east side of the canyon, with many stable or insignificant trends observed in wells throughout and in the middle of the canyon.

Because multiple COCs and arsenic continue to exceed standards and exhibit increasing trends, corrective action management continues to be appropriate for Cell 1. Data collected from sampling events will be used to evaluate the performance of the April 2023 pilot study and will be presented in a forthcoming pilot study report now that the 1-year performance monitoring period (May 2023 through May 2024) is complete.

4.4 Cell 2

Cell 2 is currently in assessment monitoring. MW-12 is the background well, and MW-8, MW-9, and MW-13 are downgradient compliance wells. MW-7 is not a compliance well and has been impacted by waste in the Cell 1 area; therefore, it was not sampled or evaluated herein. Samples collected from Cell 2 monitoring wells during the spring 2024 monitoring event were analyzed for all Appendix II parameters, according to assessment monitoring requirements (Section 4.2.2).

This section presents the statistical analysis of Appendix II organic and inorganic parameters in Cell 2 monitoring wells sampled in spring 2024. **Appendix F** provides comprehensive time series plots for chlorinated ethenes, daughter products, geochemical parameters, and inorganics.

4.4.1 Statistical Approach

Appendix G presents the complete statistical approach and analysis, which is summarized below.

- ***Cell 2 Statistical Analyses***:
  - Comparison of latest value to standard if available.
  - Comparison of lower confidence limit (LCL) of the mean to standard if available.
  - Comparison of latest value to upper prediction limit (UPL) of background for inorganics if the standard is not available.
  - Mann–Kendall trend analysis and Theil–Sen regression.
  - Parameters with data sets consisting entirely of MDL values were not statistically analyzed and are not shown. The only data sets presented with 100% MDL values are those for inorganic parameters in background well MW-12, which are shown for comparison to downgradient compliance wells.
- ***Analyzed Data Range***: August 2017 through May 2024.
- ***Exceedance Criteria***:
  - LCL of the mean that exceeds the promulgated standard may trigger corrective action.

- Either a spring 2024 Appendix II inorganic result that exceeds UPL of background or a spring 2024 detection (exceedance of background) of Appendix II organic requires continuation of the assessment monitoring management tier.

- ***Source of Background Data***:
  - Organic parameters: Not applicable. All detections of organic Appendix I or Appendix II parameters (40 CFR §258, Subpart E) are considered exceedances of background.
  - Inorganic parameters: Background compliance well MW-12, interwell method.
- ***UPL of Background Criteria***: The UPL is calculated for background data sets with at least two distinct detected results.
- ***Confidence Limits Criteria***: LCL of the mean is calculated with a 95% confidence interval for data sets with at least two distinct detected results.
- ***Trend Analysis Criteria***:
  - Trends are only calculated for data sets with at least 50% detected results and at least six results.
  - Trends are only calculated for RCRA Appendix II parameters with an exceedance of the standard (LCL) or background (detection for organics).
  - A statistically significant trend is present if the confidence level is greater than 95% for increasing and decreasing results, with a direction corresponding to the sign of S. No trend is established for confidence levels below 95%.

The following sections provide a results summary for the statistical analysis of Cell 2 wells, organized by parameter group.

4.4.2 Organic Parameters

Tables G-5 and **G-6** present the complete statistical analysis for VOCs and non-VOC organics, respectively, in Cell 2. **Table 4-6** summarizes key statistical results.

4.4.2.1 Comparison of Latest Value and LCLs to Standard

For Appendix II organics in Cell 2 monitoring wells, neither spring 2024 results nor LCLs of the data set mean exceeded promulgated standards, where standards exist.

4.4.2.2 Comparison of Latest Value to Background

Background concentrations of Appendix II organic parameters are considered to be the MDL; therefore, any detections constitute an exceedance of background (Section 4.2.2), which include the following data sets for spring 2024:

- VOCs: **Appendix G** presents time series plot data for these parameters.
  - In MW-8, TCE (J-qualified) was detected. It is not typically detected in this well and was last detected in 2016.

- In MW-9, 1,2-dichloroethane (J-qualified), benzene (J-qualified), dichlorodifluoromethane (J-qualified, no standard), and VC (J-qualified) were detected. Except for VC, these parameters are not typically detected in this well.

- In MW-13, cis-1,2-DCE, dichlorodifluoromethane (J-qualified, no standard), and TCE (J-qualified) were detected. cis-1,2-DCE and dichlorodifluoromethane have consistently been detected in recent sampling at low concentrations. TCE has been detected occasionally at low concentrations in the past. Low concentrations of several VOCs are often detected in MW-13.

- Non-VOC organics: There were no detections of non-VOC Appendix II organics in Cell 2 monitoring wells in spring 2024.

4.4.2.3 Trend Analysis

Mann–Kendall trend results were as follows (**Table 4-6**):

- VOCs: In MW-13, increasing trends for cis-1,2-DCE and dichlorodifluoromethane. In MW-9, there was not a statistically significant trend for dichlorodifluoromethane.

- Non-VOC organics: Trend analysis was not performed because data sets consist of entirely of nondetect results.

4.4.3 Inorganic Parameters

Table G-7 presents the complete statistical analysis for inorganics in Cell 2. **Table 4-7** summarizes key statistical results.

4.4.3.1 Comparison of Latest Value and Standards and LCLs

No Appendix II inorganic parameter exceeded its promulgated standard in spring 2024. Additionally, LCLs of the mean in Cell 2 compliance wells did not exceed RCRA Appendix II parameters for inorganics. Parameters without a standard include cobalt, nickel, sulfide, tin, and vanadium.

In MW-9, iron and manganese spring 2024 results and LCLs of the mean exceeded the IDGW secondary standards. Inorganics with secondary IDGW standards include iron, manganese, silver, and zinc.

4.4.3.2 Comparison of Latest Value to Background

All spring 2024 inorganics results were compared to background, which is defined by the UPL of the background data sets for MW-12. **Appendix G** presents individual data graphs for RCRA parameters exceeding background, which included the following data sets:

- MW-8: arsenic, which has been detected in this well in every sample since 2002.

- MW-9: nickel and zinc, both of which have been detected in this well in every sample since 2002; arsenic; lead; and selenium, frequently detected in this well.

- MW-13: Arsenic and barium, both of which have been detected in this well in every sample since 2002.

Spring 2024 results exceeding background were one to two orders of magnitude lower than the standard for the respective parameter. Nickel is the only parameter without a standard.

Inorganics with secondary IDGW standards that exceeded background included iron and manganese in MW-9 and MW-13. These metals are not regulated under RCRA.

4.4.3.3 Trend Analysis

The Mann–Kendall trend results for RCRA parameters per Section 4.4.1 are summarized below.

Downgradient Compliance Wells

The following concentration trends were observed for Cell 2 compliance wells in which the spring 2024 result exceeded background (**Table 4-7**):

- MW-8: Arsenic is decreasing.
- MW-9: Nickel and zinc are decreasing, and arsenic exhibits no significant trend.
- MW-13: Arsenic and barium exhibit no significant trend.

Upgradient Background Well

Background compliance well MW-12 exhibited no statistically significant trends, except for barium and cobalt, which exhibited decreasing trends with very shallow Theil–Sen slopes (**Table G-7**). Most parameters were not evaluated for trends in MW-12 because of the high percentage of MDL results in the evaluated period.

4.4.4 Cell 2 Statistical Summary

In assessment monitoring, if any RCRA Appendix II parameter exceeds a promulgated standard and the exceedance cannot be explained as a statistical anomaly, alternate sources, or natural background, then corrective measures must be initiated. However, if concentrations of any of the Appendix II parameters are significantly greater than background but less than the groundwater protection standard, then assessment monitoring continues. Exceedances of background do not trigger corrective action unless there is a statistically significant increasing trend, which highlights COCs with future potential to exceed their standard (**Section 4.2**).

In Cell 2 monitoring wells, no Appendix II parameters exceeded promulgated standards in spring 2024. Several VOCs were detected at low concentrations (**Table 4-6**), and several inorganics exceeded the UPL of background (**Table 4-7**) in MW-8, MW-9, and MW-13. These results are generally consistent with recent evaluations, and non-VOC organics detected in fall 2023 were not observed again in spring 2024.

Because of the exceedances of background (both UPL and MDL) in Cell 2, assessment monitoring management continues to be appropriate (**Section 4.2.2**).

4.5 Cell 4

Cell 4 is currently in detection monitoring. MW-4A is the background well, and MW-3A, MW-5AR, and MW-6A are the downgradient compliance wells. MW-4 is not a compliance well, but it is part of the monitoring network for Cell 2 and is used in the Cell 1 performance monitoring program.

Samples collected from Cell 4 monitoring wells during the spring 2024 monitoring event were analyzed for Appendix I VOCs and metals, according to detection monitoring requirements (Section 4.2.1).

This section includes a discussion on the statistical analysis of Appendix I organic and inorganic parameters in Cell 4 compliance monitoring wells sampled in spring 2024. **Appendix F** provides comprehensive time series plots for chlorinated ethenes, daughter products, geochemical parameters, and inorganics.

4.5.1 Statistical Approach

Appendix G presents the complete statistical approach and analysis, which is summarized below.

- ***Cell 4 Statistical Analyses***:
  - Comparison of latest value to standard, if the standard is available
    - *If latest value exceeds the standard, comparison of LCL to standard*
  - Comparison of latest value to MDL for organics
  - Comparison UPL of background for inorganics
  - Mann–Kendall trend analysis and Theil–Sen regression
  - Parameters with data sets consisting entirely of MDL values were not statistically analyzed and are not shown. The only data sets presented with 100% MDL values are those for inorganic parameters in background wells, which are shown for comparison to downgradient compliance wells.
- ***Analyzed Data Range***: August 2017 through May 2024.
- ***Exceedance Criteria***:
  - Spring 2024 result or LCL of the mean exceeds the promulgated standard (may trigger corrective action).
  - Spring 2024 result exceeds the UPL of background (inorganic) or MDL of the parameter (organic) (may trigger assessment monitoring).
- ***Source of Background Data:***
  - Organic parameters: Not applicable. All detections of organic Appendix I parameters (40 CFR §258, Subpart E) are considered exceedances of background.
  - Inorganic parameters: Background compliance well MW-4A, interwell method.
- ***UPL of Background Criteria***: The UPL is calculated for background data sets with at least two distinct detected results.

- ***Confidence Limits Criteria***: LCL of the mean is calculated with a 95% confidence interval for data sets at least two distinct detected results.
- ***Trend Analysis Criteria***:
  - Trends are only calculated for data sets with at least 50% detected results and at least six results.
  - Trends are only calculated in compliance wells for data sets with an exceedance of background.
  - A statistically significant trend is present if the confidence level is greater than 95% for increasing and decreasing results, with a direction corresponding to the sign of S. No trend is established for confidence levels below 95%.

The following sections provide a results summary for the statistical analysis of Cell 4 wells, organized by parameter group.

4.5.2 VOCs

Table G-8 presents the complete statistical analysis for VOCs in Cell 4. **Table 4-8** summarizes key statistical results.

4.5.2.1 Comparison of Latest Value to MDL and Standard

Background concentrations of Appendix I organic parameters are typically considered to be the MDL; therefore, any detection constitutes an exceedance of background (Section 4.2.1). VOCs were not detected in compliance wells; however, several VOCs were detected in MW-4 (not a compliance well).

4.5.2.2 Trend Analysis

Mann–Kendall analysis was not performed for any VOC data from the compliance and background wells because there were no VOC detections (i.e., exceedances of background) in wells with sufficient data to perform the test. Several VOCs exhibited statistically significant trends in MW-4 (not a compliance well), as shown in **Table 4-8**.

4.5.3 Inorganics

The Appendix I inorganics group consists of 15 metals. Tin, an Appendix II parameter, was also analyzed in Cell 4 samples. **Table G-9** presents the complete statistical analysis for inorganics in Cell 4. **Table 4-9** summarizes key statistical results.

4.5.3.1 Comparison of Latest Value to Standards

No Appendix I inorganic parameter value exceeded promulgated standards in Cell 4 compliance monitoring wells, which is consistent with recent results. Cobalt, nickel, and vanadium do not have standards.

In MW-4, iron and manganese exceeded their respective IDGW secondary standards.

4.5.3.2 Comparison of Latest Value to Background

All spring 2024 inorganics results were compared to background, which is defined by the UPL of the data sets from background well MW-4A. No RCRA parameters exceeded background in compliance wells in spring 2024.

In MW-4 (not a compliance well), arsenic, barium, cobalt, and vanadium exceeded background. Additionally, inorganics with secondary IDGW standards that exceeded background included iron and manganese in MW-4.

4.5.3.3 Trend Analysis

A Mann–Kendall trend analysis was performed for RCRA parameters per Section 4.5.1.

Downgradient Wells

Several inorganics exhibited statistically significant trends in MW-4 (not a compliance well), as shown in **Table 4-9**.

Upgradient Background Well

Background compliance well MW-4A exhibited no significant trends for arsenic, selenium, and vanadium and exhibited a decreasing trend for barium. Other parameters were not evaluated for trends in MW-4A because of the high percentage of MDL results in the evaluated period.

4.5.4 Cell 4 Statistical Summary

In detection monitoring, if a statistically significant increase over background or a detection above the standard cannot be attributed to sampling or analytical error, natural variation, or a source outside of the landfill cell, then assessment monitoring is initiated within 90 days. For FHML, background levels are considered to be the MDL for organic Appendix II parameters, because no background levels are expected for these chemicals; therefore, detections of organics constitute an exceedance of background.

In Cell 4 monitoring wells, no Appendix I parameters exceeded promulgated standards in spring 2024 (**Tables 4-8** and **4-9**). VOCs were not detected (i.e., did not exceed background) in compliance wells. Inorganics did not exceed background in compliance wells. These results are generally consistent with recent evaluations. Detection monitoring is an appropriate management tier for Cell 4.

Section 5

Conclusions and Recommendations

Groundwater samples were collected in May during the spring 2024 sampling event to achieve the following objectives:

- Evaluate groundwater gradients and flow within and downgradient from the FHML Cell 1 source area and offsite plume and within Cell 2 and 4 areas.
- Evaluate the Cell 1 remedy and determine the current nature and extent of the PCE and TCE plume discharging from Cell 1, the impact of the remediation system, and impacts within PVA.
- Evaluate the status of RCRA compliance monitoring at Cells 2 and 4 with updated statistical analysis of RCRA Subtitle D Appendix I and/or II parameters.
- Evaluate the spatial and time concentration trends in the Cell 1 source area, offsite plume, and Cells 2 and 4 for regulated chemicals above promulgated standards and/or background.
- Determine whether the air stripper remediation system is meeting the discharge permit requirements.

5.1 Cell 1 Source Area and Offsite Plume

5.1.1 Conclusions and Key Changes

In spring 2024, VOCs were analyzed from all sampled locations (**Table 2-1**). Chemicals that exceeded MCLs in the Cell 1 source area and offsite monitoring wells included PCE and TCE, as presented in **Section 3.3**. Additionally, PCE, TCE, benzene, chloroform, and VC data sets statistically exceed promulgated standards in one or more wells, as indicated by calculation of the UCLs of the mean, presented in **Section 4.3**. Statistically significant increasing and stable trends of PCE and TCE concentrations have been observed in wells upgradient, downgradient, and throughout the remediation system area, which indicates that there is a continuing source of contamination and incomplete capture of contamination by the existing remediation system. These findings are generally consistent with previous interpretations (CDM Smith 2024a). However, about one-third of the data sets exhibiting increasing or probably increasing trends as of spring 2023 are no longer exhibiting statistically significant trends after spring 2024 sampling. Additional changes in concentrations will be evaluated for the pilot study under a separate cover.

5.1.2 Recommendations and Future Changes

Table 5-1 presents the recommended FHML sampling plan for fall 2024 sampling. The following tasks would be conducted:

- A comprehensive synoptic groundwater level measurement across Cells 1, 2, and 4
- Semiannual spring and fall sampling of monitoring wells for various monitoring objectives:

- Downgradient and FHML boundary wells to monitor performance of the existing treatment system and capture
- Source area wells to evaluate COC discharge to the groundwater plume
- Upgradient wells to track input of COCs to the remediation system
- Offsite wells for performance monitoring in the distal plume
- Pilot study area wells to supplement the performance evaluation for the April 2023 injection pilot study (evaluated under a separate cover)

Changes to the sampling approach for fall 2024 include:

- Total metals analysis in MW-121 because the spring 2024 sample exceeded the MCL.
- Select wells planned for HydraSleeve passive sampling may be sampled via low-flow methods with a portable pump to support supplemental pilot study monitoring.

No other changes to the sampling plan approach are recommended at this time.

5.2 Cells 2 and 4

5.2.1 Conclusions and Key Changes

Cell 2 is in assessment monitoring. In Cell 2 monitoring wells, no Appendix II parameters exceeded promulgated standards in spring 2024. However, several VOCs were detected at low concentrations in MW-8, MW-9, and MW-13and several inorganics exceeded the UPL of background in MW-8, MW-9, and MW-13. Manganese and iron exceeded secondary IDGW standards (**Section 4.4**). These results are generally consistent with recent evaluations, and non-VOC organics detections in fall 2023 were not repeated in spring 2024. Exceedances of background (both UPL and MDL) require the continuation of assessment monitoring management for Cell 2.

Cell 4 is in detection monitoring. In Cell 4 compliance monitoring wells, no Appendix I parameters exceeded promulgated standards in spring 2024. VOCs were not detected in compliance wells, and inorganics did not exceed background in compliance wells (**Section 4.5**). MW-4 continues to have detections and exceedances of some parameters. These results are generally consistent with recent evaluations and require the continuation of detection monitoring management for Cell 4.

No key changes were incorporated into the sampling event or observed in sampling results.

5.2.2 Recommendations and Future Changes

Table 5-1 presents the recommended FHML sampling plan for fall 2024 sampling. The following tasks would be conducted:

- Cell 2 monitoring wells will be sampled for all Appendix I parameters and Appendix II organochlorine pesticides and SVOCs. Cell 4 monitoring wells will be sampled for all Appendix I parameters.

- In fall 2024, Cell 2 monitoring wells will be sampled for all Appendix II parameters, and Cell 4 monitoring wells will be sampled for Appendix I parameters.

No changes to the sampling plan approach are recommended at this time.

5.3 Operation of Pump-and-Treat System

5.3.1 Conclusions and Key Changes

The remediation system efficiently operated throughout the monitoring period with minimal unplanned shutdowns. Quarterly compliance sampling from the injection well indicate that the air stripper system is meeting the requirements of the discharge permit.

5.3.2 Recommendations and Future Changes

Operation of the remediation system will continue throughout 2024 to ensure that the system will continue operating to meet requirements of the CO, including the following:

- Operation and maintenance of the system:
  - Operators will continue to confirm the system is operating as intended.
  - Operators will confirm continued operation of the air stripper and blower, continued level control of extraction pumps, and continued operation of the antiscalant metering pump.
  - Operators will collect weekly extraction well data, including flow totals, instantaneous flow rates, instantaneous pump speeds, operational runtime, and pump starts/stops.

If appropriate, the following maintenance and optimization activities may be considered for the remainder of 2024, based on their expected value:

- Further optimization of pumping based on operational data.
- Operational data listed above will be supplemented with periodic evaluation of well-specific capacity for analysis to determine when well efficiency is dropping and when additional rehabilitation may be needed. Rehabilitation may also be considered for wells that have not been recently rehabilitated.
- Flowmeters and pumps will be evaluated and replaced as needed, depending on performance.

Performance and compliance monitoring will be continued, with quarterly sampling of the injection well. In the first and third quarter of each year, VOCs will be analyzed using EPA Method 8260. In the second and fourth quarter of each year, VOCs will be analyzed using EPA Methods 8260 and 8011 and the extended suite of parameters (**Tables 5-1** and **5-2**).

Section 6
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FIGURES

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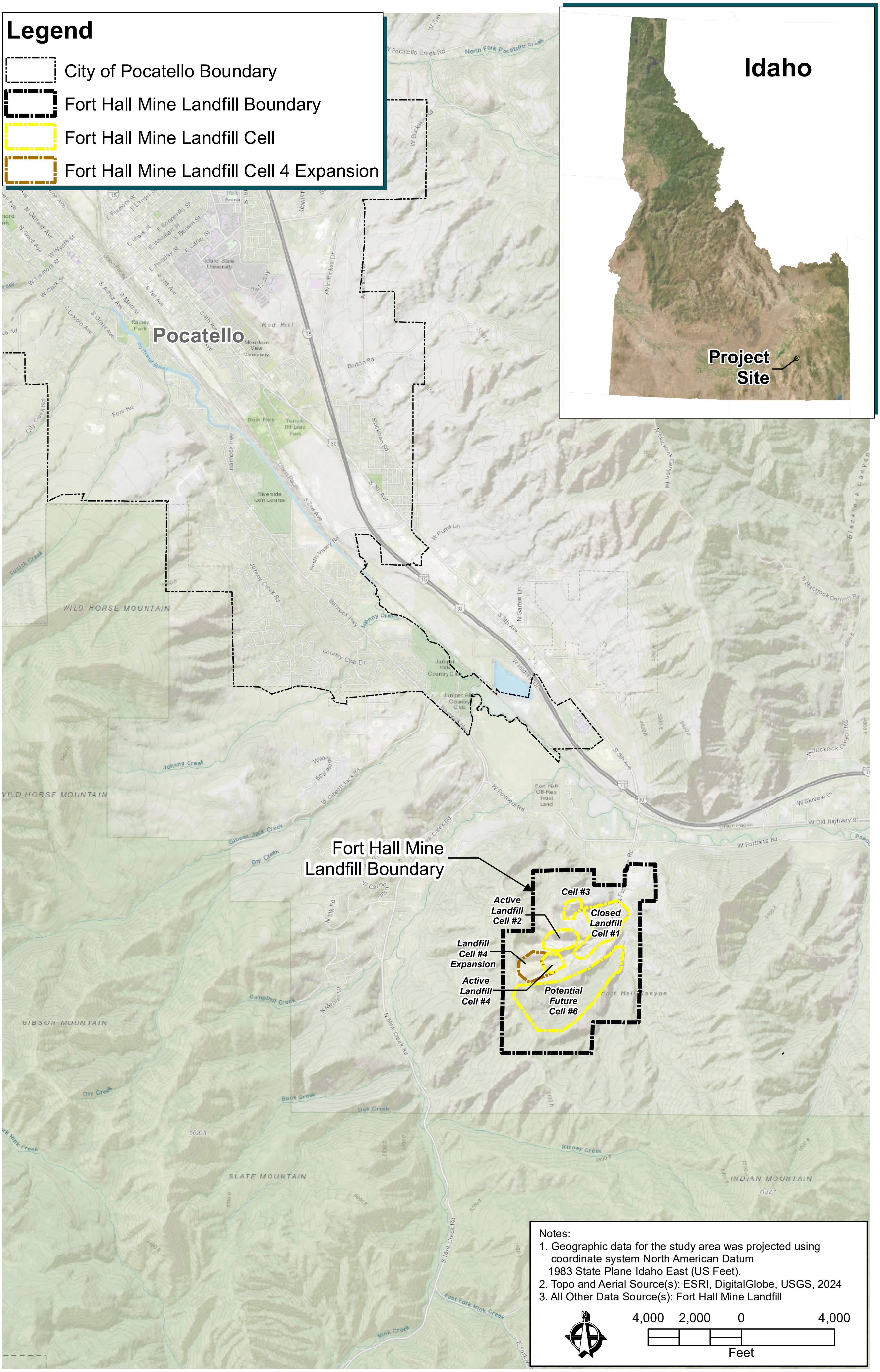

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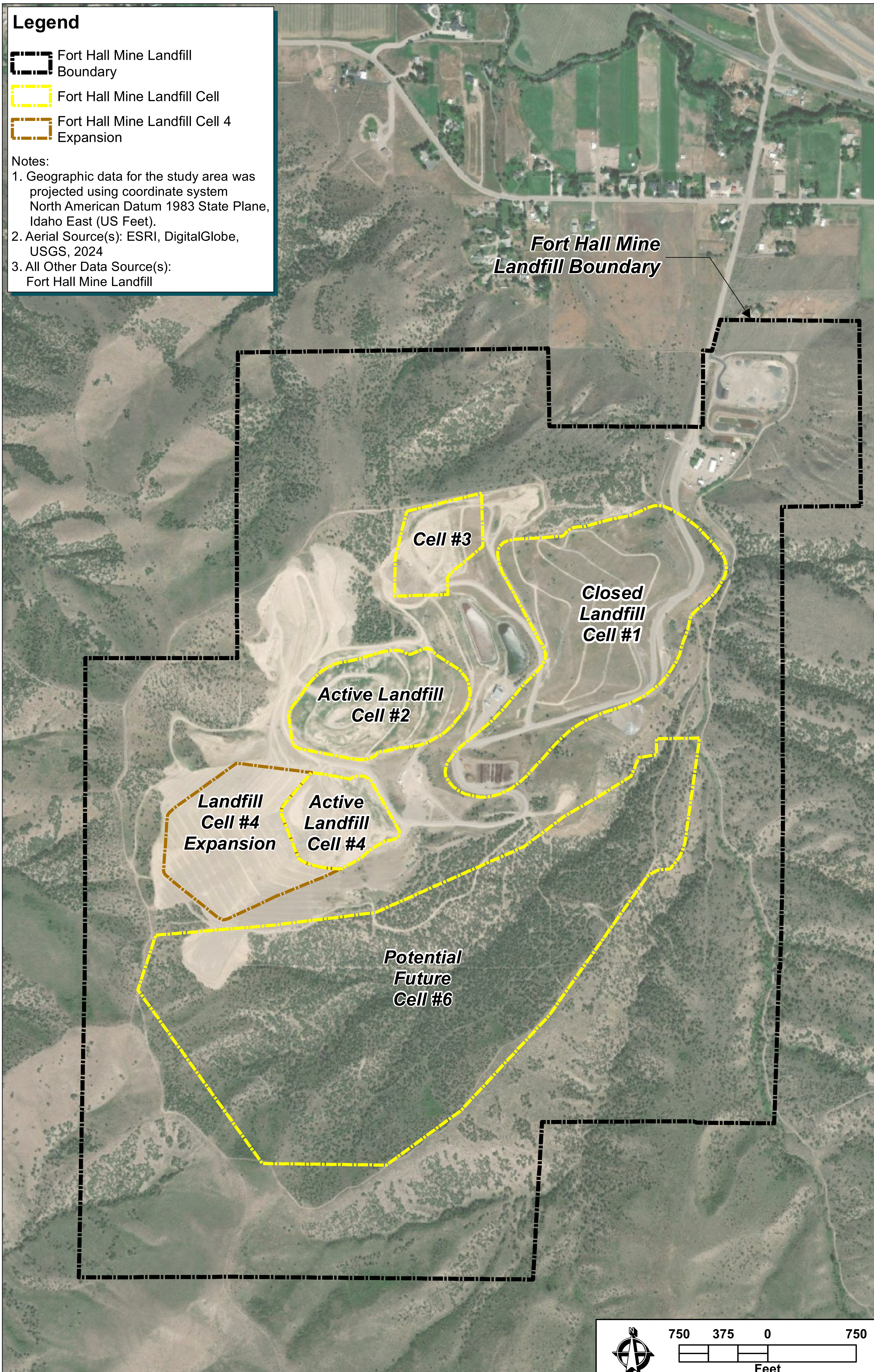
2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring
and Remediation System Operation and Maintenance Report
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 1-1
Site Location Map



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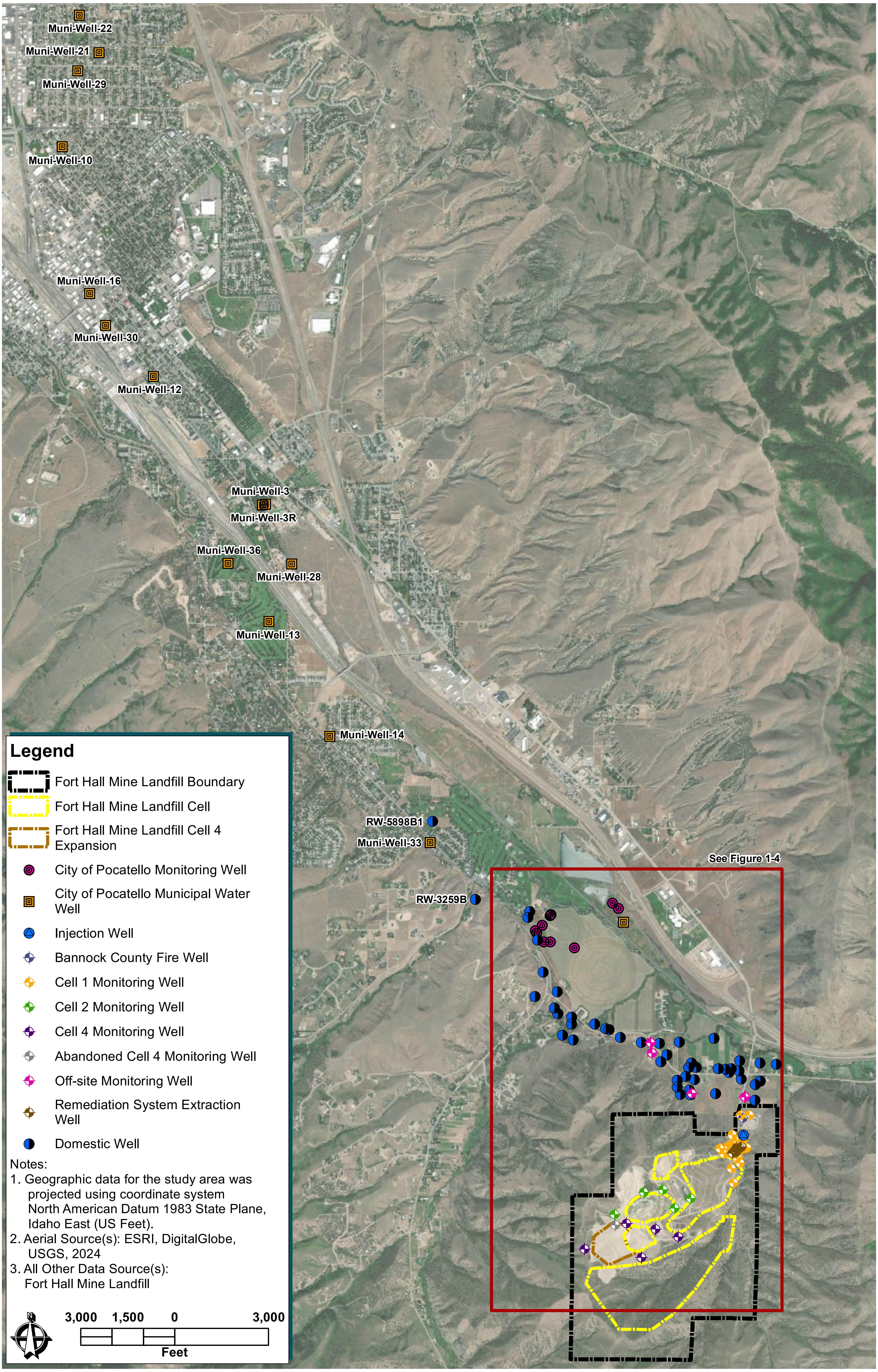
2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring and Remediation System Operation and Maintenance Report
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 1-2
Fort Hall Mine Landfill



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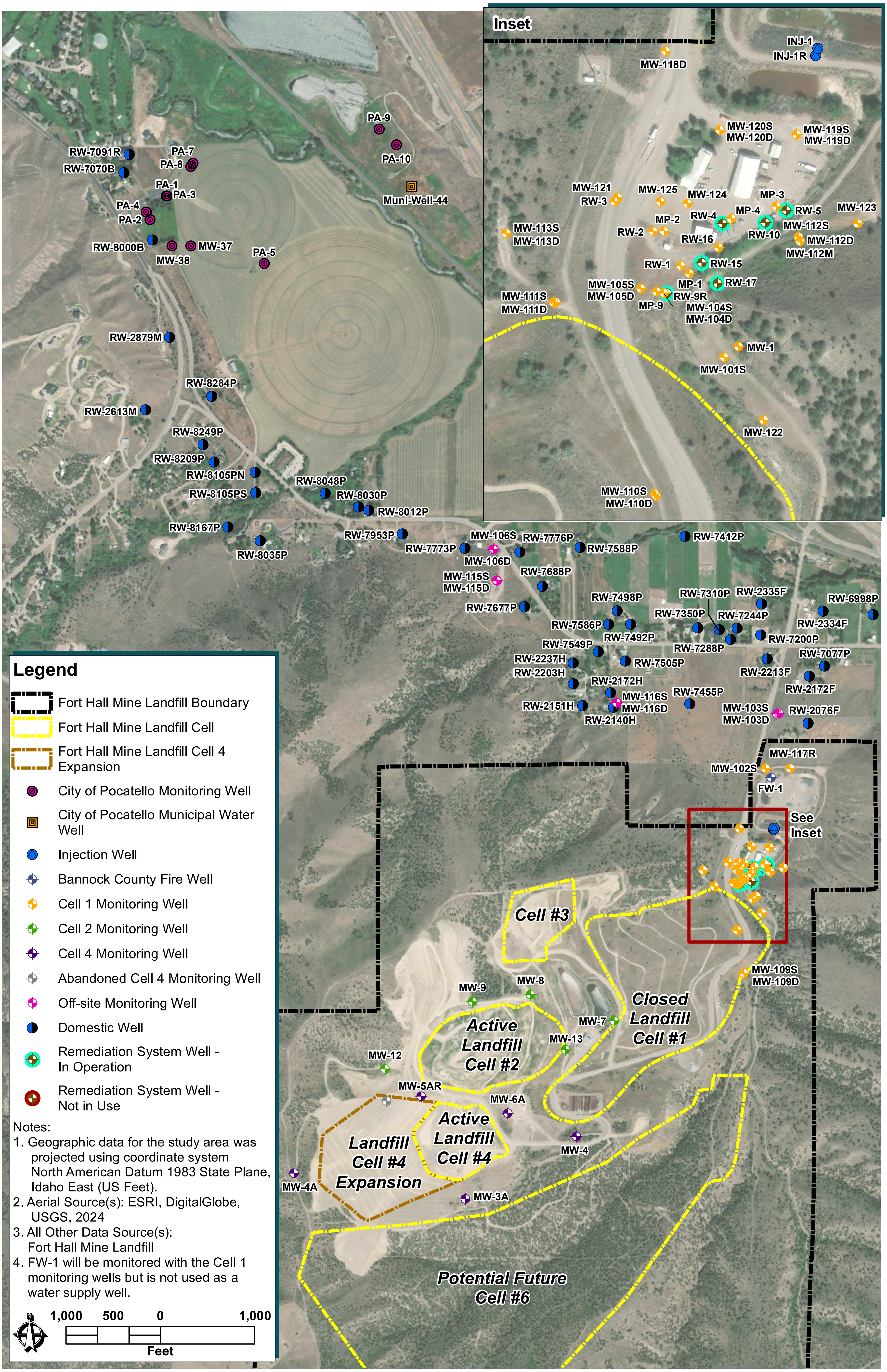
2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring and Remediation System Operation and Maintenance Report
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 1-3
Groundwater Monitoring Well Network of the Fort Hall Mine Landfill



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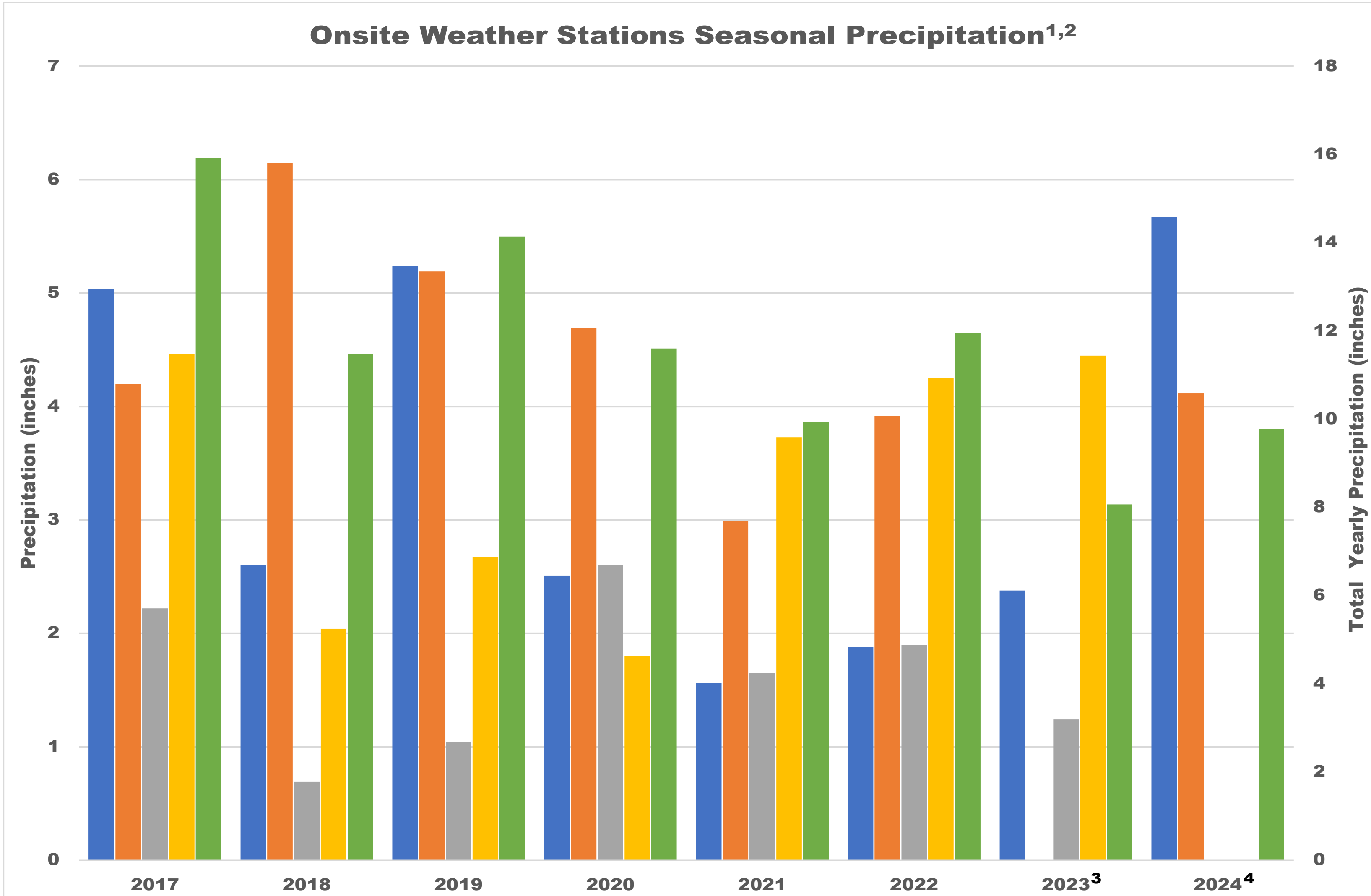
2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring and Remediation System Operation and Maintenance Report
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 1-4
Groundwater Monitoring Well Network of the Fort Hall Mine Landfill

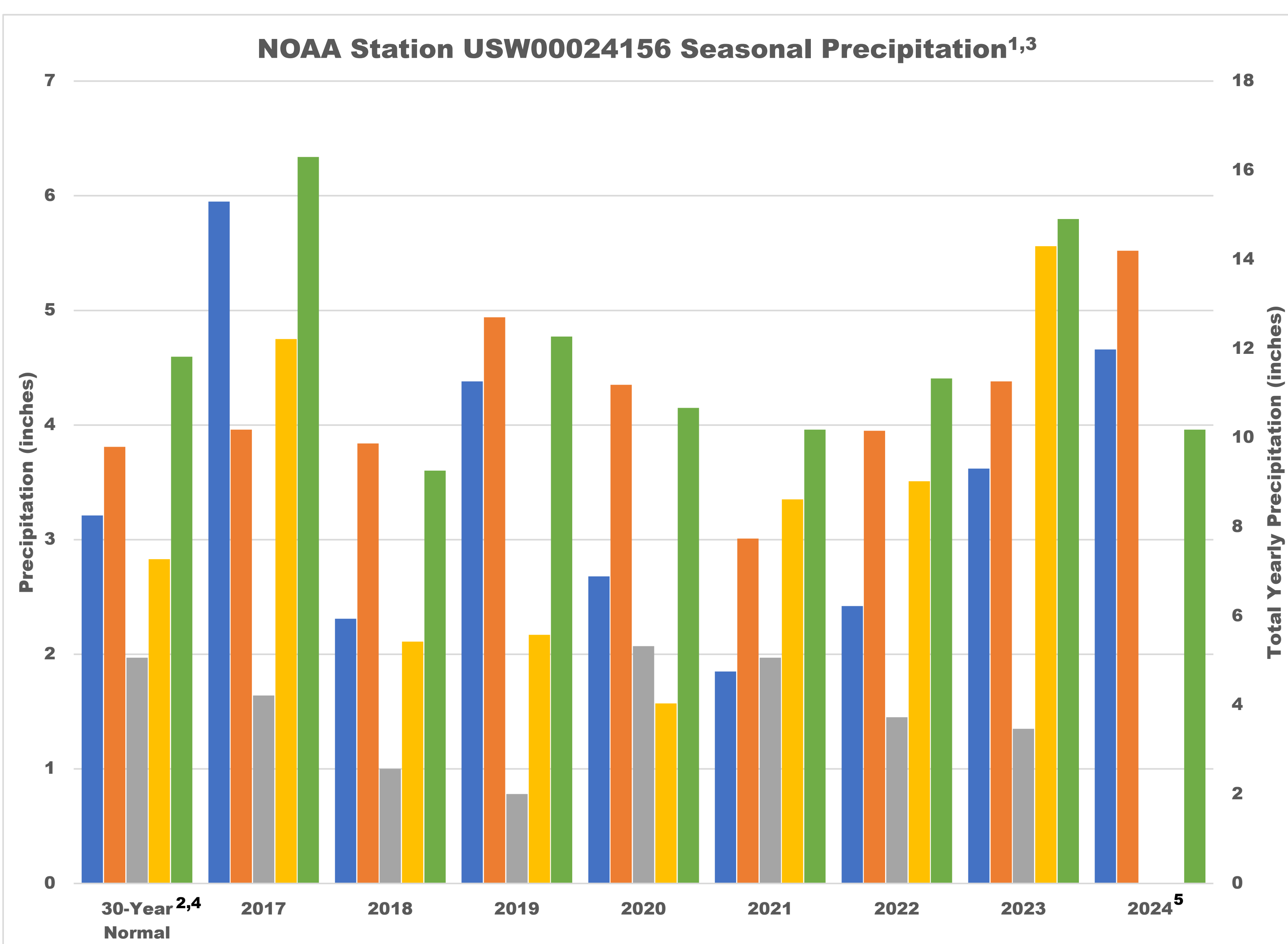


Legend

- Winter
- Spring
- Summer
- Fall
- Total

Notes:

1. The following meteorological seasons were used: Winter (December [prior calendar year], January, and February); Spring (March, April, and May); Summer (June, July, and August); and Fall (September, October, November).
2. A new onsite station was installed in March 2022, all data from March 2022 to present was recorded at the new station. Data prior to March 2022 was recorded at the previous station.
3. Data collected between January 2023 and June 2023 were excluded because of data quality issues resulting from an equipment malfunction. Therefore, Winter 2023 only includes data collected in December 2022, all Spring 2023 data is excluded, and Summer 2023 only includes data collected in July and August 2023.
4. Spring 2024 data only includes data collected from 2/1/24 through 4/30/24. Total 2024 data only includes data collected through 4/30/24.



Legend

- Winter
- Spring
- Summer
- Fall
- Total

Notes:

1. The following meteorological seasons were used: Winter (December [prior calendar year], January, and February); Spring (March, April, and May); Summer (June, July, and August); and Fall (September, October, November).
2. 30-Year Normal - 1991-2020 Climate Normal Average Precipitation For NOAA Station USW00024156
3. Source: NOAA. 2024a. "NCEI Climate Data Online." Accessed June 5, 2024, https://www.ncei.noaa.gov/cdo-web/
4. 30-year Climate Normals Source: NOAA. 2024b. "NCEI U.S. Climate Normals Quick Access." Accessed June 5, 2024, https://www.ncei.noaa.gov/access/us-climate-normals/#dataset=normals-monthly&timeframe=30&station=USW00024156
5. Total 2024 data only includes data collected through May 2024.

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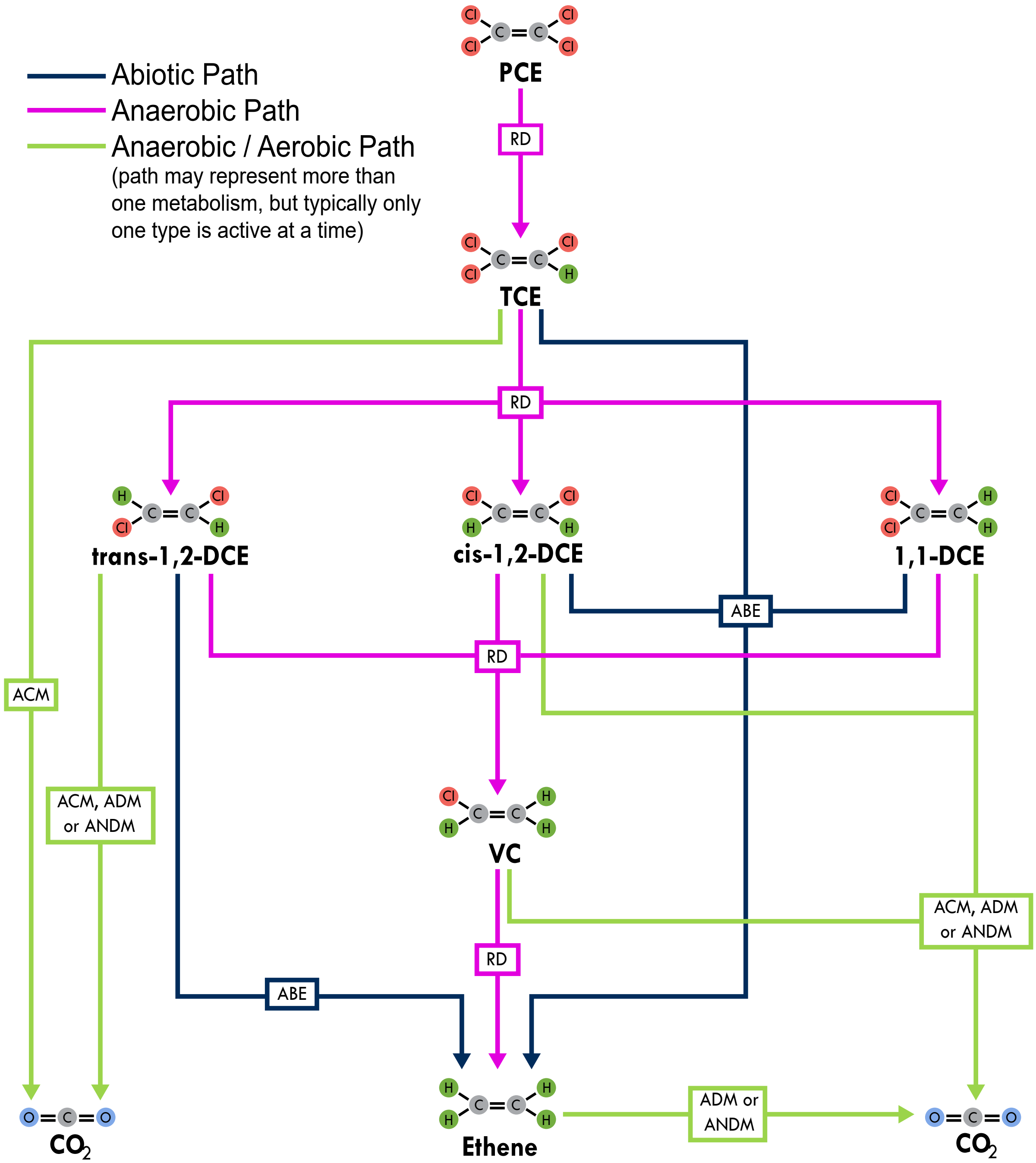
2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring and Remediation System Operation and Maintenance Report
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 1-5
Seasonal Precipitation:
Onsite Weather Station
and NOAA Station USW00024156



Acronyms

ABE	Abiotic Beta-Elimination	Cl	Chloride
ACM	Aerobic Cometabolism	CO_2	Carbon Dioxide
ADM	Aerobic Direct Metabolism	H	Hydrogen
ANDM	Anaerobic Direct Metabolism	O	Oxygen
RD	Reductive Dechlorination (Biotic)	PCE	Tetrachlorothene
1,1-DCE	1-1-Dichloroethene	TCE	Trichloroethene
cis-1,2-DCE	cis-1,2-Dichloroethene	trans-1,2-DCE	trans-1,2-Dichloroethene
C	Carbon	VC	Vinyl Chloride

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Groundwater Monitoring and
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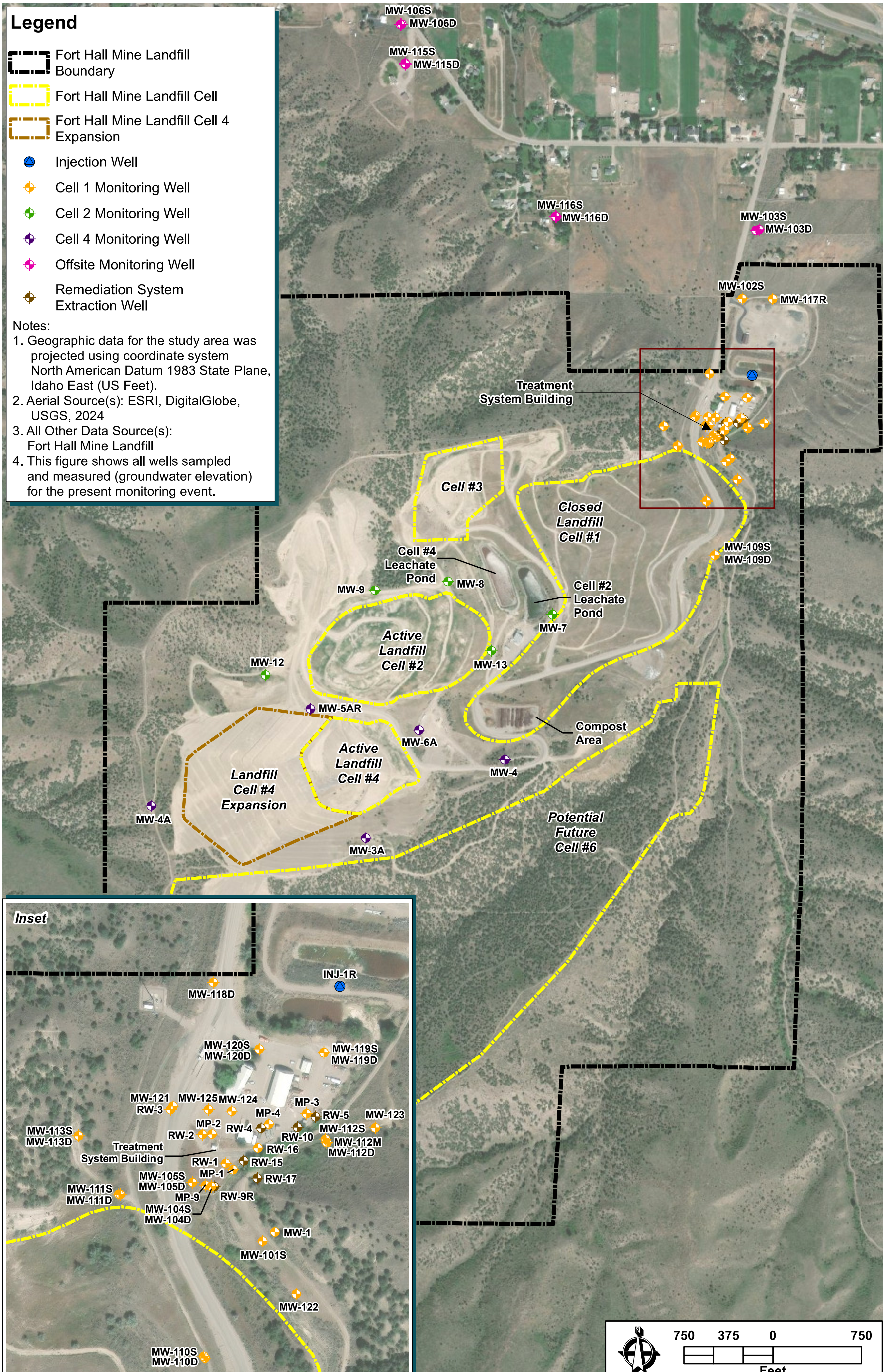
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 1-6
Chlorinated Ethene
Degradation Pathways



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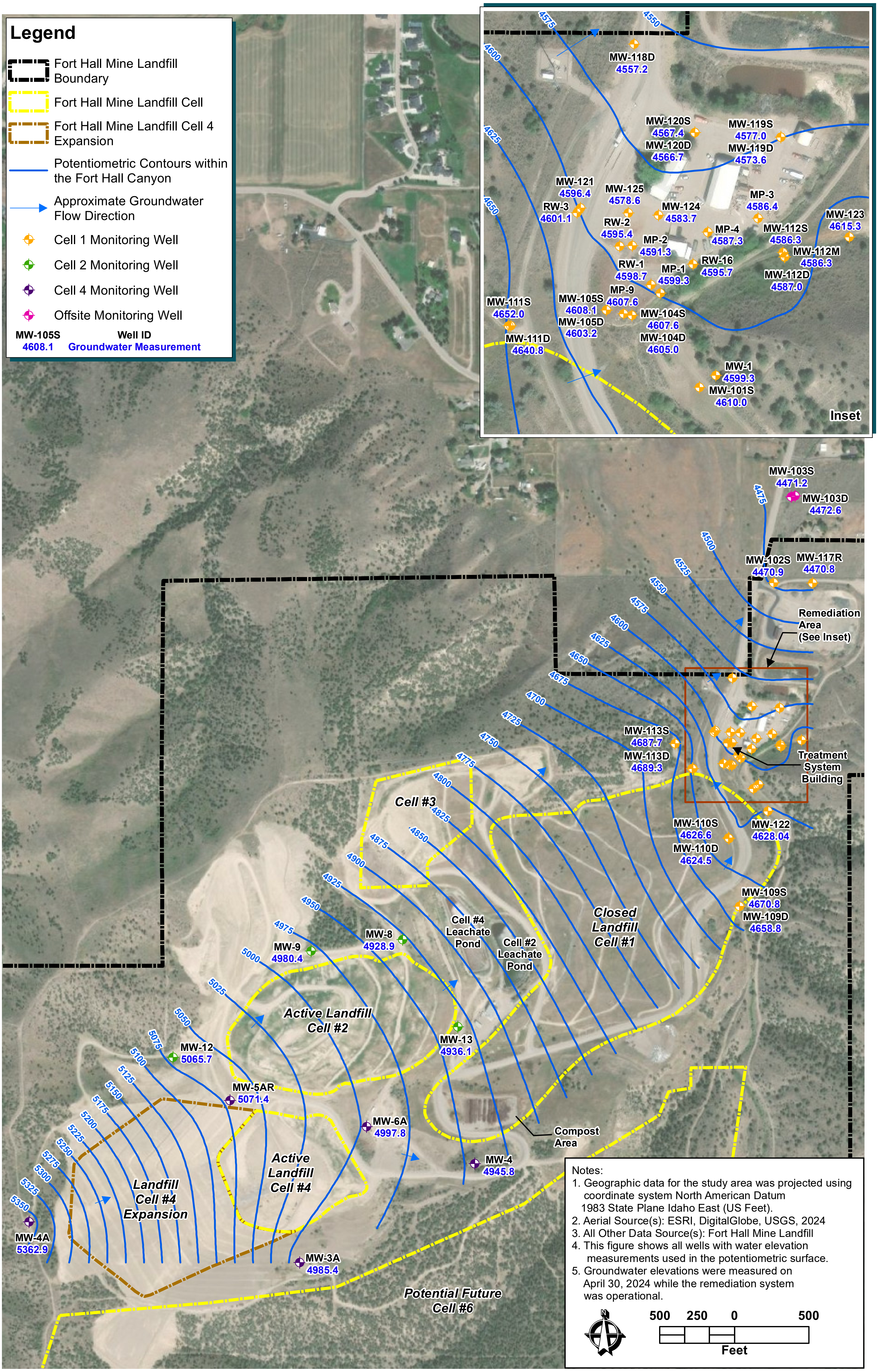
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 2-1
Spring 2024 Onsite Groundwater Sample Locations



Draft By: K. Scheller Date: 07/10/2024 | Check By: H. Rolston Date: 07/30/2024 | Update By: K. Scheller Date: 08/08/2024 | Backcheck By: ______ Date: ______

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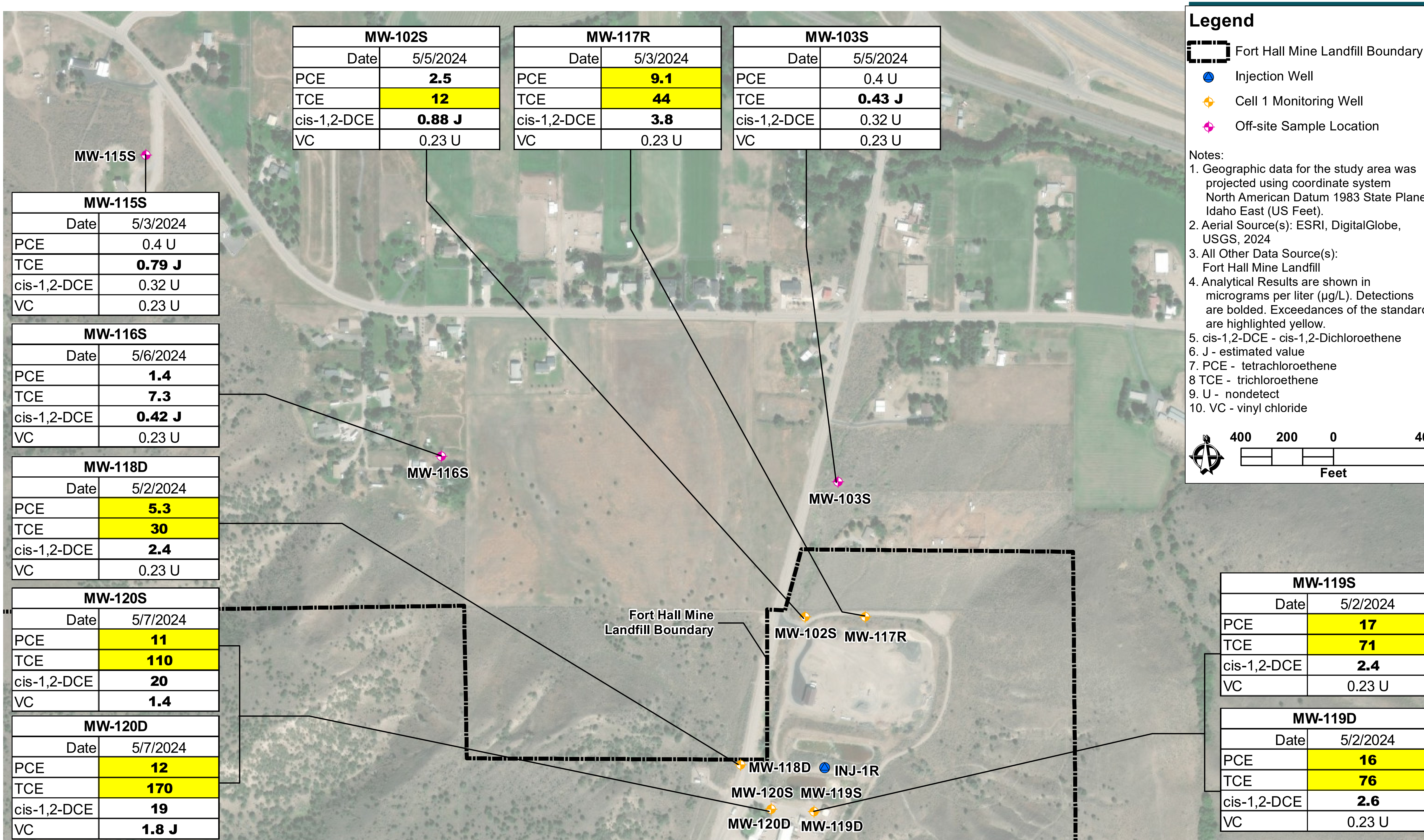
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 3-1
Onsite Potentiometric Contour Map



MW-102S	
Date	5/5/2024
PCE	**2.5**
TCE	**12**
cis-1,2-DCE	**0.88 J**
VC	0.23 U

MW-117R	
Date	5/3/2024
PCE	**9.1**
TCE	**44**
cis-1,2-DCE	**3.8**
VC	0.23 U

MW-103S	
Date	5/5/2024
PCE	0.4 U
TCE	**0.43 J**
cis-1,2-DCE	0.32 U
VC	0.23 U

MW-115S	
Date	5/3/2024
PCE	0.4 U
TCE	**0.79 J**
cis-1,2-DCE	0.32 U
VC	0.23 U

MW-116S	
Date	5/6/2024
PCE	**1.4**
TCE	**7.3**
cis-1,2-DCE	**0.42 J**
VC	0.23 U

MW-118D	
Date	5/2/2024
PCE	**5.3**
TCE	**30**
cis-1,2-DCE	**2.4**
VC	0.23 U

MW-120S	
Date	5/7/2024
PCE	**11**
TCE	**110**
cis-1,2-DCE	**20**
VC	**1.4**

MW-120D	
Date	5/7/2024
PCE	**12**
TCE	**170**
cis-1,2-DCE	**19**
VC	**1.8 J**

MW-119S	
Date	5/2/2024
PCE	**17**
TCE	**71**
cis-1,2-DCE	**2.4**
VC	0.23 U

MW-119D	
Date	5/2/2024
PCE	**16**
TCE	**76**
cis-1,2-DCE	**2.6**
VC	0.23 U

Legend

- Fort Hall Mine Landfill Boundary
- Injection Well
- Cell 1 Monitoring Well
- Off-site Sample Location

Notes:
1. Geographic data for the study area was projected using coordinate system North American Datum 1983 State Plane, Idaho East (US Feet).
2. Aerial Source(s): ESRI, DigitalGlobe, USGS, 2024
3. All Other Data Source(s): Fort Hall Mine Landfill
4. Analytical Results are shown in micrograms per liter (µg/L). Detections are bolded. Exceedances of the standard are highlighted yellow.
5. cis-1,2-DCE - cis-1,2-Dichloroethene
6. J - estimated value
7. PCE - tetrachloroethene
8 TCE - trichloroethene
9. U - nondetect
10. VC - vinyl chloride

400 200 0 400
Feet

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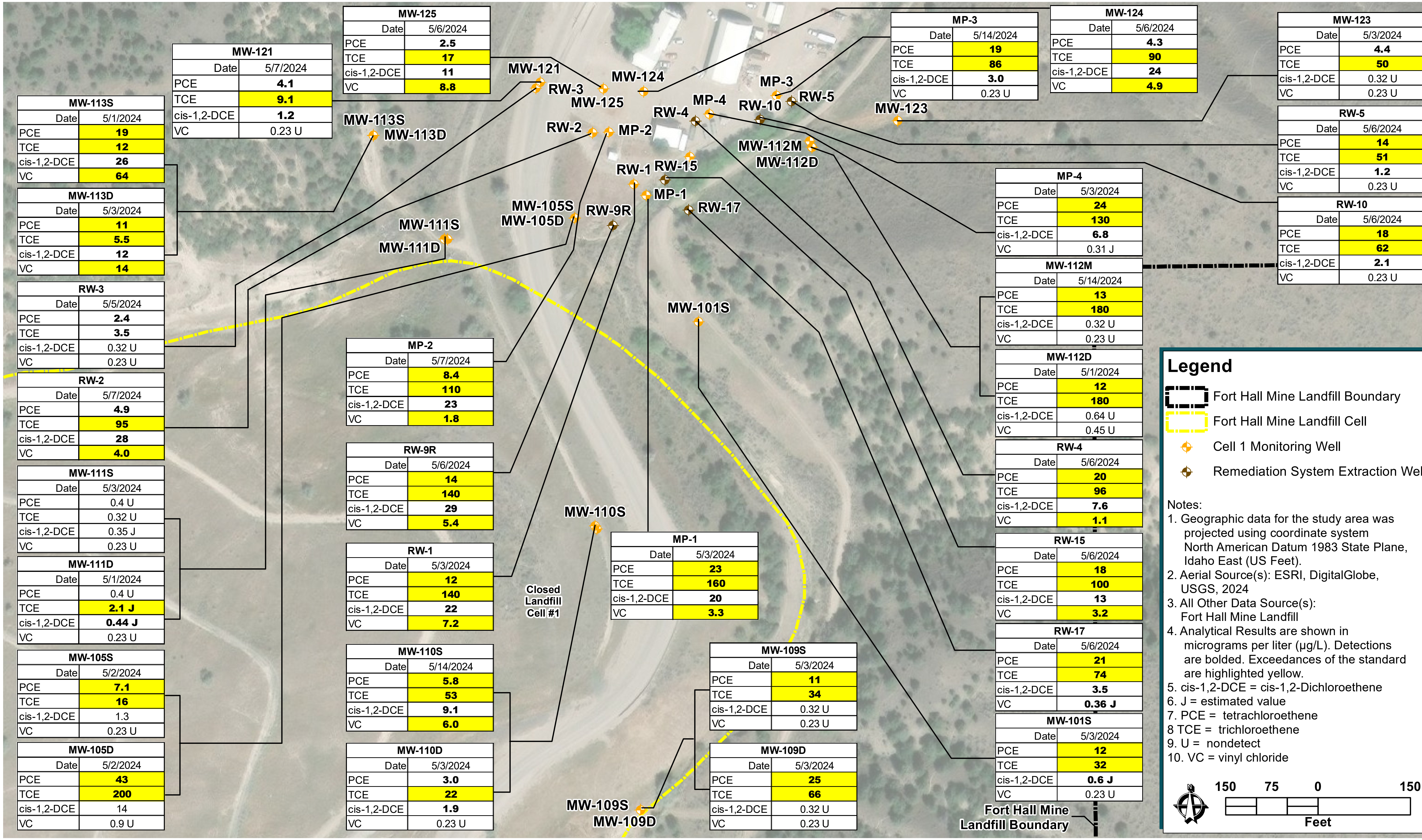
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 3-2
Spring 2024 Chlorinated Ethene Results for Cell 1 North and Offsite Wells



Well	Date	PCE	TCE	cis-1,2-DCE	VC
MW-125	5/6/2024	2.5	17	11	8.8
MW-121	5/7/2024	4.1	9.1	1.2	0.23 U
MW-113S	5/1/2024	19	12	26	64
MW-113D	5/3/2024	11	5.5	12	14
RW-3	5/5/2024	2.4	3.5	0.32 U	0.23 U
RW-2	5/7/2024	4.9	95	28	4.0
MW-111S	5/3/2024	0.4 U	0.32 U	0.35 J	0.23 U
MW-111D	5/1/2024	0.4 U	2.1 J	0.44 J	0.23 U
MW-105S	5/2/2024	7.1	16	1.3	0.23 U
MW-105D	5/2/2024	43	200	14	0.9 U
MP-2	5/7/2024	8.4	110	23	1.8
RW-9R	5/6/2024	14	140	29	5.4
RW-1	5/3/2024	12	140	22	7.2
MW-110S	5/14/2024	5.8	53	9.1	6.0
MW-110D	5/3/2024	3.0	22	1.9	0.23 U
MP-1	5/3/2024	23	160	20	3.3
MW-109S	5/3/2024	11	34	0.32 U	0.23 U
MW-109D	5/3/2024	25	66	0.32 U	0.23 U
MP-3	5/14/2024	19	86	3.0	0.23 U
MW-124	5/6/2024	4.3	90	24	4.9
MW-123	5/3/2024	4.4	50	0.32 U	0.23 U
RW-5	5/6/2024	14	51	1.2	0.23 U
RW-10	5/6/2024	18	62	2.1	0.23 U
MP-4	5/3/2024	24	130	6.8	0.31 J
MW-112M	5/14/2024	13	180	0.32 U	0.23 U
MW-112D	5/1/2024	12	180	0.64 U	0.45 U
RW-4	5/6/2024	20	96	7.6	1.1
RW-15	5/6/2024	18	100	13	3.2
RW-17	5/6/2024	21	74	3.5	0.36 J
MW-101S	5/3/2024	12	32	0.6 J	0.23 U

Notes:
1. Geographic data for the study area was projected using coordinate system North American Datum 1983 State Plane, Idaho East (US Feet).
2. Aerial Source(s): ESRI, DigitalGlobe, USGS, 2024
3. All Other Data Source(s): Fort Hall Mine Landfill
4. Analytical Results are shown in micrograms per liter (µg/L). Detections are bolded. Exceedances of the standard are highlighted yellow.
5. cis-1,2-DCE = cis-1,2-Dichloroethene
6. J = estimated value
7. PCE = tetrachloroethene
8 TCE = trichloroethene
9. U = nondetect
10. VC = vinyl chloride

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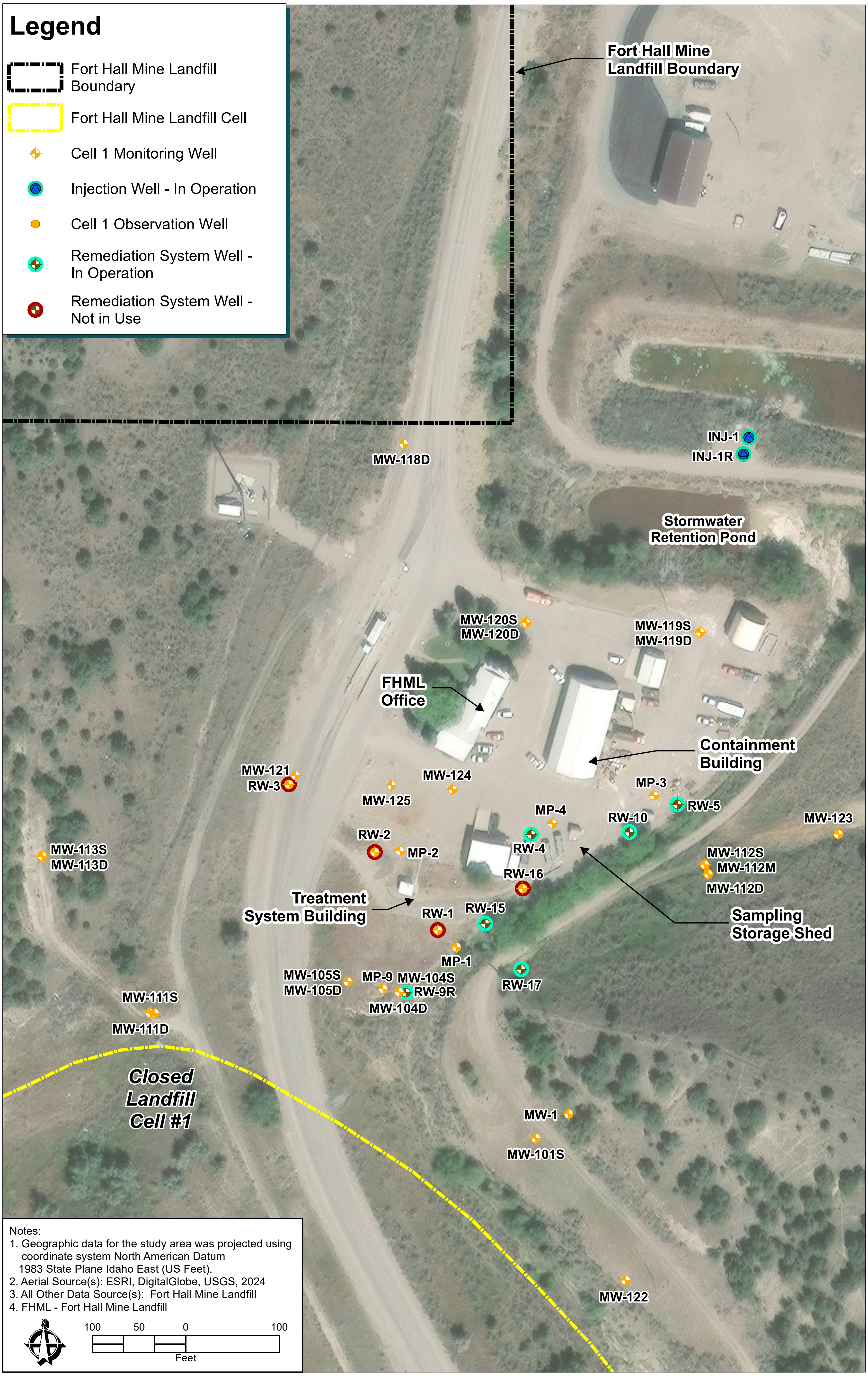
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 3-3
Spring 2024 Chlorinated Ethene Results for Cell 1 South



Draft By: K. Scheller Date: 07/10/2024 | Check By: Date: | Update By: Date: | Backcheck By: Date:

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2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring
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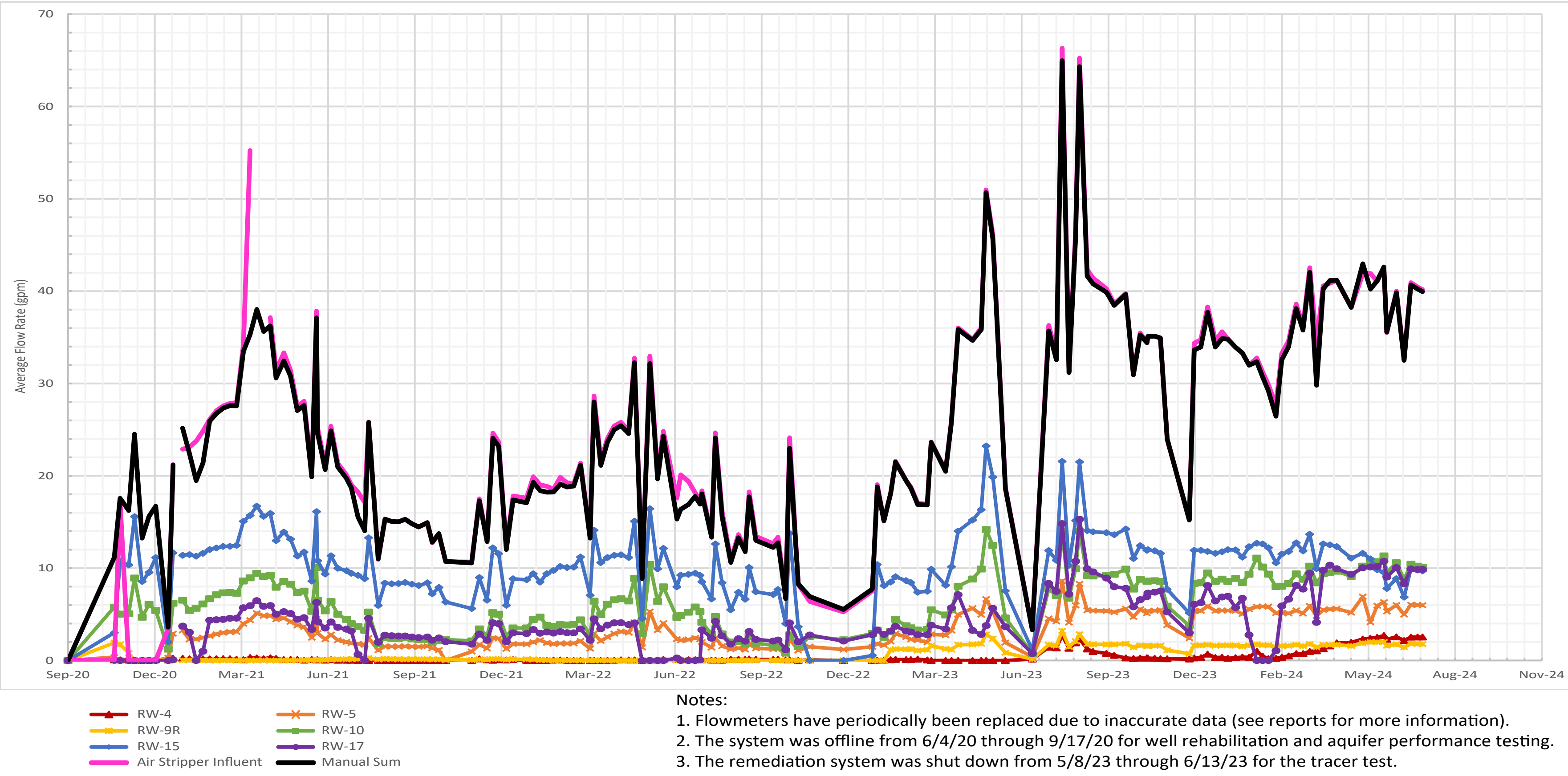
Fort Hall Mine Landfill, Bannock County, Idaho

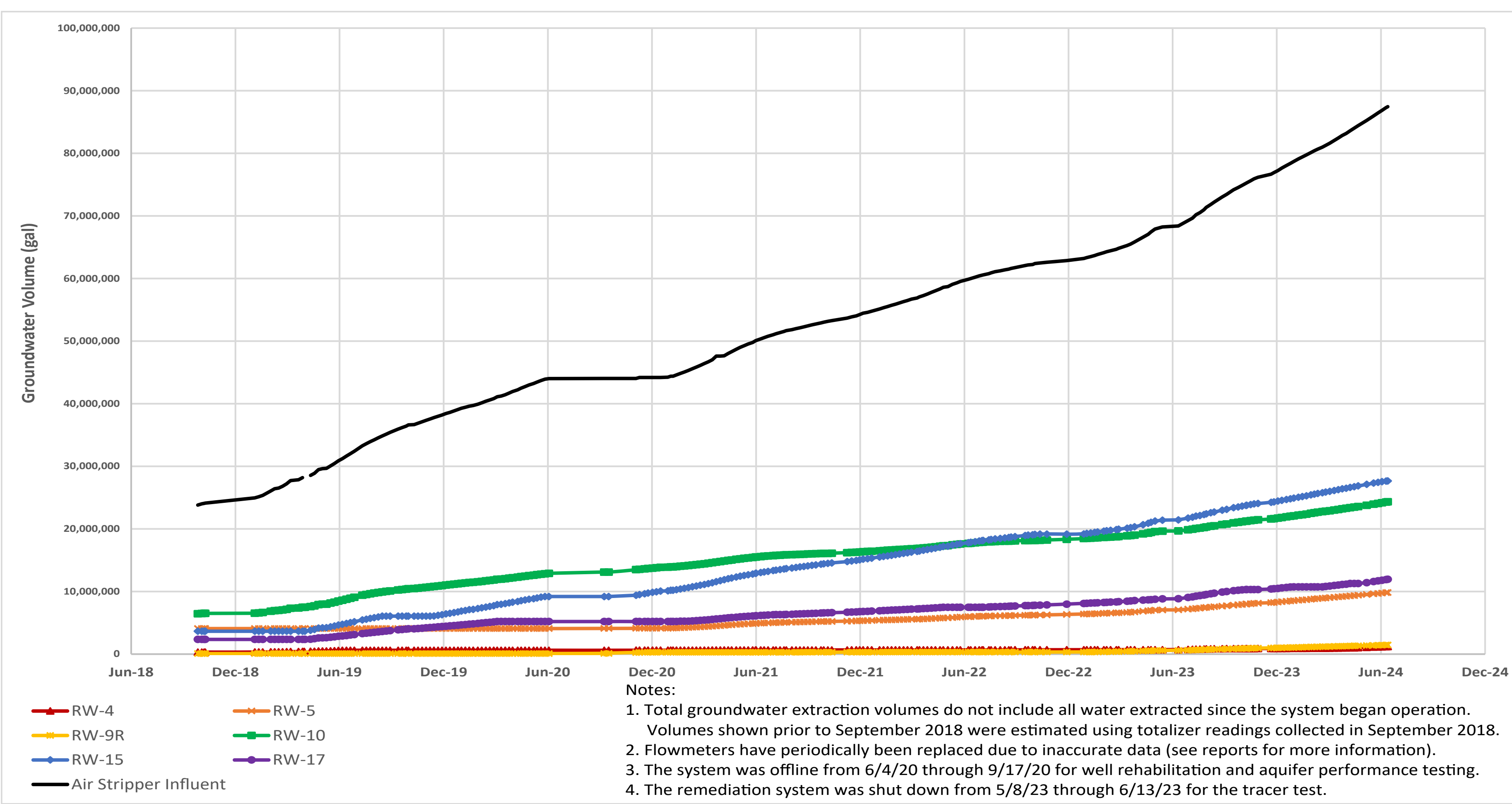
Figure 3-4
Remediation System
Well Locations

Panel A - Average Groundwater Extraction Flow Rates



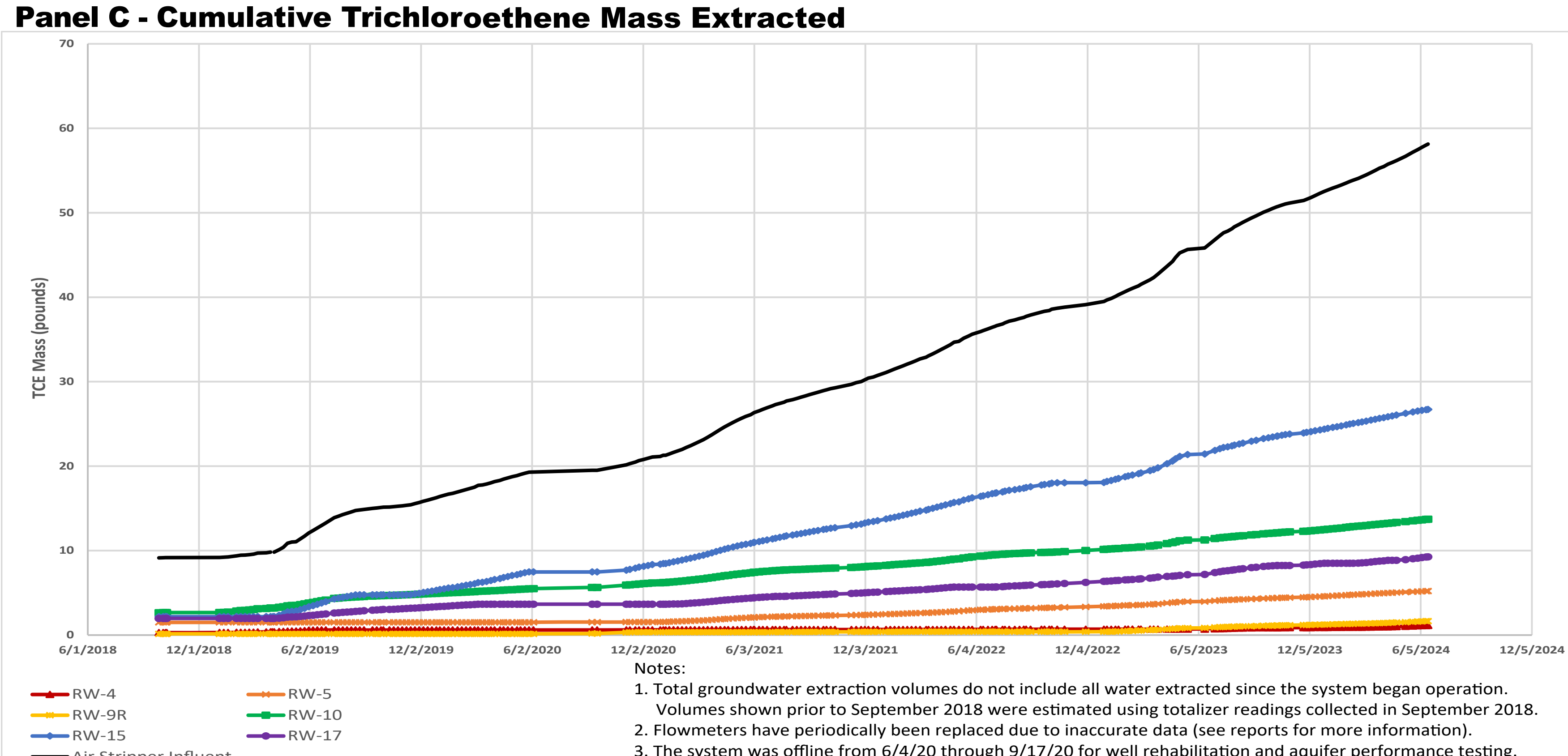
Notes:
1. Flowmeters have periodically been replaced due to inaccurate data (see reports for more information).
2. The system was offline from 6/4/20 through 9/17/20 for well rehabilitation and aquifer performance testing.
3. The remediation system was shut down from 5/8/23 through 6/13/23 for the tracer test.

Panel B - Cumulative Groundwater Extracted



Notes:
1. Total groundwater extraction volumes do not include all water extracted since the system began operation. Volumes shown prior to September 2018 were estimated using totalizer readings collected in September 2018.
2. Flowmeters have periodically been replaced due to inaccurate data (see reports for more information).
3. The system was offline from 6/4/20 through 9/17/20 for well rehabilitation and aquifer performance testing.
4. The remediation system was shut down from 5/8/23 through 6/13/23 for the tracer test.

Panel C - Cumulative Trichloroethene Mass Extracted



Notes:
1. Total groundwater extraction volumes do not include all water extracted since the system began operation. Volumes shown prior to September 2018 were estimated using totalizer readings collected in September 2018.
2. Flowmeters have periodically been replaced due to inaccurate data (see reports for more information).
3. The system was offline from 6/4/20 through 9/17/20 for well rehabilitation and aquifer performance testing.
4. The remediation system was shut down from 5/8/23 through 6/13/23 for the tracer test.

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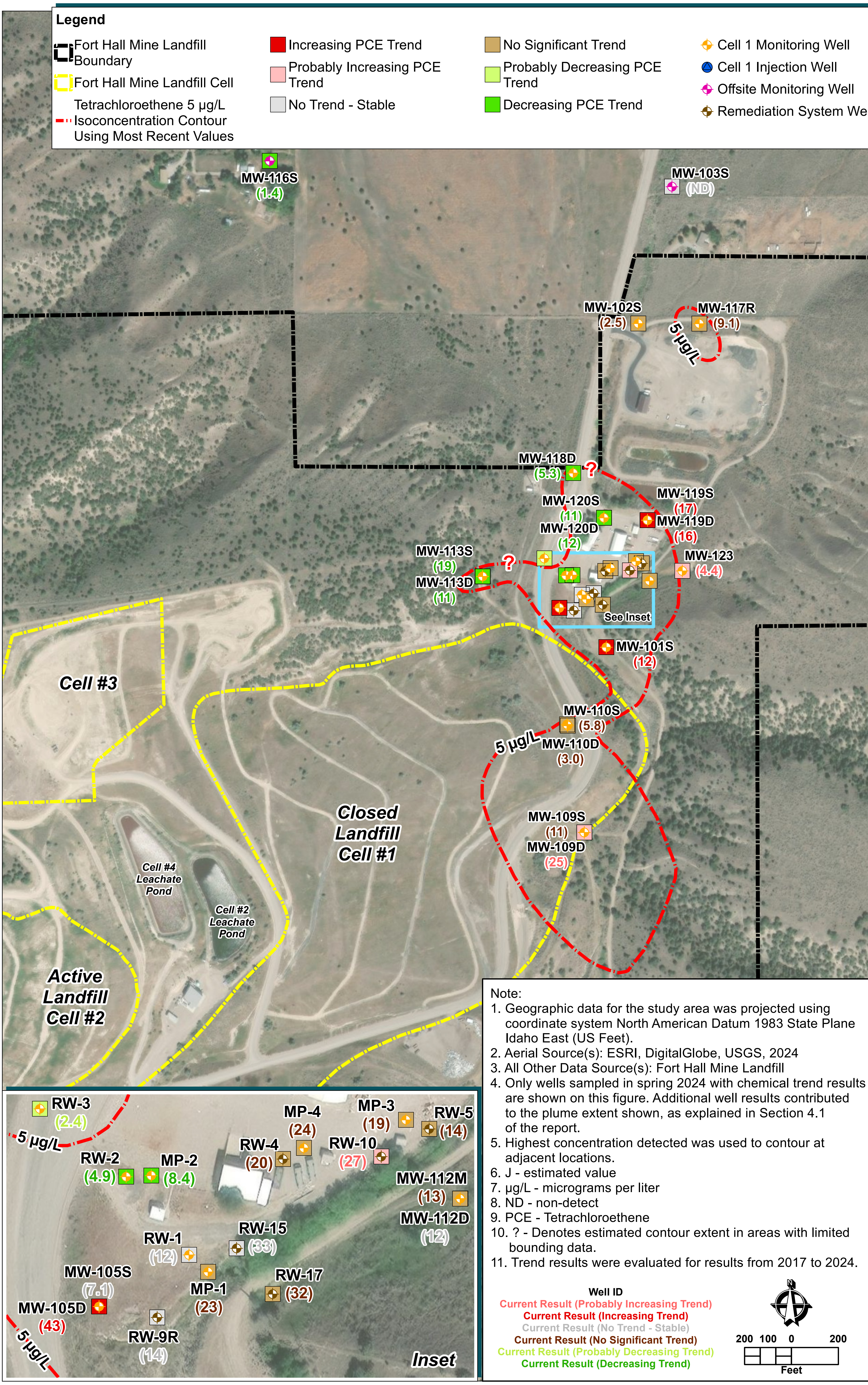
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 3-5
Treatment System Monitoring Trends



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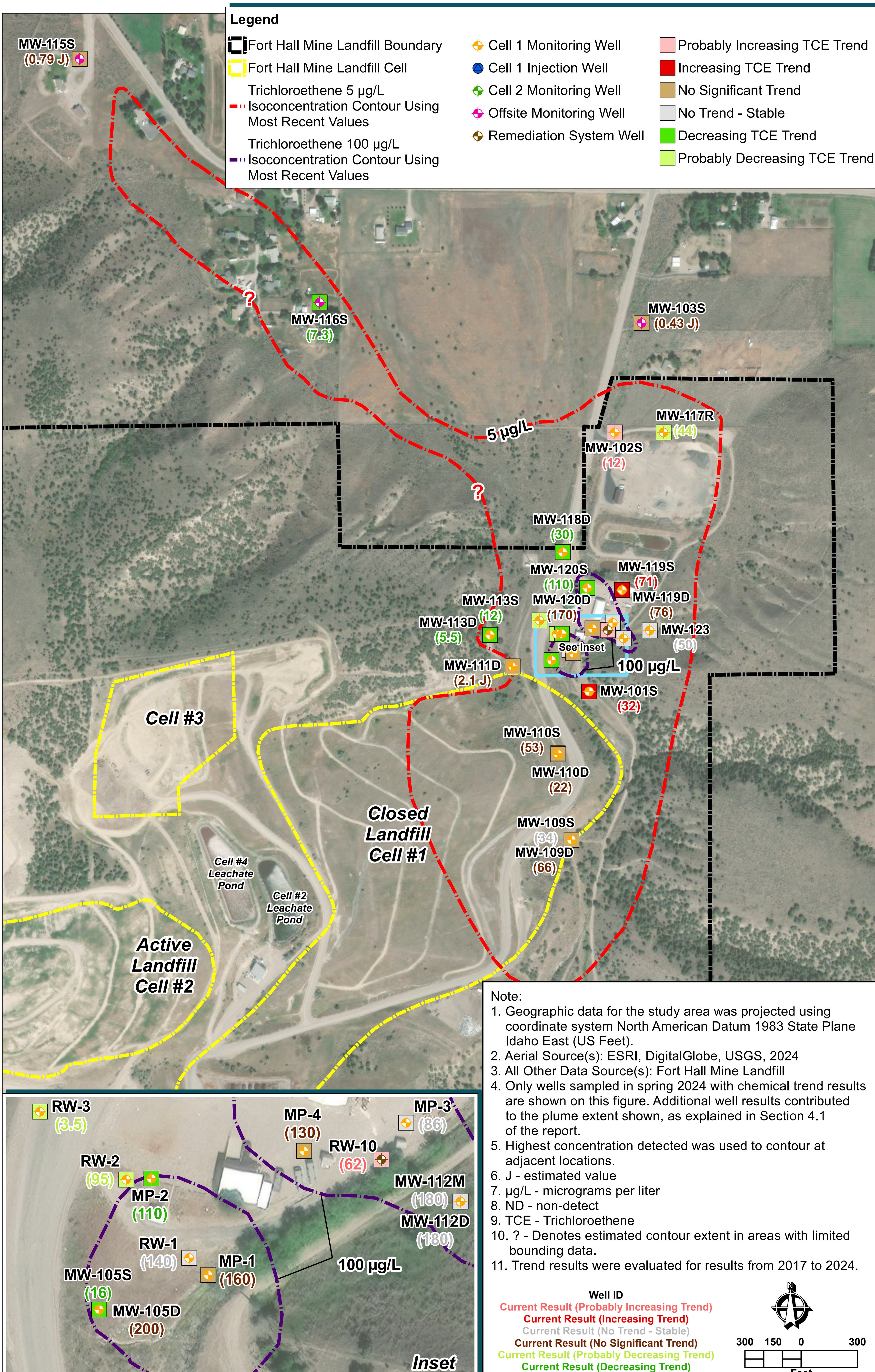
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 4-1
Tetrachloroethene Plume Extent and Trend Analysis



Note:
1. Geographic data for the study area was projected using coordinate system North American Datum 1983 State Plane Idaho East (US Feet).
2. Aerial Source(s): ESRI, DigitalGlobe, USGS, 2024
3. All Other Data Source(s): Fort Hall Mine Landfill
4. Only wells sampled in spring 2024 with chemical trend results are shown on this figure. Additional well results contributed to the plume extent shown, as explained in Section 4.1 of the report.
5. Highest concentration detected was used to contour at adjacent locations.
6. J - estimated value
7. µg/L - micrograms per liter
8. ND - non-detect
9. TCE - Trichloroethene
10. ? - Denotes estimated contour extent in areas with limited bounding data.
11. Trend results were evaluated for results from 2017 to 2024.

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2024 Spring Semiannual Cell 1, 2 and 4 Groundwater Monitoring and Remediation System Operation and Maintenance Report
Fort Hall Mine Landfill, Bannock County, Idaho

Figure 4-2
Trichloroethene Plume Extent and Trend Analysis

TABLES

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Table 2-1
Summary of Sample Locations and Anaylsis Spring 2024

Location Group	Location	Sampling Approach	Water Levels	Field parameters[1]	Appendix II RCRA Subtitle D Parameters													
					Appendix I				Additional Appendix II									
					VOCs			Total metals	SVOCs		O/C Pest[2]	O/P Pest	Chlor Herb	PCBs[2]	Dioxin/ Furan	Mercury	Cyanide	Total Sulfide
				water quality meter	8260D	8260D unpreserved	8011	6020B	8270E	8270E SIM	8081B	8141B	8321B	8082A	8290A	7470A	SM4500_CN_E	SM4500-S2-D
Cell 1	MP-1	Passive	X	X	X													
Cell 1	MP-2	Portable Pump[4]	X	X	X			X										
Cell 1	MP-3	Passive	X	X	X													
Cell 1	MP-4	Passive	X	X	X													
Cell 1	MP-9	NA	X															
Cell 1	MW-1	NA	X															
Cell 1	MW-101S	Passive	X	X	X													
Cell 1	MW-102S	Dedicated	X	X	X													
Cell 1	MW-104D	NA	X															
Cell 1	MW-104S	NA	X															
Cell 1	MW-105D	Dedicated	X	X	X	X												
Cell 1	MW-105S	Dedicated	X	X	X	X												
Cell 1	MW-109D	Passive	X	X	X													
Cell 1	MW-109S	Passive	X	X	X													
Cell 1	MW-110D	Passive	X	X	X													
Cell 1	MW-110S	Passive	X	X	X													
Cell 1	MW-111D	Dedicated	X	X	X	X												
Cell 1	MW-111S	Passive[5]	X	X	X													
Cell 1	MW-112D	Dedicated	X	X	X													
Cell 1	MW-112M	Passive	X	X	X													
Cell 1	MW-112S	Bail (If Not DRY)	X															
Cell 1	MW-113D	Passive	X	X	X													
Cell 1	MW-113S	Dedicated	X	X	X													
Cell 1	MW-117R	Passive[5]	X	X	X													
Cell 1	MW-118D	Dedicated	X	X	X													
Cell 1	MW-119D	Dedicated	X	X	X													
Cell 1	MW-119S	Dedicated	X	X	X													
Cell 1	MW-120D	Dedicated	X	X	X													
Cell 1	MW-120S	Dedicated	X	X	X													
Cell 1	MW-121	Portable Pump	X	X	X			X										
Cell 1	MW-122	Bail (If Not DRY)	X	X	X													
Cell 1	MW-123	Passive	X	X	X													
Cell 1	MW-124	Portable Pump[4]	X	X	X			X										
Cell 1	MW-125	Portable Pump[4]	X	X	X			X										
Cell 1	RW-1	Portable Pump[4]	X	X	X													
Cell 1	RW-16	NA	X															
Cell 1	RW-2	Portable Pump[4]	X	X	X			X										
Cell 1	RW-3	Portable Pump[4]	X	X	X													
Cell 2	MW-12	Dedicated	X	X	X		X	X	X	X	X							
Cell 2	MW-13	Dedicated	X	X	X		X	X	X	X	X							
Cell 2	MW-7	NA																
Cell 2	MW-8	Dedicated	X	X	X		X	X	X	X	X							
Cell 2	MW-9	Dedicated	X	X	X		X	X	X	X	X							
Cell 4	MW-3A	Dedicated	X	X	X		X	X										
Cell 4	MW-4	Dedicated	X	X	X		X	X										
Cell 4	MW-4A	Dedicated	X	X	X		X	X										
Cell 4	MW-5AR	Dedicated	X	X	X		X	X										
Cell 4	MW-6A	Dedicated	X	X	X		X	X										
Offsite	MW-103D	NA	X															
Offsite	MW-103S	Dedicated	X	X	X													
Offsite	MW-106D	NA	X															
Offsite	MW-106S	NA	X															
Offsite	MW-115D	NA	X															

Table 2-1
Summary of Sample Locations and Anaylsis Spring 2024

Location Group	Location	Sampling Approach	Water Levels	Field parameters[1]	Appendix II RCRA Subtitle D Parameters													
					Appendix I				Additional Appendix II									
					VOCs			Total metals	SVOCs		O/C Pest[2]	O/P Pest	Chlor Herb	PCBs[2]	Dioxin/ Furan	Mercury	Cyanide	Total Sulfide
				water quality meter	8260D	8260D unpreserved	8011	6020B	8270E	8270E SIM	8081B	8141B	8321B	8082A	8290A	7470A	SM4500_CN_E	SM4500-S2-D
Offsite	MW-115S	Passive	X	X	X													
Offsite	MW-116D	NA																
Offsite	MW-116S	Portable Pump		X	X													
RSE	RW-10	Tap		X	X													
RSE	RW-15	Tap		X	X													
RSE	RW-17	Tap		X	X													
RSE	RW-4	Tap		X	X													
RSE	RW-5	Tap		X	X													
RSE	RW-9R	Tap		X	X													
System Effluent*	INJ-1R	Tap			X		X	X	X	X	X	X	X	X	X	X	X	X

Notes

Parameters specified for analysis are for routine monitoring and may not include those analyzed for pilot or tracer study monitoring.

* INJ-1R will also be sampled for VOCs (8260B) in the winter and summer

[1] Field parameters include pH, oxidation reduction potential, turbidity, dissolved oxygen, specific conductivity, and temperature

[2] PCBs and O/C Pest are collected in the same bottle

[3] Anions include sulfate, chloride, nitrate, nitrite, and bromide

[4] After spring 2024, these wells will be sampled via passive methods.

[5] It was decided to install hydrasleeves for these wells instead of bailing after discussion between Hannah Rolton and Ben Carreon on 4/30/2024

Acronyms and Abbreviations

Chlor Herb = chlorinated herbicides
Herb = herbicide
O/C = organochlorine
O/P = organophosphate
PCBs = polychlorinated biphenyls
Pest = pesticide
RCRA = Resource Conservation and Recovery Act
RSE = remediation system extraction
SVOCs = semivolatile organic compounds
VOCs = volatile organic compounds

Section 3 Tables Notes

Highlight indicates values greater than the MCL
Underline indicates values greater than IDGW Standard (or outside range for pH)
Bold indicates detected values
Italics indicates nondetected values

µg/L = micrograms per liter
µS/cm = microsiemens per centimeter
EPA = U.S. Environmental Protection Agency
ID GW = Idaho Groundwater Standards
J = Result is estimated
J- = Result is estimated biased low
J+ = Result is estimated biased high
MCL = maximum contaminant level
mg/L = milligrams per liter
NTU = Nephelometric Turbidity Unit
PCB = Polychlorinated Biphenyl
pg/L = picograms per liter
Q = qualifier
R = Result is Rejected
su = standard unit
SVOCs = semivolatile organic compounds
U = Analyte was not detected at the associated value
UJ = The non-detection at the associated value is an estimate
VOCs = volatile organic compounds

Table 3-1
Monitoring Well Water Levels, Screened Intervals, and Vertical Gradients

Well ID	Screened Interval (ft bgs)	Remediation System On			Direction of Gradient^	Gradient^ (ft/ft)
		Measurement Date and Time	Water Level Depth (ft btoc)	Water Level Elevation (ft amsl)		
MP-1	60-100	04/30/2024 13:26:00	57.39	4599.29	NA	NA
MP-2	50-90	04/30/2024 14:30:00	63.84	4591.33	NA	NA
MP-3	60-100	04/30/2024 15:43:00	56.87	4586.36	NA	NA
MP-4	60-100	04/30/2024 15:22:00	58.38	4587.26	NA	NA
MP-9	120-125	04/30/2024 12:58:00	55.48	4607.57	NA	NA
MW-1	77-97	04/30/2024 14:23:00	60.18	4604.72	NA	NA
MW-101S	55-75	04/30/2024 14:10:00	56.39	4610.01	NA	NA
MW-102S	125-145	04/30/2024 12:15:00	123.28	4470.92	NA	NA
MW-103D	173.5-183.5	04/30/2024 12:45:00	87.50	4472.60	up	-0.02
MW-103S	90-110	04/30/2024 12:53:00	88.85	4471.15		
MW-104D	79-89	04/30/2024 12:49:00	55.12	4604.96	down	0.10
MW-104S	47-67	04/30/2024 12:51:00	52.65	4607.57		
MW-105D	72-82	04/30/2024 12:35:00	59.45	4603.15	down	0.28
MW-105S	45-65	04/30/2024 12:37:00	54.52	4608.08		
MW-106D	89-99	04/30/2024 13:35:00	47.60	4468.50	none	0.00
MW-106S	55-75	04/30/2024 13:40:00	48.37	4468.53		
MW-109D	75-95	04/30/2024 13:05:00	60.78	4658.82	down	0.40
MW-109S	42-62	04/30/2024 13:14:00	48.92	4670.78		
MW-110D	154-159	04/30/2024 09:57:00	123.37	4624.46	down	0.07
MW-110S	107.5-127.5	04/30/2024 09:31:00	120.55	4626.64		
MW-111D	104-124	04/30/2024 10:11:00	58.34	4640.76	down	0.21
MW-111S	54-74	04/30/2024 10:15:00	47.40	4652.00		
MW-112D	93-103	04/30/2024 14:49:00	61.26	4586.95	up	-0.02
MW-112M	66-76	04/30/2024 14:43:00	61.91	4586.31		
MW-112S	41-61	04/30/2024 15:21:00	61.26	4586.26	NA	NA
MW-113D	115-135	04/30/2024 10:30:00	22.40	4689.31	up	-0.02
MW-113S	74-94	04/30/2024 10:30:00	23.88	4687.70		
MW-115D	100-120	04/30/2024 13:50:00	70.10	4468.70	none	0.00
MW-115S	80-90	04/30/2024 13:53:00	70.03	4468.67		
MW-117R	113-123	04/30/2024 12:25:00	112.27	4470.83	NA	NA
MW-118D	82-102	04/30/2024 12:00:00	84.27	4557.23	NA	NA
MW-119D	90-100	04/30/2024 10:44:00	67.93	4573.57	down	0.14
MW-119S	70-80	04/30/2024 10:50:00	64.14	4576.96		
MW-120D	90-100	04/30/2024 11:32:00	76.81	4566.69	--	--
MW-120S	70-80	04/30/2024 11:30:00	76.10	4567.40		
MW-121	67-87	04/30/2024 15:08:00	55.07	4596.43	NA	NA
MW-122	38-48	04/30/2024 14:28:00	51.02	4628.04	NA	NA
MW-123	67.3-71.3	04/30/2024 15:00:00	38.42	4615.26	NA	NA
MW-124	60-90	04/30/2024 15:06:00	61.55	4583.74	NA	NA
MW-125	60-90	04/30/2024 14:52:00	67.85	4578.58	NA	NA
MW-12	168.5-208.5	04/30/2024 11:16:00	162.06	5065.74	NA	NA
MW-13	157-177	04/30/2024 12:11:00	74.60	4936.10	NA	NA
MW-3A	379-399	04/30/2024 10:48:00	282.53	4985.37	NA	NA
MW-4	141-181	04/30/2024 10:26:00	130.11	4945.79	NA	NA
MW-4A	179-199	04/30/2024 11:02:00	142.28	5362.92	NA	NA
MW-5AR	195-215	04/30/2024 11:34:00	154.39	5071.44	NA	NA
MW-6A	145.4-165.4	04/30/2024 10:35:00	90.16	4997.84	NA	NA
MW-8	189.5-229.5	04/30/2024 11:58:00	194.14	4928.86	NA	NA
MW-9	229.5-269.5	04/30/2024 11:46:00	213.12	4980.38	NA	NA
RW-1	60-100	04/30/2024 13:17:00	56.66	4598.74	NA	NA
RW-2	70-90	04/30/2024 14:25:00	59.85	4595.38	NA	NA
RW-3	50-90	04/30/2024 14:45:00	51.50	4601.11	NA	NA

Notes
ft btoc = feet below top of casing
ft amsl = feet above mean sea level
ft bgs = feet below ground surface
NA = not applicable
^Direction and magnitude of gradient is calculated between shallow and deep paired wells

Table 3-2
Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells VOC Results

				Area	Cell 1 Monitoring Well																					
				Well ID	FW-1		FW-1		FW-1		MP-1		MP-2		MP-3		MP-4		MW-101S		MW-102S		MW-102S		MW-102S	
				Sample Name	FW-1-205.0-20240222		FW-1-315.0-20240222		FW-1-425.0-20240222		MP-1-20240503		MP-2-20240507		MP-3-20240514		MP-4-20240503		MW-101S-20240503		MW-102S-135.0-20240222		MW-102S-20240505		MW-102SQ-20240505	
		ID GW -	ID GW -	Sample Date	2/22/2024		2/22/2024		2/22/2024		5/3/2024		5/7/2024		5/14/2024		5/3/2024		5/3/2024		2/22/2024		5/5/2024		5/5/2024	
Analyte	EPA MCL	PRIMARY	SECONDARY	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	200	200	--	µg/L	0.39	U	0.39	U	0.39	U	0.78	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
1,1-Dichloroethane	--	--	--	µg/L	0.22	U	0.22	U	0.22	U	0.96	J	1.2		0.32	J	0.51	J	0.22	U	0.22	U	0.22	U	0.22	U
1,1-Dichloroethene	7	7	--	µg/L	0.23	U	0.23	U	0.23	U	0.46	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U
1,2-Dichlorobenzene	600	600	--	µg/L	0.37	U	0.37	U	0.37	U	3.7		1.7		0.14	U	0.56	J	0.14	U	0.37	U	0.14	U	0.14	U
1,2-Dichloroethane	5	5	--	µg/L	0.54	U	0.54	U	0.54	U	0.56	U	0.28	U	0.28	U	0.28	U	0.28	U	0.54	U	0.28	U	0.28	U
1,2-Dichloropropane	5	5	--	µg/L	0.52	U	0.52	U	0.52	U	0.49	U	0.86	J	0.24	U	0.24	U	0.24	U	0.52	U	0.24	U	0.24	U
1,3-Dichlorobenzene	--	600	--	µg/L	0.33	U	0.33	U	0.33	U	0.67	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
1,4-Dichlorobenzene	75	75	--	µg/L	0.39	U	0.39	U	0.39	U	1.3	J	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
2,2-Dichloropropane	--	--	--	µg/L	0.38	U	0.38	U	0.38	U	0.34	U	0.17	U	0.17	U	0.17	U	0.17	U	0.38	U	0.17	U	0.17	U
2-Butanone (MEK)	--	--	--	µg/L	6	U	6	U	6	U	9.2	U	4.6	U	4.6	U	4.6	U	4.6	U	6	U	4.6	U	4.6	U
4-Methyl-2-pentanone (MIBK)	--	--	--	µg/L	0.98	U	0.98	U	0.98	U	2	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Acetone	--	--	--	µg/L	6.6	U	6.6	U	6.6	U	13	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
Benzene	5	5	--	µg/L	0.31	U	0.31	U	0.31	U	0.29	U	0.14	U	0.14	U	0.14	U	0.14	U	0.31	U	0.14	U	0.14	U
Carbon disulfide	--	--	--	µg/L	0.63	U	0.63	U	0.63	U	0.6	J	0.26	U	0.26	U	0.26	U	0.26	U	0.63	U	0.26	U	0.26	U
Chlorobenzene	100	100	--	µg/L	0.42	U	0.42	U	0.42	U	1	J	0.34	J	0.092	U	0.092	U	0.092	U	0.42	U	0.092	U	0.092	U
Chloroethane	--	--	--	µg/L	1.4	U	1.4	U	1.4	U	1.3	U	0.64	U	0.64	U	0.64	U	0.64	U	1.4	U	0.64	U	0.64	U
Chloroform	80	2	--	µg/L	0.36	U	0.36	U	0.36	U	0.94	J	1.1		1.3		1.1		0.36	U	0.36	U	0.36	U	0.36	U
Chloromethane	--	--	--	µg/L	0.75	U	0.75	U	0.75	U	0.45	U	0.23	U	0.23	U	0.23	U	0.23	U	0.75	U	0.23	U	0.23	U
cis-1,2-Dichloroethene	70	70	--	µg/L	0.32	U	0.32	U	0.32	U	20		23		3		6.8		0.6	J	0.34	J	0.88	J	0.94	J
Dichlorodifluoromethane	--	--	--	µg/L	0.96	U	0.96	U	0.96	U	0.6	U	0.3	U	0.3	U	0.3	U	0.3	U	0.96	U	0.3	U	0.3	U
Ethylbenzene	700	700	--	µg/L	0.3	U	0.3	U	0.3	U	0.29	U	0.14	U	0.14	U	0.14	U	0.14	U	0.3	U	0.14	U	0.14	U
m,p-Xylene	10000	--	--	µg/L	0.36	U	0.36	U	0.36	U	0.71	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
o-xylene	10000	--	--	µg/L	0.33	U	0.33	U	0.33	U	0.23	U	0.11	U	0.11	U	0.11	U	0.11	U	0.33	U	0.11	U	0.11	U
Tetrachloroethene	5	5	--	µg/L	0.4	U	0.4	U	0.4	U	23		8.4		19		24		12		0.69	J	2.5		2.6	
Toluene	1000	1000	--	µg/L	0.32	U	0.32	U	0.32	U	0.64	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
trans-1,2-Dichloroethene	100	100	--	µg/L	0.37	U	0.37	U	0.37	U	0.74	U	0.61	J	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U
Trichloroethene	5	5	--	µg/L	0.3	U	0.3	U	0.3	U	160		110		86		130		32		2.9		12		12	
Trichlorofluoromethane	--	--	--	µg/L	0.57	U	0.57	U	0.57	U	0.4	U	0.2	U	0.2	U	0.2	U	0.2	U	0.57	U	0.2	U	0.2	U
Vinyl chloride	2	2	--	µg/L	0.51	U	0.51	U	0.51	U	3.3		1.8		0.23	U	0.31	J	0.23	U	0.51	U	0.23	U	0.23	U
Xylenes, total	10000	10000	--	µg/L	0.33	U	0.33	U	0.33	U	0.23	U	0.11	U	0.11	U	0.11	U	0.11	U	0.33	U	0.11	U	0.11	U
Field and Redox Parameters																										
Alkalinity	--	--	--	mg/L	--		--		--		--		550		--		--		--		--		--		--	
Bromide	--	--	--	mg/L	0.23	U	0.88		0.51		--		1.7		--		--		--		0.23	U	--		--	
Chloride	--	--	250	mg/L	--		--		--		--		320		--		--		--		--		--		--	
Dissolved Oxygen	--	--	--	mg/L	9.63		8.56		8.6		20.9		1.24		3.82		2.5		5.91		8.95		5.92		5.92	
Ethane	--	--	--	µg/L	--		--		--		--		0.57	U	--		--		--		--		--		--	
Ethene	--	--	--	µg/L	--		--		--		--		0.4	U	--		--		--		--		--		--	
Ferrous Iron	--	--	--	mg/L	--		--		--		--		0.03		--		--		--		--		--		--	
Manganese- Dissolved	--	--	0.05	mg/L	--		--		--		--		0.01		--		--		--		--		--		--	
Manganese- Total	--	--	0.05	mg/L	--		--		--		--		0.0093		--		--		--		--		--		--	
Methane	--	--	--	mg/L	--		--		--		--		0.092		--		--		--		--		--		--	
Nitrate	10	10	--	mg/L	--		--		--		--		1.5		--		--		--		--		--		--	
Oxidation-Reduction Potential	--	--	--	millivolts	29.8		33.9		6.9		238.8		123.8		160.1		245.6		108.8		25.3		109.7		109.7	
pH	--	--	6.5 - 8.5	su	8.43		8.45		8.21		6.5		6.34		6.89		6.54		6.84		7.73		6.88		6.88	
Specific Conductance	--	--	--	µS/cm	289		280		564		1903		2139		1344		3609		906		389		967		967	
Sulfate	--	--	250	mg/L	--		--		--		--		110		--		--		--		--		--		--	
Temperature	--	--	--	Celsius	11.74		10.72		10.22		11.6		8.2		12.8		11.2		13.4		10.19		10.5		10.5	
Total Organic Carbon	--	--	--	mg/L	--		--		--		--		5.4		--		--		--		--		--		--	
Turbidity	--	--	--	ntu	398		69.1		27.7		3		0.54		3.4		63.4		3.67		3.21		0.36		0.36	

Table 3-2
Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells VOC Results

	Cell 1 Monitoring Well																									
	MW-105D		MW-105S		MW-109D		MW-109S		MW-110D		MW-110S		MW-111D		MW-111S		MW-112D		MW-112M		MW-113D		MW-113S		MW-117R	
	MW-105D-20240502		MW-105S-20240502		MW-109D-20240503		MW-109S-20240503		MW-110D-20240503		MW-110S-20240514		MW-111D-20240501		MW-111S-20240503		MW-112D-20240501		MW-112M-20240514		MW-113D-20240503		MW-113S-20240501		MW-117R-20240503	
	5/2/2024		5/2/2024		5/3/2024		5/3/2024		5/3/2024		5/14/2024		5/1/2024		5/3/2024		5/1/2024		5/14/2024		5/3/2024		5/1/2024		5/3/2024	
Analyte	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	1.6	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	R	0.39	U	0.78	U	0.63	J	0.39	U	0.39	U	0.39	U
1,1-Dichloroethane	3.7	J	0.22	U	0.22	U	0.22	U	0.22	U	0.74	J	2.3	J	0.43	J	0.44	U	0.51	J	7.6		22		0.22	U
1,1-Dichloroethene	0.92	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	R	0.23	U	0.46	U	0.45	J	0.25	J	0.68	J	0.23	U
1,2-Dichlorobenzene	0.58	U	0.24	J	0.14	U	0.14	U	0.14	U	2.6		14	J	23		0.29	U	0.14	U	0.14	U	11		0.14	U
1,2-Dichloroethane	1.1	U	0.28	U	0.28	U	0.28	U	0.28	U	0.45	J	0.28	R	0.28	U	0.56	U	0.28	U	1.7		3.8		0.28	U
1,2-Dichloropropane	0.97	U	0.24	U	0.24	U	0.24	U	0.24	U	0.71	J	1.3	J	1		0.49	U	0.24	U	1.4		4.5		0.24	U
1,3-Dichlorobenzene	1.3	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	J	0.46	J	0.67	U	0.33	U	0.33	U	0.33	U	0.33	U
1,4-Dichlorobenzene	1.6	U	0.39	U	0.39	U	0.39	U	0.39	U	0.92	J	9.3	J	17		0.78	U	0.39	U	0.53	J	5.8		0.39	U
2,2-Dichloropropane	0.67	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	R	0.17	U	0.34	U	0.17	U	0.17	U	0.17	U	0.17	U
2-Butanone (MEK)	18	U	4.6	U	4.6	U	4.6	U	4.6	U	4.6	U	4.6	R	6.8	J	9.2	U	4.6	U	4.6	U	4.6	U	4.6	U
4-Methyl-2-pentanone (MIBK)	3.9	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	R	2.2	J	2	U	0.98	U	0.98	U	0.98	U	0.98	U
Acetone	26	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	R	12	J	13	U	6.6	U	6.6	U	6.6	U	6.6	U
Benzene	0.58	U	0.14	U	0.14	U	0.14	U	0.14	U	0.49	J	12	J	17		0.29	U	0.14	U	0.44	J	6.2		0.14	U
Carbon disulfide	1	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	R	0.26	U	0.51	U	0.26	U	0.26	U	0.26	U	0.26	U
Chlorobenzene	0.37	U	0.092	U	0.092	U	0.092	U	0.092	U	0.57	J	75	J	120		0.18	U	0.092	U	0.092	U	0.55	J	0.092	U
Chloroethane	2.6	U	0.64	U	0.64	U	0.64	U	0.64	U	0.64	U	0.64	R	1	J	1.3	U	0.64	U	0.64	U	0.64	U	0.64	U
Chloroform	1.7	J	1.1		0.49	J	0.55	J	0.36	U	0.36	U	0.36	R	0.36	U	0.72	U	0.64	J	0.87	J	1.2		0.59	J
Chloromethane	0.91	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	R	0.23	U	0.45	U	0.23	U	0.23	U	0.23	U	0.23	U
cis-1,2-Dichloroethene	14		1.3		0.32	U	0.32	U	1.9		9.1		0.44	J	0.35	J	0.64	U	0.32	U	12		26		3.8	
Dichlorodifluoromethane	3.2	J	0.3	U	0.3	U	0.3	U	1.9	J	0.4	J	0.3	R	0.3	U	1.4	J	1.9	J	17		17		0.3	U
Ethylbenzene	0.58	U	0.14	U	0.14	U	0.14	U	0.14	U	0.14	U	6.6	J	17		0.29	U	0.14	U	0.14	U	0.14	U	0.14	U
m,p-Xylene	1.4	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.92	J	14		0.71	U	0.36	U	0.36	U	0.36	U	0.36	U
o-xylene	0.46	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	6.3	J	21		0.23	U	0.11	U	0.11	U	1.1		0.11	U
Tetrachloroethene	43		7.1		25		11		3		5.8		0.4	R	0.4	U	12		13		11		19		9.1	
Toluene	1.3	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	R	0.76	J	0.64	U	0.32	U	0.32	U	0.32	U	0.32	U
trans-1,2-Dichloroethene	1.5	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	R	0.37	U	0.74	U	0.37	U	0.37	U	1.2		0.37	U
Trichloroethene	200		16		66		34		22		53		2.1	J	0.3	U	180		180		5.5		12		44	
Trichlorofluoromethane	0.79	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	R	0.2	U	0.67	J	0.59	J	1.7	J	1.1	J	0.2	U
Vinyl chloride	0.9	U	0.23	U	0.23	U	0.23	U	0.23	U	6		0.23	R	0.23	U	0.45	U	0.23	U	14		64		0.23	U
Xylenes, total	0.46	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	7.2	J	35		0.23	U	0.11	U	0.11	U	1.1		0.11	U
Field and Redox Parameters																										
Alkalinity	--		--		--		--		--		--		--		--		--		--		--		--		--	
Bromide	--		--		--		--		--		--		--		--		--		--		--		--		--	
Chloride	--		--		--		--		--		--		--		--		--		--		--		--		--	
Dissolved Oxygen	6.3		1.78		4.28		8.18		18.9		1.21		0.55		0.75		9.93		5.07		2.39		0.51		5.9	
Ethane	--		--		--		--		--		--		--		--		--		--		--		--		--	
Ethene	--		--		--		--		--		--		--		--		--		--		--		--		--	
Ferrous Iron	0.02		0	U	--		--		--		--		--		--		--		--		--		--		--	
Manganese- Dissolved	--		--		--		--		--		--		--		--		--		--		--		--		--	
Manganese- Total	--		--		--		--		--		--		--		--		--		--		--		--		--	
Methane	--		--		--		--		--		--		--		--		--		--		--		--		--	
Nitrate	--		--		--		--		--		--		--		--		--		--		--		--		--	
Oxidation-Reduction Potential	162.5		217.5		138.6		124.8		-124.9		120.1		-136.1		-89.4		173.7		251.1		86.9		33.1		222	
pH	6.77		6.76		7.11		7.05		7.24		6.34		6.61		6.75		7.41		6.64		7.12		6.37		6.77	
Specific Conductance	1748		3848		1055		1024		976		1586		7537		8420		786		923		959		3057		1515	
Sulfate	--		--		--		--		--		--		--		--		--		--		--		--		--	
Temperature	11.3		8.8		11.1		11.5		13.7		13.7		9.2		13.1		9.9		14		14.7		10.7		11.3	
Total Organic Carbon	2.2		20		--		--		--		--		--		--		--		--		--		--		--	
Turbidity	0.43		0.51		4.18		19.7		12.4		4.6		0.51		19.7		2.4		12.17		7.72		0.25		6.91	

Table 3-2
Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells VOC Results

	Cell 1 Monitoring Well											
	MW-118D		MW-118D		MW-119D		MW-119D		MW-119S		MW-119S	
	MW-118D-20240502		MW-118D-93.4-20240222		MW-119D-20240502		MW-119D-95.0-20240222		MW-119S-20240502		MW-119SQ-20240502	
	5/2/2024		2/22/2024		5/2/2024		2/22/2024		5/2/2024		5/2/2024	
Analyte	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
1,1-Dichloroethane	5.2		9.3		0.22	U	0.27	J	0.22	UJ	0.28	J
1,1-Dichloroethene	0.23	U	1.2		0.23	U	0.23	U	0.23	U	0.23	U
1,2-Dichlorobenzene	3		1.6		0.14	U	0.37	U	0.16	J	0.14	UJ
1,2-Dichloroethane	0.28	U	0.54	U	0.28	U	0.54	U	0.28	U	0.28	U
1,2-Dichloropropane	0.8	J	1.1		0.24	U	0.52	U	0.24	U	0.24	U
1,3-Dichlorobenzene	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
1,4-Dichlorobenzene	1.9		0.93	J	0.39	U	0.39	U	0.39	U	0.39	U
2,2-Dichloropropane	0.17	U	0.38	U	0.17	U	0.38	U	0.17	U	0.17	U
2-Butanone (MEK)	4.6	U	6	U	4.6	U	6	U	4.6	U	4.6	U
4-Methyl-2-pentanone (MIBK)	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Acetone	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
Benzene	1.5		1.2		0.14	U	0.31	U	0.14	U	0.14	U
Carbon disulfide	0.26	U	0.63	U	0.26	U	0.63	U	0.26	U	0.26	U
Chlorobenzene	8.3		0.61	J	0.092	U	0.42	U	0.092	U	0.092	U
Chloroethane	0.64	U	1.4	U	0.64	U	1.4	U	0.64	U	0.64	U
Chloroform	0.36	U	0.61	J	0.92	J	0.89	J	1.1		1	
Chloromethane	0.23	U	0.75	U	0.46	J	0.75	U	0.23	U	0.23	U
cis-1,2-Dichloroethene	2.4		9.6		2.6		1.8		2.4		2.4	
Dichlorodifluoromethane	1.5	J	4.3		0.3	U	0.96	U	0.3	U	0.3	U
Ethylbenzene	0.14	U	0.3	U	0.14	U	0.3	U	0.14	U	0.14	U
m,p-Xylene	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
o-xylene	0.44	J	0.33	U	0.11	U	0.33	U	0.11	U	0.11	U
Tetrachloroethene	5.3		16		16		16		17		17	
Toluene	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
trans-1,2-Dichloroethene	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U
Trichloroethene	30		100		76		76		71		71	
Trichlorofluoromethane	0.2	U	0.72	J	0.2	U	0.57	U	0.2	U	0.2	U
Vinyl chloride	0.23	U	1.3	J	0.23	U	0.51	U	0.23	U	0.23	U
Xylenes, total	0.44	J	0.33	U	0.11	U	0.33	U	0.11	U	0.11	U
Field and Redox Parameters												
Alkalinity	760		--		310		--		300		310	
Bromide	2.9		2.8		1.3		1.5		0.87		0.94	
Chloride	770		--		180		--		190		200	
Dissolved Oxygen	0.65		4.25		4.02		8.62		4.33		--	
Ethane	0.57		--		0.57	U	--		0.57	U	0.57	U
Ethene	0.4		--		0.4	U	--		0.4	U	0.4	U
Ferrous Iron	0.02		--		0	U	--		0	U	--	
Manganese- Dissolved	1.2		--		0.0022	J	--		0.00053	J	0.0017	J
Manganese- Total	--		--		--		--		--		--	
Methane	0.028		--		0.00063	U	--		0.00063	U	0.00063	U
Nitrate	0.88		--		1.8		--		2.1		2.1	
Oxidation-Reduction Potential	109.2		64.1		196.3		52.2		232.1		--	
pH	6.52		6.98		6.64		8.17		6.62		--	
Specific Conductance	3745		2754		1224		1382		1295		--	
Sulfate	91		--		110		--		120		120	
Temperature	10.7		7.29		10.3		8.16		7.2		--	
Total Organic Carbon	27		--		1.6		--		2.1		2.2	
Turbidity	0.25		4.88		1.6		3.68		0.15		--	

	Cell 1 Monitoring Well													
	MW-120D		MW-120D		MW-120S		MW-120S		MW-121		MW-123		MW-124	
	MW-120D-20240507		MW-120D-96.1-20240222		MW-120S-20240507		MW-120S-79.3-20240222		MW-121-20240507		MW-123-20240503		MW-124-20240506	
	5/7/2024		2/22/2024		5/7/2024		2/22/2024		5/7/2024		5/3/2024		5/6/2024	
Analyte	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	0.78	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
1,1-Dichloroethane	2		0.22	U	1.3		0.22	U	0.81	J	0.22	U	1.2	
1,1-Dichloroethene	1.5	J	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U
1,2-Dichlorobenzene	0.58	J	0.37	U	1.1		0.37	U	0.8	J	0.14	U	2	
1,2-Dichloroethane	0.56	U	0.54	U	0.28	U	0.54	U	0.28	U	0.28	U	0.33	J
1,2-Dichloropropane	0.49	U	0.52	U	0.66	J	0.52	U	0.24	U	0.24	U	0.76	J
1,3-Dichlorobenzene	0.67	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
1,4-Dichlorobenzene	0.78	U	0.39	U	0.72	J	0.39	U	0.39	U	0.39	U	0.39	U
2,2-Dichloropropane	0.34	U	0.38	U	0.17	U	0.38	U	0.17	U	0.17	U	0.17	U
2-Butanone (MEK)	9.2	U	6	U	4.6	U	6	U	4.6	U	4.6	U	4.6	U
4-Methyl-2-pentanone (MIBK)	2	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Acetone	13	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
Benzene	0.29	U	0.31	U	0.14	U	0.31	U	0.14	U	0.14	U	0.36	J
Carbon disulfide	0.51	U	0.63	U	0.26	U	0.63	U	0.26	U	0.26	U	0.26	U
Chlorobenzene	0.18	U	0.42	U	0.092	U	0.42	U	1.4		0.092	U	0.092	U
Chloroethane	1.3	U	1.4	U	0.64	U	1.4	U	0.64	U	0.64	U	0.64	U
Chloroform	0.78	J	0.36	U	0.74	J	0.36	U	0.36	U	0.36	U	0.36	U
Chloromethane	0.45	U	0.75	U	0.23	U	0.75	U	0.23	U	0.23	U	0.23	U
cis-1,2-Dichloroethene	19		0.45	J	20		3		1.2		0.32	U	24	
Dichlorodifluoromethane	3.4	J	0.96	U	0.3	U	0.96	U	1.5	J	0.32	J	0.3	U
Ethylbenzene	0.29	U	0.3	U	0.14	U	0.3	U	0.14	U	0.14	U	0.14	U
m,p-Xylene	0.71	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
o-xylene	0.23	U	0.33	U	0.11	U	0.33	U	0.11	U	0.11	U	0.11	U
Tetrachloroethene	12		1.1		11		0.63	J	4.1		4.4		4.3	
Toluene	0.64	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
trans-1,2-Dichloroethene	0.74	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U
Trichloroethene	170		7.8		110		17		9.1		50		90	
Trichlorofluoromethane	0.4	U	0.57	U	0.2	U	0.57	U	0.2	U	0.2	U	0.2	U
Vinyl chloride	1.8	J	0.51	U	1.4		0.51	U	0.23	U	0.23	U	4.9	
Xylenes, total	0.23	U	0.33	U	0.11	U	0.33	U	0.11	U	0.11	U	0.11	U
Field and Redox Parameters														
Alkalinity	400		--		510		--		--		--		530	
Bromide	1.2		0.23	U	1.6	J+	0.23	U	1.1		--		1.8	
Chloride	230		--		340		--		360		--		290	
Dissolved Oxygen	2.17		8.57		2.01		--		0.42		5		0.61	
Ethane	0.57	U	--		0.57	U	--		0.57	U	--		0.62	J
Ethene	0.4	U	--		0.4	U	--		0.4	U	--		1.6	J
Ferrous Iron	0	U	--		0	U	--		0	U	--		0.24	
Manganese- Dissolved	0.03		--		0.0023	J	--		0.71		--		4.5	
Manganese- Total	--		--		--		--		0.87		--		4.8	
Methane	0.00063	U	--		0.0013	J	--		0.034		--		0.19	
Nitrate	0.59		--		1.2		--		4.8		--		0.7	
Oxidation-Reduction Potential	186.1		35.2		181		--		86.9		176.6		22.3	
pH	6.63		7.7		6.46		--		6.53		7.24		6.48	
Specific Conductance	1597		324		2101		--		2098		1019		2121	
Sulfate	85		--		110		--		58		--		100	
Temperature	7.6		9.99		9		--		11.7		11.3		11.7	
Total Organic Carbon	3.1		--		5.4		--		9.4		--		5.1	
Turbidity	2.38		93.8		1.62		--		60.1		164		6.32	

Table 3-2

Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells VOC Results

	Cell 1 Monitoring Well								Offsite Monitoring Well										Remediation System Extraction Well							
	MW-125		RW-1		RW-2		RW-3		MW-103D		MW-103S		MW-103S		MW-115S		MW-116S		RW-10		RW-10		RW-10		RW-15	
	MW-125-20240506		RW-1-20240503		RW-2-20240507		RW-3-20240505		MW-103D-178.5-20240222		MW-103S-100.0-20240222		MW-103S-20240505		MW-115S-20240503		MW-116S-20240506		RW-10-20240222		RW-10-20240506		RW-10-Q-20240222		RW-15-20240222	
	5/6/2024		5/3/2024		5/7/2024		5/5/2024		2/22/2024		2/22/2024		5/5/2024		5/3/2024		5/6/2024		2/22/2024		5/6/2024		2/22/2024		2/22/2024	
Analyte	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
1,1-Dichloroethane	0.82	J	1.3		1.1		0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.67	J
1,1-Dichloroethene	0.23	U	0.55	J	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U
1,2-Dichlorobenzene	0.46	J	3.2		1.7		0.14	U	0.37	U	0.37	U	0.14	U	0.14	U	0.14	U	0.37	U	0.29	J	0.37	U	1.6	
1,2-Dichloroethane	0.28	U	0.41	J	0.28	U	0.28	U	0.54	U	0.54	U	0.28	U	0.28	U	0.28	U	0.54	U	0.28	U	0.54	U	0.54	U
1,2-Dichloropropane	0.24	U	0.63	J	0.88	J	0.24	U	0.52	U	0.52	U	0.24	U	0.24	U	0.24	U	0.52	U	0.24	U	0.52	U	0.52	U
1,3-Dichlorobenzene	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
1,4-Dichlorobenzene	0.39	U	0.82	J	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
2,2-Dichloropropane	0.17	U	0.17	U	0.17	U	0.17	U	0.38	U	0.38	U	0.17	U	0.17	U	0.17	U	0.38	U	0.17	U	0.38	U	0.38	U
2-Butanone (MEK)	4.6	U	4.6	U	4.6	U	4.6	U	6	U	6	U	4.6	U	4.6	U	4.6	U	6	U	4.6	U	6	U	6	U
4-Methyl-2-pentanone (MIBK)	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Acetone	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
Benzene	0.18	J	0.41	J	0.37	J	0.14	U	0.31	U	0.31	U	0.14	U	0.14	U	0.14	U	0.31	U	0.14	U	0.31	U	0.31	U
Carbon disulfide	0.26	U	0.26	U	0.26	U	0.26	U	0.63	U	0.63	U	0.26	U	0.26	U	0.26	U	0.63	U	0.26	U	0.63	U	0.63	U
Chlorobenzene	0.092	U	0.41	J	0.092	U	0.36	J	0.42	U	0.42	U	0.092	U	0.092	U	0.092	U	0.42	U	0.092	U	0.42	U	0.42	U
Chloroethane	0.64	U	0.64	U	0.64	U	0.64	U	1.4	U	1.4	U	0.64	U	0.64	U	0.64	U	1.4	U	0.64	U	1.4	U	1.4	U
Chloroform	0.36	U	0.41	J	0.82	J	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.91	J	0.87	J	0.98	J	0.89	J
Chloromethane	0.23	U	0.23	U	0.23	U	0.23	U	0.75	U	0.75	U	0.23	U	0.23	U	0.23	U	0.75	U	0.23	U	0.75	U	0.75	U
cis-1,2-Dichloroethene	11		22		28		0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.42	J	1.9		2.1		1.7		10	
Dichlorodifluoromethane	1.2	J	0.41	J	0.3	U	0.44	J	0.96	U	0.96	U	0.3	U	0.3	U	0.3	U	0.96	U	0.3	U	0.96	U	0.96	U
Ethylbenzene	0.14	U	0.14	U	0.14	U	0.14	U	0.3	U	0.3	U	0.14	U	0.14	U	0.14	U	0.3	U	0.14	U	0.3	U	0.3	U
m,p-Xylene	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
o-xylene	0.11	U	0.11	U	0.11	U	0.11	U	0.33	U	0.33	U	0.11	U	0.11	U	0.11	U	0.33	U	0.11	U	0.33	U	0.33	U
Tetrachloroethene	2.5		12		4.9		2.4		0.4	U	0.4	U	0.4	U	0.4	U	1.4		19		18		18		18	
Toluene	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
trans-1,2-Dichloroethene	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U
Trichloroethene	17		140		95		3.5		0.3	U	0.3	U	0.43	J	0.79	J	7.3		65		62		67		96	J
Trichlorofluoromethane	0.2	U	0.2	U	0.2	U	0.2	U	0.57	U	0.57	U	0.2	U	0.2	U	0.2	U	0.57	U	0.2	U	0.57	U	0.57	U
Vinyl chloride	8.8		7.2		4		0.23	U	0.51	U	0.51	U	0.23	U	0.23	U	0.23	U	0.51	U	0.23	U	0.51	U	1.2	J
Xylenes, total	0.11	U	0.11	U	0.11	U	0.11	U	0.33	U	0.33	U	0.11	U	0.11	U	0.11	U	0.33	U	0.11	U	0.33	U	0.33	U
Field and Redox Parameters																										
Alkalinity	500		--		560		--		--		--		--		--		--		--		--		--		--	
Bromide	1.4		--		2.1		--		0.23	U	0.23	U	0.23	U	--		--		0.84		0.87		0.91		1.3	
Chloride	430		--		360		--		--		--		--		--		--		--		190		--		--	
Dissolved Oxygen	1.65		0.4		1.14		3.81		11.01		10.89		8.97		9.4		7.68		5.01		--		--		6.45	
Ethane	3.3	J	--		0.57	U	--		--		--		--		--		--		--		--		--		--	
Ethene	0.4	U	--		0.4	U	--		--		--		--		--		--		--		--		--		--	
Ferrous Iron	0.19		0.27		1.2		0.02		--		--		--		--		--		--		0.12		--		--	
Manganese- Dissolved	1		--		1.7		--		--		--		--		--		--		--		--		--		--	
Manganese- Total	1		--		1.5		--		--		--		--		--		--		--		--		--		--	
Methane	2.4		--		0.4		--		--		--		--		--		--		--		--		--		--	
Nitrate	1.6		--		0.74		--		--		--		--		--		--		--		1.9		--		--	
Oxidation-Reduction Potential	54.5		14.4		28.1		240.3		-8.2		17.4		103.9		201.8		163.1		5.4		233		--		14.2	
pH	6.64		6.41		6.62		6.98		8.19		7.76		7.14		7.29		7.11		6.88		6.59		--		6.76	
Specific Conductance	2260		2051		2194		2163		386		284		748		896		908		1269		1342		--		1475	
Sulfate	55		--		120		--		--		--		--		--		--		--		120		--		--	
Temperature	7.5		12.3		9.2		9.9		9.96		8.97		10.1		11.3		10.3		11.98		11.5		--		11.11	
Total Organic Carbon	3.8		5.3		6.5		4.2		--		--		--		--		--		--		2.1		--		--	
Turbidity	1.75		3.6		1.47		13.5		818		1.79		0.22		3.39		1.59		0.8		1.11		--		3.42	

Table 3-2
Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells VOC Results

	Remediation System Extraction Well																	
	RW-15		RW-17		RW-17		RW-4		RW-4		RW-5		RW-5		RW-9R		RW-9R	
	RW-15-20240506		RW-17-20240222		RW-17-20240506		RW-4-20240222		RW-4-20240506		RW-5-20240222		RW-5-20240506		RW-9R-20240222		RW-9R-20240506	
	5/6/2024		2/22/2024		5/6/2024		2/22/2024		5/6/2024		2/22/2024		5/6/2024		2/22/2024		5/6/2024	
Analyte	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U
1,1-Dichloroethane	0.73	J	0.34	J	0.28	J	0.73	J	0.22	U	0.22	U	0.22	U	1.2		1.2	
1,1-Dichloroethene	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.28	J	0.29	J
1,2-Dichlorobenzene	2.7		0.37	U	0.58	J	0.49	J	0.86	J	0.37	U	0.14	U	3.6		5.4	
1,2-Dichloroethane	0.28	J	0.54	U	0.28	U	0.54	U	0.28	U	0.54	U	0.28	U	0.54	U	0.28	U
1,2-Dichloropropane	0.54	J	0.52	U	0.24	U	0.52	U	0.24	U	0.52	U	0.24	U	0.76	J	0.24	U
1,3-Dichlorobenzene	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
1,4-Dichlorobenzene	0.72	J	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	0.39	U	1.1		1.7	
2,2-Dichloropropane	0.17	U	0.38	U	0.17	U	0.38	U	0.17	U	0.38	U	0.17	U	0.38	U	0.17	U
2-Butanone (MEK)	4.6	U	6	U	4.6	U	6	U	4.6	U	6	U	4.6	U	6	U	4.6	U
4-Methyl-2-pentanone (MIBK)	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Acetone	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
Benzene	0.46	J	0.31	U	0.14	U	0.31	U	0.14	U	0.31	U	0.14	U	0.44	J	0.59	J
Carbon disulfide	0.26	U	0.63	U	0.26	U	0.63	U	0.26	U	0.63	U	0.26	U	0.63	U	0.26	U
Chlorobenzene	0.5	J	0.42	U	0.092	U	0.42	U	0.092	U	0.42	U	0.092	U	0.43	J	0.72	J
Chloroethane	0.64	U	1.4	U	0.64	U	1.4	U	0.64	U	1.4	U	0.64	U	1.4	U	0.64	U
Chloroform	0.81	J	0.85	J	1.1		0.94	J	0.95	J	0.89	J	0.7	J	0.48	J	0.63	J
Chloromethane	0.23	U	0.75	U	0.23	U	0.75	U	0.23	U	0.75	U	0.23	U	0.75	U	0.23	U
cis-1,2-Dichloroethene	13		4		3.5		9.1		7.6		1.2		1.2		18		29	
Dichlorodifluoromethane	0.3	U	0.96	U	0.3	U	0.96	U	0.3	U	0.96	U	0.3	U	0.96	U	0.3	U
Ethylbenzene	0.14	U	0.3	U	0.14	U	0.3	U	0.14	U	0.3	U	0.14	U	0.3	U	0.14	U
m,p-Xylene	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
o-xylene	0.11	U	0.33	U	0.11	U	0.33	U	0.11	U	0.33	U	0.11	U	0.33	U	0.11	U
Tetrachloroethene	18		19		21		19		20		15		14		9.3		14	
Toluene	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
trans-1,2-Dichloroethene	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U
Trichloroethene	100		77		74		110		96		59		51		94		140	
Trichlorofluoromethane	0.2	U	0.57	U	0.2	U	0.57	U	0.2	U	0.57	U	0.2	U	0.57	U	0.2	U
Vinyl chloride	3.2		0.51	U	0.36	J	0.51	U	1.1		0.51	U	0.23	U	4.1		5.4	
Xylenes, total	0.11	U	0.33	U	0.11	U	0.33	U	0.11	U	0.33	U	0.11	U	0.33	U	0.11	U
Field and Redox Parameters																		
Alkalinity	--		--		--		--		--		--		--		--		--	
Bromide	2		1		1.1		1.4		1.6		0.98		0.6		2.1		2.3	
Chloride	310		--		210		--		260		--		190		--		380	
Dissolved Oxygen	0.74		7.42		1.88		5.72		1.91		5.95		3.9		5.42		1.45	
Ethane	--		--		--		--		--		--		--		--		--	
Ethene	--		--		--		--		--		--		--		--		--	
Ferrous Iron	0.12		--		0.1		--		0	U	--		0	U	--		0.18	
Manganese- Dissolved	--		--		--		--		--		--		--		--		--	
Manganese- Total	--		--		--		--		--		--		--		--		--	
Methane	--		--		--		--		--		--		--		--		--	
Nitrate	0.55		--		1.6		--		1.2		--		2.1		--		0.28	J
Oxidation-Reduction Potential	112.8		10.7		125.5		-1.7		222.8		-6.3		221.6		-2.9		136.3	
pH	6.43		6.97		6.48		6.82		6.46		6.88		6.65		6.73		6.48	
Specific Conductance	2045		1328		1471		1576		1815		1290		1279		1964		2361	
Sulfate	120		--		130		--		130		--		110		--		120	
Temperature	12		12.16		11.7		11.01		11.5		11.17		11.5		12.08		12	
Total Organic Carbon	5.8		--		2.5		--		4		--		1.7		--		7.2	
Turbidity	1.26		20		2.27		17.2		1.31		7.36		2		70.2		1.54	

Table 3-3

Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells Inorganic Results

					Sample Name	MP-2-20240507		MW-118D-20240502		MW-119D-20240502		MW-119S-20240502		MW-119SQ-20240502		MW-120D-20240507	
					Well ID	MP-2		MW-118D		MW-119D		MW-119S		MW-119S		MW-120D	
					Area	Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well	
			ID GW -	ID GW -	Sample Date	2024-05-07		2024-05-02		2024-05-02		2024-05-02		2024-05-02		2024-05-07	
Analyte	FRACTION	EPA MCL	PRIMARY	SECONDARY	Unit	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Antimony	Dissolved	6	6	--	µg/L	2.4		0.4	U	2.2		0.4	U	0.4	U	0.4	U
Arsenic	Dissolved	10	50	--	µg/L	0.6	J	1.7	J	0.51	J	0.5	UJ	0.53	J	1.6	J
Arsenic	Total	10	50	--	µg/L	0.91	J	--		--		--		--		--	
Barium	Dissolved	2000	2000	--	µg/L	330		630		210		210		210		300	
Barium	Total	2000	2000	--	µg/L	340		--		--		--		--		--	
Cadmium	Dissolved	5	5	--	µg/L	0.19	U	0.44	J	0.19	U	0.19	U	0.19	U	0.19	U
Cadmium	Total	5	5	--	µg/L	0.19	U	--		--		--		--		--	
Calcium	Dissolved	--	--	--	µg/L	180000		1600000		120000		130000		130000		150000	
Calcium	Total	--	--	--	µg/L	200000		--		--		--		--		--	
Chromium	Dissolved	100	100	--	µg/L	0.5	U	3	U	3	U	3	U	3	U	0.5	U
Chromium	Total	100	100	--	µg/L	0.5	U	--		--		--		--		--	
Cobalt	Dissolved	--	--	--	µg/L	0.33	U	7.7	J-	0.33	UJ	0.33	UJ	0.33	UJ	0.33	U
Cobalt	Total	--	--	--	µg/L	0.33	U	--		--		--		--		--	
Copper	Dissolved	1300	1300	--	µg/L	0.99	J	12		0.71	U	1.6	J	0.81	J	1.7	J
Copper	Total	1300	1300	--	µg/L	0.74	J	--		--		--		--		--	
Iron	Dissolved	--	--	300	µg/L	8.7	U	200	U	200	U	200	U	8.7	U	56	J
Iron	Total	--	--	300	µg/L	8.7	U	--		--		--		--		--	
Lead	Dissolved	15	15	--	µg/L	0.23	U	4		0.23	U	0.23	U	0.23	U	0.23	U
Lead	Total	15	15	--	µg/L	0.23	U	--		--		--		--		--	
Magnesium	Dissolved	--	--	--	µg/L	62000		120000		51000		53000		52000		53000	
Magnesium	Total	--	--	--	µg/L	67000		--		--		--		--		--	
Manganese	Total	--	--	0.05	mg/L	0.0093		--		--		--		--		--	
Manganese	Dissolved	--	--	0.05	mg/L	0.01		1.2		0.0022	J	0.00053	J	0.0017	J	0.03	
Nickel	Dissolved	--	--	--	µg/L	3.6		97		0.83	U	0.83	U	0.83	U	3.2	
Nickel	Total	--	--	--	µg/L	3.1		--		--		--		--		--	
Potassium	Dissolved	--	--	--	µg/L	3600		7000		3700		4200		4300		5200	
Potassium	Total	--	--	--	µg/L	3900		--		--		--		--		--	
Silver	Dissolved	--	--	100	µg/L	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
Silver	Total	--	--	100	µg/L	0.045	U	--		--		--		--		--	
Sodium	Dissolved	--	--	--	µg/L	82000		1100000	J+	68000	J+	77000	J+	22000	J+	65000	
Sodium	Total	--	--	--	µg/L	87000		--		--		--		--		--	
Vanadium	Dissolved	--	--	--	µg/L	2.1	J	2.4	J	1.1	U	1.1	U	1.1	U	3.1	J
Vanadium	Total	--	--	--	µg/L	2.1	J	--		--		--		--		--	
Zinc	Dissolved	--	--	5000	µg/L	4.4	J	10	U	10	U	10	U	2	U	5.8	J
Zinc	Total	--	--	5000	µg/L	2	U	--		--		--		--		--	

Table 3-3

Cell 1 Monitoring Wells, Offsite Monitoring Wells, and Remediation System Extraction Wells Inorganic Results

					Sample Name	MW-120S-20240507		MW-121-20240507		MW-124-20240506		MW-125-20240506		RW-2-20240507	
					Well ID	MW-120S		MW-121		MW-124		MW-125		RW-2	
					Area	Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well		Cell 1 Monitoring Well	
			ID GW -	ID GW -	Sample Date	2024-05-07		2024-05-07		2024-05-06		2024-05-06		2024-05-07	
Analyte	FRACTION	EPA MCL	PRIMARY	SECONDARY	Unit	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Antimony	Dissolved	6	6	--	µg/L	*0.4*	U	**1.9**	J	**0.93**	J	*0.4*	U	**2.3**	
Arsenic	Dissolved	10	50	--	µg/L	**0.79**	J+	**1.3**	J	**0.75**	J	**1.5**	J	**1.8**	J
Arsenic	Total	10	50	--	µg/L	--		**120**		**1.4**	J	**1.5**	J	**1.5**	J
Barium	Dissolved	2000	2000	--	µg/L	**330**		**420**		**440**		**390**		**380**	
Barium	Total	2000	2000	--	µg/L	--		**750**		**460**		**440**		**350**	
Cadmium	Dissolved	5	5	--	µg/L	*0.19*	UJ	*0.19*	U	*0.19*	U	*0.19*	U	**0.37**	J
Cadmium	Total	5	5	--	µg/L	--		*0.19*	U	*0.19*	U	*0.19*	U	**0.39**	J
Calcium	Dissolved	--	--	--	µg/L	**190000**		**170000**		**220000**		**230000**		**240000**	
Calcium	Total	--	--	--	µg/L	**--**		**200000**		**230000**		**230000**		**260000**	
Chromium	Dissolved	100	100	--	µg/L	*0.5*	U	*0.5*	U	**0.5**	J	**2.1**	J	*0.5*	U
Chromium	Total	100	100	--	µg/L	--		**32**		**15**		**11**		**3.8**	
Cobalt	Dissolved	--	--	--	µg/L	*0.33*	U	**6.1**		**2.1**		**0.8**	J	**2.2**	
Cobalt	Total	--	--	--	µg/L	**--**		**7.6**		**2.4**		**0.84**	J	**1.9**	
Copper	Dissolved	1300	1300	--	µg/L	**1.7**	J	**2.3**		**1.4**	J	**1.5**	J	**3.2**	
Copper	Total	1300	1300	--	µg/L	--		**3.9**		**1.6**	J	**1.1**	J	**2.8**	
Iron	Dissolved	--	--	300	µg/L	**9.7**	J	**47**	J	**280**		**80**	J	**270**	
Iron	Total	--	--	300	µg/L	**--**		**25000**		**950**		*200*	U	**520**	
Lead	Dissolved	15	15	--	µg/L	*0.23*	UJ	**0.65**	J	*0.23*	U	*0.23*	U	*0.23*	U
Lead	Total	15	15	--	µg/L	--		**4.8**		*0.23*	U	*0.23*	U	*0.23*	U
Magnesium	Dissolved	--	--	--	µg/L	**70000**		**51000**		**73000**		**71000**		**79000**	
Magnesium	Total	--	--	--	µg/L	**--**		**61000**		**74000**		**74000**		**75000**	
Manganese	Total	--	--	0.05	mg/L	**--**		**0.87**		**4.8**		**1**		**1.5**	
Manganese	Dissolved	--	--	0.05	mg/L	**0.0023**	J	**0.71**		**4.5**		**1**		**1.7**	
Nickel	Dissolved	--	--	--	µg/L	*3*	UJ	**30**		**23**		**17**		**27**	
Nickel	Total	--	--	--	µg/L	**--**		**33**		**24**		**18**		**24**	
Potassium	Dissolved	--	--	--	µg/L	**4100**		**3900**		**4100**		**4300**		**4800**	
Potassium	Total	--	--	--	µg/L	**--**		**5100**		**4200**		**4500**		**4500**	
Silver	Dissolved	--	--	100	µg/L	*0.045*	UJ	*0.045*	U	*0.045*	U	**0.056**	J	*0.045*	U
Silver	Total	--	--	100	µg/L	**--**		**0.26**	J	*0.045*	U	*0.045*	U	*0.045*	U
Sodium	Dissolved	--	--	--	µg/L	**100000**		**130000**		**100000**		**100000**		**120000**	
Sodium	Total	--	--	--	µg/L	**--**		**150000**		**110000**		**110000**		**110000**	
Vanadium	Dissolved	--	--	--	µg/L	**2.2**	J	**2.4**	J	**1.2**	J	**3**	J	**3.3**	J
Vanadium	Total	--	--	--	µg/L	**--**		**37**		**1.7**	J	**3.3**	J	**3**	J
Zinc	Dissolved	--	--	5000	µg/L	**3.4**	J	**5.5**	J	**3.6**	J	**2.9**	J	**4.9**	J
Zinc	Total	--	--	5000	µg/L	**--**		**11**		*10*	U	*2*	U	*2*	U

Table 3-4
Remediation Well Status and Groundwater Production Summary

Well ID	Total Depth (ft bgs)	Screened Interval (ft bgs)	Status (as of 6/17/24)	Cumulative Groundwater Removed (gal) 12/07/23 - 06/17/24	Average Flow Rate (gpm) 12/07/23 - 06/17/24
RW-4	100’	50’ to 100’	Operating	301,585	1.0
RW-5	100’	60’ to 100’	Operating	1,506,480	5.5
RW-9R	78’	51’ to 76’	Operating	460,788	1.7
RW-10	85’	50’ to 85’	Operating	2,567,969	9.4
RW-15	105’	42’ to 105’	Operating	3,194,650	11.7
RW-17	103.5’	43.5’ to 103.5’	Operating	1,411,893	6.7
Air Stripper Influent			Operating	10,043,187	36.5

Notes:

1. RW-17 continually shut off during the month of January due to sensor alarms/faults. When this happened, RW-17 was shut off until maintenance could be performed. Eventually, the transducer was determined to need replacement and RW-17 was shut off from 1/26/24 through 2/20/24 while a replacement was procured and installed.

2. The transducer at RW-4 was replaced on 2/20/24.

3. The system was off from 2/21/24 through 2/22/24 due to a crack in the RW-17 ball valve and subsequent maintenance.

4. The flow meter at RW-17 was replaced several times throughout the reporting period. The system was turned off for short periods when these replacements were made.

5. The system was off from 5/1/24 through 5/2/24 in order to replace a CIM280 (an interface for data transmission to the cloud). There was an unknown issue preventing the system from turning back on after the replacement. The electrician was able to inspect the system and turn it back on, citing a issue with the main breaker.

Abreviations:

ft bgs = feet below ground surface

gal = gallons

gpm = gallons per minute

Table 3-5
Injection Well Results

Analyte	EPA MCL	ID GW - PRIMARY	ID GW - SECONDARY	Area	Remediation System			
				Well ID	INJ-1R		INJ-1R	
				Sample Name	INJ-1R-20240222		INJ-1R-20240505	
				Sample Date	2/22/2024		5/5/2024	
				Unit	Result	Q	Result	Q
Volatile Organic Compounds (VOCs)								
1,1,1,2-Tetrachloroethane	--	--	--	µg/L	*0.58*	*U*	*0.16*	*U*
1,1,1-Trichloroethane	200	200	--	µg/L	*0.39*	*U*	*0.39*	*U*
1,1,2,2-Tetrachloroethane	--	--	--	µg/L	*0.21*	*U*	*0.21*	*U*
1,1,2-Trichloroethane	5	5	--	µg/L	*0.27*	*U*	*0.27*	*U*
1,1-Dichloroethane	--	--	--	µg/L	*0.22*	*U*	*0.22*	*U*
1,1-Dichloroethene	7	7	--	µg/L	*0.23*	*U*	*0.23*	*U*
1,1-Dichloropropene	--	--	--	µg/L	*0.42*	*U*	*0.19*	*U*
1,2,3-Trichloropropane	--	--	--	µg/L	*0.86*	*U*	*0.005*	*U*
1,2,4-Trichlorobenzene	70	70	--	µg/L	*0.58*	*U*	*0.58*	*U*
1,2-Dibromo-3-Chloropropane	0.2	0.2	--	µg/L	*1.8*	*U*	*0.0067*	*U*
1,2-Dibromoethane	0.05	0.05	--	µg/L	*0.4*	*U*	*0.0037*	*U*
1,2-Dichlorobenzene	600	600	--	µg/L	*0.37*	*U*	*0.14*	*U*
1,2-Dichloroethane	5	5	--	µg/L	*0.54*	*U*	*0.28*	*U*
1,2-Dichloropropane	5	5	--	µg/L	*0.52*	*U*	*0.24*	*U*
1,3-Dichlorobenzene	--	600	--	µg/L	*0.33*	*U*	*0.33*	*U*
1,3-Dichloropropane	--	--	--	µg/L	*0.38*	*U*	*0.17*	*U*
1,4-Dichlorobenzene	75	75	--	µg/L	*0.39*	*U*	*0.39*	*U*
2,2-Dichloropropane	--	--	--	µg/L	*0.38*	*U*	*0.17*	*U*
2-Butanone (MEK)	--	--	--	µg/L	*6*	*U*	*4.6*	*U*
2-Hexanone	--	--	--	µg/L	*1.7*	*U*	*0.81*	*U*
4-Methyl-2-pentanone (MIBK)	--	--	--	µg/L	*0.98*	*U*	*0.98*	*U*
Acetone	--	--	--	µg/L	*6.6*	*U*	*6.6*	*U*
Acetonitrile; methyl cyanide	--	--	--	µg/L	*9.6*	*U*	*14*	*U*
Acrolein	--	--	--	µg/L	*4.9*	*U*	*4.9*	*U*
Acrylonitrile	--	--	--	µg/L	*4.5*	*U*	*1.7*	*U*
Allyl chloride	--	--	--	µg/L	*0.17*	*U*	*0.46*	*U*
Benzene	5	5	--	µg/L	*0.31*	*U*	*0.14*	*U*
Bromochloromethane	--	--	--	µg/L	*0.4*	*U*	*0.4*	*U*
Bromodichloromethane	80	100	--	µg/L	*0.39*	*U*	*0.19*	*U*
Bromoform	80	100	--	µg/L	*1.2*	*U*	*0.25*	*U*
Bromomethane	--	--	--	µg/L	*2.4*	*U*	*2.4*	*U*
Carbon disulfide	--	--	--	µg/L	*0.63*	*U*	*0.26*	*U*
Carbon tetrachloride	5	5	--	µg/L	*0.57*	*U*	*0.23*	*U*
Chlorobenzene	100	100	--	µg/L	*0.42*	*U*	*0.092*	*U*
Chlorodibromomethane	80	100	--	µg/L	*0.62*	*U*	*0.28*	*U*
Chloroethane	--	--	--	µg/L	*1.4*	*U*	*0.64*	*U*
Chloroform	80	2	--	µg/L	*0.36*	*U*	*0.36*	*U*
Chloromethane	--	--	--	µg/L	*0.75*	*U*	*0.23*	*U*
Chloroprene	--	--	--	µg/L	*1.2*	*U*	*0.79*	*U*
cis-1,2-Dichloroethene	70	70	--	µg/L	*0.32*	*U*	*0.32*	*U*
cis-1,3-Dichloropropene	--	--	--	µg/L	*0.63*	*U*	*0.16*	*U*
Dibromomethane	--	--	--	µg/L	*0.34*	*U*	*0.34*	*U*
Dichlorodifluoromethane	--	--	--	µg/L	*0.96*	*U*	*0.3*	*U*
Ethyl methacrylate	--	--	--	µg/L	*0.86*	*U*	*0.19*	*U*
Ethylbenzene	700	700	--	µg/L	*0.3*	*U*	*0.14*	*U*
Iodomethane	--	--	--	µg/L	**3**	**J**	*2.6*	*U*
Isobutanol; Isobutyl alcohol	--	--	--	µg/L	*37*	*U*	*37*	*U*
m,p-Xylene	10000	--	--	µg/L	*0.36*	*U*	*0.36*	*U*
Methacrylonitrile	--	--	--	µg/L	*5.3*	*U*	*5.3*	*U*
Methyl methacrylate	--	--	--	µg/L	*1.1*	*U*	*1.1*	*U*
Methylene Chloride	5	5	--	µg/L	*0.94*	*U*	*0.94*	*U*
o-xylene	10000	--	--	µg/L	*0.33*	*U*	*0.11*	*U*
Propionitrile; ethyl cyanide	--	--	--	µg/L	*3.7*	*U*	*3.7*	*U*
Styrene	100	100	--	µg/L	*0.36*	*U*	*0.13*	*U*
Tetrachloroethene	5	5	--	µg/L	*0.4*	*U*	*0.4*	*U*
Toluene	1000	1000	--	µg/L	*0.32*	*U*	*0.32*	*U*
trans-1,2-Dichloroethene	100	100	--	µg/L	*0.37*	*U*	*0.37*	*U*
trans-1,3-Dichloropropene	--	--	--	µg/L	*0.65*	*U*	*0.14*	*U*
trans-1,4-Dichloro-2-butene	--	--	--	µg/L	*1.4*	*U*	*0.51*	*U*
Trichloroethene	5	5	--	µg/L	*0.3*	*U*	**0.35**	**J**
Trichlorofluoromethane	--	--	--	µg/L	*0.57*	*U*	*0.2*	*U*
Vinyl acetate	--	--	--	µg/L	*0.94*	*U*	*0.36*	*U*
Vinyl chloride	2	2	--	µg/L	*0.51*	*U*	*0.23*	*U*
Xylenes, total	10000	10000	--	µg/L	*0.33*	*U*	*0.11*	*U*
Inorganics								
Antimony	6	6	--	µg/L	--		*0.4*	*U*
Arsenic	10	50	--	µg/L	--		**0.72**	**J**
Barium	2000	2000	--	µg/L	--		**250**	
Beryllium	4	4	--	µg/L	--		*0.3*	*U*
Cadmium	5	5	--	µg/L	--		*0.19*	*U*

Table 3-5
Injection Well Results

Analyte	EPA MCL	ID GW - PRIMARY	ID GW - SECONDARY	Area	Remediation System			
				Well ID	INJ-1R		INJ-1R	
				Sample Name	INJ-1R-20240222		INJ-1R-20240505	
				Sample Date	2/22/2024		5/5/2024	
				Unit	Result	Q	Result	Q
Calcium	--	--	--	µg/L	--		**160000**	
Chromium	100	100	--	µg/L	--		*0.5*	*U*
Cobalt	--	--	--	µg/L	--		*0.33*	*U*
Copper	1300	1300	--	µg/L	--		**2**	
Cyanide	0.2	0.2	--	mg/L	--		*0.005*	*U*
Iron	--	--	300	µg/L	--		*200*	*U*
Lead	15	15	--	µg/L	--		*0.23*	*U*
Magnesium	--	--	--	µg/L	--		**65000**	
Manganese	--	--	0.05	mg/L	--		**0.15**	
Mercury	2	2	--	µg/L	--		*0.061*	*U*
Nickel	--	--	--	µg/L	--		**3.2**	
Potassium	--	--	--	µg/L	--		**5600**	
Selenium	50	50	--	µg/L	--		*1*	*U*
Silver	--	--	100	µg/L	--		*0.045*	*U*
Sodium	--	--	--	µg/L	--		**95000**	
Sulfide	--	--	--	mg/L	--		**0.042**	**J**
Thallium	2	2	--	µg/L	--		*0.21*	*U*
Tin	--	--	--	µg/L	--		*0.58*	*U*
Vanadium	--	--	--	µg/L	--		**1.4**	**J**
Zinc	--	--	5000	µg/L	--		**2.4**	**J**
Semivolatile Organic Compounds (SVOCs)								
1,2,4,5-Tetrachlorobenzene	--	--	--	µg/L	--		*1.7*	*U*
1,3,5-Trinitrobenzene	--	--	--	µg/L	--		*5*	*U*
1,3-Dinitrobenzene	--	--	--	µg/L	--		*5*	*U*
1,4-Naphthoquinone	--	--	--	µg/L	--		*5.3*	*U*
1-Naphthylamine	--	--	--	µg/L	--		*3.6*	*U*
2,3,4,6-Tetrachlorophenol	--	--	--	µg/L	--		*6.8*	*U*
2,4,5-Trichlorophenol	--	--	--	µg/L	--		*2.5*	*U*
2,4,6-Trichlorophenol	--	--	--	µg/L	--		*2.2*	*U*
2,4-Dichlorophenol	--	--	--	µg/L	--		*2.9*	*U*
2,4-Dimethylphenol; m-Xylenol	--	--	--	µg/L	--		*1.3*	*U*
2,4-Dinitrophenol	--	--	--	µg/L	--		*12*	*U*
2,4-Dinitrotoluene	--	--	--	µg/L	--		*1.4*	*U*
2,6-Dichlorophenol	--	--	--	µg/L	--		*2*	*U*
2,6-Dinitrotoluene	--	--	--	µg/L	--		*1.4*	*U*
2-Acetylaminofluorene	--	--	--	µg/L	--		*7.8*	*U*
2-Chloronaphthalene	--	--	--	µg/L	--		*1.2*	*U*
2-Chlorophenol	--	--	--	µg/L	--		*2.5*	*U*
2-Methylnaphthalene	--	--	--	µg/L	--		*1.2*	*U*
2-Methylphenol; o-Cresol	--	--	--	µg/L	--		*0.75*	*U*
2-Naphthylamine	--	--	--	µg/L	--		*1.3*	*U*
2-Nitroaniline; o-Nitroaniline	--	--	--	µg/L	--		*2.5*	*U*
2-Nitrophenol; o-Nitrophenol	--	--	--	µg/L	--		*3.4*	*U*
3&4-Methylphenol	--	--	--	µg/L	--		*2.1*	*U*
3,3'-Dichlorobenzidine	--	--	--	µg/L	--		*3.3*	*U*
3,3'-Dimethylbenzidine	--	--	--	µg/L	--		*4.4*	*U*
3-Methylcholanthrene	--	--	--	µg/L	--		*3.7*	*U*
3-Nitroaniline; m-Nitroaniline	--	--	--	µg/L	--		*3.2*	*U*
4,6-Dinitro-2-methylphenol	--	--	--	µg/L	--		*3.9*	*U*
4-Aminobiphenyl	--	--	--	µg/L	--		*7.6*	*U*
4-Bromophenyl phenyl ether	--	--	--	µg/L	--		*0.98*	*U*
4-Chloro-3-methylphenol	--	--	--	µg/L	--		*1.6*	*U*
4-Chloroaniline; p-Chloroaniline	--	--	--	µg/L	--		*6.1*	*U*
4-Chlorophenyl phenyl ether	--	--	--	µg/L	--		*1.2*	*U*
4-Nitroaniline; p-Nitroaniline	--	--	--	µg/L	--		*2.5*	*U*
4-Nitrophenol; p-Nitrophenol	--	--	--	µg/L	--		*8.8*	*U*
5-Nitro-o-toluidine	--	--	--	µg/L	--		*4.1*	*U*
7,12-Dimethylbenz[a]anthracene	--	--	--	µg/L	--		*3.1*	*U*
Acenaphthene	--	--	--	µg/L	--		*0.93*	*U*
Acenaphthylene	--	--	--	µg/L	--		*0.72*	*U*
Acetophenone	--	--	--	µg/L	--		*2.2*	*U*
Anthracene	--	--	--	µg/L	--		*0.56*	*U*
Benzo[a]anthracene	--	--	--	µg/L	--		*0.93*	*U*
Benzo[a]pyrene	0.2	0.2	--	µg/L	--		*0.024*	*U*
Benzo[b]fluoranthene	--	--	--	µg/L	--		*2.1*	*U*
Benzo[ghi]perylene	--	--	--	µg/L	--		*2.7*	*U*
Benzo[k]fluoranthene	--	--	--	µg/L	--		*1*	*U*
Benzyl alcohol	--	--	--	µg/L	--		*2.4*	*U*
Bis(2-chloroethoxy)methane	--	--	--	µg/L	--		*2.3*	*U*
Bis(2-chloroethyl)ether	--	--	--	µg/L	--		*2*	*U*
Bis(2-chloroisopropyl)ether	--	--	--	µg/L	--		*1.3*	*U*

Table 3-5
Injection Well Results

Analyte	EPA MCL	ID GW - PRIMARY	ID GW - SECONDARY	Area	Remediation System			
				Well ID	INJ-1R		INJ-1R	
				Sample Name	INJ-1R-20240222		INJ-1R-20240505	
				Sample Date	2/22/2024		5/5/2024	
				Unit	Result	Q	Result	Q
Bis(2-ethylhexyl) phthalate	6	6	--	µg/L	--		*3.2*	*U*
Butyl benzyl phthalate	--	--	--	µg/L	--		*1.5*	*U*
Chlorobenzilate	--	--	--	µg/L	--		*4.4*	*U*
Chrysene	--	--	--	µg/L	--		*0.94*	*U*
Diallate	--	--	--	µg/L	--		*3.8*	*U*
Dibenz[a,h]anthracene	--	--	--	µg/L	--		*4.6*	*U*
Dibenzofuran	--	--	--	µg/L	--		*0.92*	*U*
Diethyl phthalate	--	--	--	µg/L	--		*1.3*	*U*
Dimethyl phthalate	--	--	--	µg/L	--		*0.73*	*U*
Di-n-butyl phthalate	--	--	--	µg/L	--		*2*	*U*
Di-n-octyl phthalate	--	--	--	µg/L	--		*3.5*	*U*
Diphenylamine	--	--	--	µg/L	--		*1.5*	*U*
Ethyl methanesulfonate	--	--	--	µg/L	--		*1.9*	*U*
Famphur	--	--	--	µg/L	--		*0.17*	*U*
Fluoranthene	--	--	--	µg/L	--		*1.1*	*U*
Fluorene	--	--	--	µg/L	--		*0.76*	*U*
Hexachloro-1,3-butadiene	--	--	--	µg/L	--		*2.8*	*U*
Hexachlorobenzene	1	1	--	µg/L	--		*2.2*	*U*
Hexachlorocyclopentadiene	50	50	--	µg/L	--		*15*	*U*
Hexachloroethane	--	--	--	µg/L	--		*4.3*	*U*
Hexachloropropene	--	--	--	µg/L	--		*8.6*	*U*
Indeno(1,2,3-cd)pyrene	--	--	--	µg/L	--		*3.3*	*U*
Isodrin	--	--	--	µg/L	--		*0.012*	*U*
Isophorone	--	--	--	µg/L	--		*1.9*	*U*
Isosafrole	--	--	--	µg/L	--		*3.3*	*U*
Kepone	--	--	--	µg/L	--		*0.88*	*U*
Methapyrilene	--	--	--	µg/L	--		*9.2*	*U*
Methyl methanesulfonate	--	--	--	µg/L	--		*3.6*	*U*
Naphthalene	--	--	--	µg/L	--		*1.5*	*U*
Nitrobenzene	--	--	--	µg/L	--		*1.2*	*U*
N-Nitrosodiethylamine	--	--	--	µg/L	--		*3*	*U*
N-Nitrosodimethylamine	--	--	--	µg/L	--		*3.2*	*U*
N-Nitrosodi-n-butylamine	--	--	--	µg/L	--		*1.2*	*U*
N-Nitrosodi-n-propylamine	--	--	--	µg/L	--		*1.8*	*U*
N-Nitrosodiphenylamine	--	--	--	µg/L	--		*1.8*	*U*
N-Nitrosomethylethylamine	--	--	--	µg/L	--		*5.6*	*U*
N-Nitrosopiperidine	--	--	--	µg/L	--		*5.1*	*U*
N-Nitrosopyrrolidine	--	--	--	µg/L	--		*4.7*	*U*
O,O,O-Triethyl phosphorothioate	--	--	--	µg/L	--		*4.7*	*U*
o-Toluidine	--	--	--	µg/L	--		*1.9*	*U*
p-(Dimethylamino)azobenzene	--	--	--	µg/L	--		*0.85*	*U*
Pentachlorobenzene	--	--	--	µg/L	--		*4.6*	*U*
Pentachloronitrobenzene	--	--	--	µg/L	--		*8*	*U*
Pentachlorophenol	1	1	--	µg/L	--		*0.038*	*U*
Phenacetin	--	--	--	µg/L	--		*4.4*	*U*
Phenanthrene	--	--	--	µg/L	--		*1.5*	*U*
Phenol	--	--	--	µg/L	--		*0.89*	*U*
Phorate	--	--	--	µg/L	--		*0.15*	*U*
Pronamide	--	--	--	µg/L	--		*1.2*	*U*
Pyrene	--	--	--	µg/L	--		*2.3*	*U*
Safrole, Total	--	--	--	µg/L	--		*3.9*	*U*
Thionazin	--	--	--	µg/L	--		*4*	*U*
Organochlorine Pesticides								
4,4'-DDD	--	--	--	µg/L	--		*0.0042*	*U*
4,4'-DDE	--	--	--	µg/L	--		*0.0042*	*U*
4,4'-DDT	--	--	--	µg/L	--		*0.024*	*U*
Aldrin	--	--	--	µg/L	--		*0.0062*	*U*
alpha-BHC	--	--	--	µg/L	--		*0.0096*	*U*
beta-BHC	--	--	--	µg/L	--		*0.009*	*U*
Chlordane - constituents	2	2	--	µg/L	--		*0.12*	*U*
delta-BHC	--	--	--	µg/L	--		*0.0077*	*U*
Dieldrin	--	--	--	µg/L	--		*0.0046*	*U*
Endosulfan I	--	--	--	µg/L	--		*0.0058*	*U*
Endosulfan II	--	--	--	µg/L	--		*0.0066*	*U*
Endosulfan sulfate	--	--	--	µg/L	--		*0.0049*	*U*
Endrin	2	2	--	µg/L	--		*0.0085*	*U*
Endrin aldehyde	--	--	--	µg/L	--		*0.0086*	*U*
gamma-BHC (lindane)	0.2	0.2	--	µg/L	--		*0.01*	*U*
Heptachlor	0.4	0.4	--	µg/L	--		*0.0099*	*U*
Heptachlor epoxide	0.2	0.2	--	µg/L	--		*0.0032*	*U*
Methoxychlor	40	40	--	µg/L	--		*0.014*	*U*

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Analyte	EPA MCL	ID GW - PRIMARY	ID GW - SECONDARY	Area	Remediation System			
				Well ID	INJ-1R		INJ-1R	
				Sample Name	INJ-1R-20240222		INJ-1R-20240505	
				Sample Date	2/22/2024		5/5/2024	
				Unit	Result	Q	Result	Q
Toxaphene	3	3	--	µg/L	--		*1.5*	*U*
Organophosphorous Pesticides								
Dimethoate	--	--	--	µg/L	--		*0.43*	*U*
Disulfoton	--	--	--	µg/L	--		*0.31*	*U*
Methyl parathion	--	--	--	µg/L	--		*0.13*	*U*
Parathion	--	--	--	µg/L	--		*0.14*	*U*
Polychlorinated Biphenyls (PCBs)								
PCB 1016	0.5	--	--	µg/L	--		*0.17*	*U*
PCB 1221	0.5	--	--	µg/L	--		*0.18*	*U*
PCB 1232	0.5	--	--	µg/L	--		*0.13*	*U*
PCB 1242	0.5	--	--	µg/L	--		*0.1*	*U*
PCB 1248	0.5	--	--	µg/L	--		*0.17*	*U*
PCB 1254	0.5	--	--	µg/L	--		*0.14*	*U*
PCB 1260	0.5	--	--	µg/L	--		*0.088*	*U*
Polychlorinated Biphenyl (PCBs)	0.5	0.5	--	µg/L	--		*0.073*	*U*
Chlorinated Herbicides								
2,4,5-TP (Silvex)	50	50	--	µg/L	--		*0.16*	*U*
2,4,5-Trichlorophenoxyacetic acid	--	--	--	µg/L	--		*0.17*	*U*
2,4-Dichlorophenoxyacetic acid	70	70	--	µg/L	--		*0.11*	*U*
Dinoseb; 2-sec-Butyl-4,6-dinitrophenol	7	7	--	µg/L	--		*0.11*	*U*
Dioxins/Furans								
2,3,7,8-TCDD	30	30	--	pg/L	--		*3.2*	*U*
Field and Redox Parameters								
Dissolved Oxygen	--	--	--	mg/L	**9.72**		**7.9**	
Oxidation-Reduction Potential	--	--	--	millivolts	**-2.8**		**176.5**	
pH	--	--	6.5 - 8.5	su	**8.12**		**8.21**	
Specific Conductance	--	--	--	µS/cm	**1357**		**1519**	
Sulfide	--	--	--	mg/L	--		**0.042**	J
Temperature	--	--	--	Celsius	**10.89**		**11.8**	
Turbidity	--	--	--	ntu	**2.57**		**2.95**	

Table 3-6
Cell 2 and Cell 4 Monitoring Well Results

				Area	Cell 2 & 4 Monitoring Well																			
				Well ID	MW-12		MW-13		MW-3A		MW-4		MW-4A		MW-5AR		MW-6A		MW-8		MW-9		MW-9	
				Sample Name	MW-12-20240501		MW-13-20240505		MW-3A-20240506		MW-4-20240502		MW-4A-20240502		MW-5AR-20240505		MW-6A-20240501		MW-8-20240503		MW-9-20240506		MW-9Q-20240506	
		ID GW -	ID GW -	Sample Date	5/1/2024		5/5/2024		5/6/2024		5/2/2024		5/2/2024		5/5/2024		5/1/2024		5/3/2024		5/6/2024		5/6/2024	
Analyte	EPA MCL	PRIMARY	SECONDARY	Unit	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organic Compounds (VOCs)																								
1,1-Dichloroethane	--	--	--	µg/L	0.22	U	0.22	U	0.22	U	0.84	J	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
1,2-Dichloroethane	5	5	--	µg/L	0.28	U	0.28	U	0.28	U	1.5		0.28	U	0.28	U	0.28	U	0.28	U	0.28	J	0.34	J
Benzene	5	5	--	µg/L	0.14	U	0.14	U	0.14	U	0.58	J	0.14	U	0.14	U	0.14	U	0.14	U	0.56	J	0.59	J
cis-1,2-Dichloroethene	70	70	--	µg/L	0.32	U	1.3		0.32	U	2.8		0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
Dichlorodifluoromethane	--	--	--	µg/L	0.3	U	1.3	J	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.34	J	0.3	UJ
Tetrachloroethene	5	5	--	µg/L	0.4	U	0.4	U	0.4	U	2.1		0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
trans-1,2-Dichloroethene	100	100	--	µg/L	0.37	U	0.37	U	0.37	U	0.62	J	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U	0.37	U
Trichloroethene	5	5	--	µg/L	0.3	U	0.51	J	0.3	U	0.88	J	0.3	U	0.3	U	0.3	U	0.3	J	0.3	U	0.3	U
Vinyl chloride	2	2	--	µg/L	0.23	U	0.23	U	0.23	U	2		0.23	U	0.23	U	0.23	U	0.23	U	0.68	J	0.61	J
Inorganics																								
Antimony	6	6	--	µg/L	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Arsenic	10	50	--	µg/L	0.69	J	4.2	J	0.5	U	2.5	J	1.6	J	0.5	U	0.61	J	3.2	J	2.5	J	2.2	J
Barium	2000	2000	--	µg/L	50		120		150		220		180		94		190		33		39		38	
Beryllium	4	4	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Cadmium	5	5	--	µg/L	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
Calcium	--	--	--	µg/L	65000		48000		54000		180000		85000		83000		73000		60000		330000		320000	
Chromium	100	100	--	µg/L	3	U	0.94	J	0.5	U	0.5	U	0.5	U	0.5	U	3	U	0.5	U	0.5	U	0.5	U
Cobalt	--	--	--	µg/L	2.6		0.68	J	0.33	U	0.82	J	0.33	U	0.33	U	0.33	U	0.33	U	0.79	J	0.74	J
Copper	1300	1300	--	µg/L	0.71	U	0.71	U	0.71	U	0.71	U	0.71	U	0.71	U	0.9	J	0.71	U	1.5	J	1.4	J
Iron	--	--	300	µg/L	29	J	220	J+	51	J	600		8.7	U	200	U	30	J	8.7	U	1500		1400	
Lead	15	15	--	µg/L	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.82	J	0.64	J
Magnesium	--	--	--	µg/L	16000		40000		27000		69000		18000		26000		40000		20000		270000		260000	
Manganese	--	--	0.05	mg/L	0.00051	U	0.0053		0.00067	J	0.15		0.00051	U	0.0026	J	0.001	J	0.00051	U	2.4		2.3	
Nickel	--	--	--	µg/L	0.83	U	0.83	U	0.83	U	1.3	J	0.83	U	0.83	U	0.83	U	0.83	U	3.5		3.1	
Potassium	--	--	--	µg/L	820	J	2600		2200		3300		3200		2600		1700		530	J	4800		4900	
Selenium	50	50	--	µg/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	2.3	J	2.4	J
Silver	--	--	100	µg/L	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
Sodium	--	--	--	µg/L	33000		37000		43000		59000		63000		260000		50000		45000		580000		580000	
Thallium	2	2	--	µg/L	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
Tin	--	--	--	µg/L	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U
Vanadium	--	--	--	µg/L	2.1	J	1.5	J	1.2	J	2.7	J	2	J	1.1	U	1.3	J	1.2	J	1.2	J	1.2	J
Zinc	--	--	5000	µg/L	2.8	J	2	U	5.8	J	2	U	2	U	2	U	4	J	2	U	120		89	
Field and Redox Parameters																								
Dissolved Oxygen	--	--	--	mg/L	9.47		9.18		7.57		1.34		10.4		6.41		9.7		8.88		0.34		--	
Oxidation-Reduction Potential	--	--	--	millivolts	189.2		205		109.7		4.1		113		198.7		198.5		216.6		-156.7		--	
pH	--	--	6.5 - 8.5	su	7.45		7.61		7.51		6.51		7.39		7.55		7.41		7.31		6.7		--	
Specific Conductance	--	--	--	µS/cm	565		681		668		1353		812		1731		895		621		5510		--	
Temperature	--	--	--	Celsius	9.2		10.9		9.7		12.2		10.5		5.7		10		12.1		10		--	
Turbidity	--	--	--	ntu	0.16		1.72		3.02		0.29		0.21		1		1.29		0.48		4.31		--	

Section 4 Tables
Statistical Definitions
Fort Hall Mine Landfill

Abbreviation/Expression	Definition
µg/L	microgram per liter
Confidence Level	confidence level of the Mann-Kendall Trend Test
Direction	Mann-Kendall trend result
J	estimated result
Last Q	laboratory qualifier for the most recent result (if any)
Latest Result	most recent result
LCL	lower confidence limit of the data set mean
Max Date	most recent date in the analyzed dataset
mg/L	milligram per liter
Min Date	earliest date in the analyzed dataset
NA	not applicable
NC	not calculated
Q	qualifier
RCRA	Resource Conservation and Recovery Act
RCRA regulated chemical	Whether the chemical is RCRA regulated
U	nondetect result
UCL	upper confidence limit of the data set mean
UJ	result estimated to be nondetect
UPL	upper prediction limit
UPL of background	UPL of the background well (Cell 2 and Cell 4 Monitoring Well only)
Decreasing (green highlight)	Mann Kendall trend test result is that the dataset has a statistically decreasing trend.
Increasing or Yes (red highlight)	Mann Kendall trend test result is that the dataset has a statistically increasing trend or the test parameter exceeds the comparison criteria (e.g., standard or UPL).

Table 4-1
Cell 1 Statistical Summary - VOCs
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Dataset			General				Confidence		Trend analysis
Well ID	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	UCL > Standard	Confidence Level %	GSI Toolkit Trend
MP-1	Tetrachloroethene	µg/L	09/13/2020	05/03/2024	23		Yes	Yes	89.1	No trend
MP-1	Trichloroethene	µg/L	09/13/2020	05/03/2024	160		Yes	Yes	83	No trend
MP-1	Vinyl chloride	µg/L	09/13/2020	05/03/2024	3.3		Yes	Yes	50	Stable
MP-2	Tetrachloroethene	µg/L	09/13/2020	05/07/2024	8.4		Yes	Yes	98.1	Decreasing
MP-2	Trichloroethene	µg/L	09/13/2020	05/07/2024	110		Yes	Yes	98.2	Decreasing
MP-2	Vinyl chloride	µg/L	09/13/2020	05/07/2024	1.8		No	Yes	94.8	Probably Decreasing
MP-3	Tetrachloroethene	µg/L	09/13/2020	05/14/2024	19		Yes	Yes	73.5	No trend
MP-3	Trichloroethene	µg/L	09/13/2020	05/14/2024	86		Yes	Yes	50	Stable
MP-4	Tetrachloroethene	µg/L	09/13/2020	05/03/2024	24		Yes	Yes	87.1	No trend
MP-4	Trichloroethene	µg/L	09/13/2020	05/03/2024	130		Yes	Yes	55	No trend
MW-101S	Tetrachloroethene	µg/L	10/05/2018	05/03/2024	12		Yes	Yes	99.2	Increasing
MW-101S	Trichloroethene	µg/L	10/05/2018	05/03/2024	32		Yes	Yes	97.7	Increasing
MW-102S	Trichloroethene	µg/L	01/24/2018	05/05/2024	12		Yes	Yes	91.2	Probably Increasing
MW-105D	Chloroform	µg/L	01/23/2018	05/02/2024	1.7	J	No	Yes	90.8	Probably Increasing
MW-105D	Tetrachloroethene	µg/L	01/23/2018	05/02/2024	43		Yes	Yes	98.4	Increasing
MW-105D	Trichloroethene	µg/L	01/23/2018	05/02/2024	200		Yes	Yes	50	No trend
MW-105S	Tetrachloroethene	µg/L	01/23/2018	05/02/2024	7.1		Yes	Yes	65	Stable
MW-105S	Trichloroethene	µg/L	01/23/2018	05/02/2024	16		Yes	Yes	99.8	Decreasing
MW-105S	Vinyl chloride	µg/L	01/23/2018	05/02/2024	0.23	U	No	Yes	95	Decreasing
MW-109D	Tetrachloroethene	µg/L	10/06/2018	05/03/2024	25		Yes	Yes	94.7	Probably Increasing
MW-109D	Trichloroethene	µg/L	10/06/2018	05/03/2024	66		Yes	Yes	58.2	No trend
MW-109S	Tetrachloroethene	µg/L	10/06/2018	05/03/2024	11		Yes	Yes	64.3	No trend
MW-109S	Trichloroethene	µg/L	10/06/2018	05/03/2024	34		Yes	Yes	50	Stable
MW-110D	Tetrachloroethene	µg/L	10/07/2018	05/03/2024	3		No	Yes	54.2	No trend
MW-110D	Trichloroethene	µg/L	10/07/2018	05/03/2024	22		Yes	Yes	66.5	No trend
MW-110S	Tetrachloroethene	µg/L	10/06/2018	05/14/2024	5.8		Yes	Yes	73.2	No trend
MW-110S	Trichloroethene	µg/L	10/06/2018	05/14/2024	53		Yes	Yes	79.7	No trend
MW-110S	Vinyl chloride	µg/L	10/06/2018	05/14/2024	6		Yes	Yes	79.5	Stable
MW-111D	Benzene	µg/L	01/24/2018	05/01/2024	12	J	Yes	Yes	99.7	Decreasing
MW-111D	Trichloroethene	µg/L	01/24/2018	05/01/2024	2.1	J	No	Yes	64.9	No trend
MW-111S	Benzene	µg/L	10/04/2018	05/03/2024	17		Yes	Yes	91.4	Probably Decreasing
MW-112D	Tetrachloroethene	µg/L	01/24/2018	05/01/2024	12		Yes	Yes	56.8	Stable
MW-112D	Trichloroethene	µg/L	01/24/2018	05/01/2024	180		Yes	Yes	81.5	Stable
MW-112M	Tetrachloroethene	µg/L	10/05/2018	05/14/2024	13		Yes	Yes	76.8	No trend
MW-112M	Trichloroethene	µg/L	10/05/2018	05/14/2024	180		Yes	Yes	52.5	Stable
MW-113D	Tetrachloroethene	µg/L	10/04/2018	05/03/2024	11		Yes	Yes	96.2	Decreasing
MW-113D	Trichloroethene	µg/L	10/04/2018	05/03/2024	5.5		Yes	Yes	99.4	Decreasing

Table 4-1
Cell 1 Statistical Summary - VOCs
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Dataset			General				Confidence		Trend analysis
Well ID	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	UCL > Standard	Confidence Level %	GSI Toolkit Trend
MW-113D	Vinyl chloride	µg/L	10/04/2018	05/03/2024	14		Yes	Yes	97.7	Decreasing
MW-113S	Benzene	µg/L	01/24/2018	05/01/2024	6.2		Yes	Yes	97.9	Decreasing
MW-113S	Chloroform	µg/L	01/24/2018	05/01/2024	1.2		No	Yes	99.9	Decreasing
MW-113S	Tetrachloroethene	µg/L	01/24/2018	05/01/2024	19		Yes	Yes	100	Decreasing
MW-113S	Trichloroethene	µg/L	01/24/2018	05/01/2024	12		Yes	Yes	100	Decreasing
MW-113S	Vinyl chloride	µg/L	01/24/2018	05/01/2024	64		Yes	Yes	97.9	Decreasing
MW-117R	Tetrachloroethene	µg/L	01/26/2018	05/03/2024	9.1		Yes	Yes	64.6	No trend
MW-117R	Trichloroethene	µg/L	01/26/2018	05/03/2024	44		Yes	Yes	93.4	Probably Decreasing
MW-118D	Tetrachloroethene	µg/L	01/23/2018	05/02/2024	5.3		Yes	Yes	100	Decreasing
MW-118D	Trichloroethene	µg/L	01/23/2018	05/02/2024	30		Yes	Yes	100	Decreasing
MW-119D	Tetrachloroethene	µg/L	01/25/2018	05/02/2024	16		Yes	Yes	98.9	Increasing
MW-119D	Trichloroethene	µg/L	01/25/2018	05/02/2024	76		Yes	Yes	77.1	No trend
MW-119S	Tetrachloroethene	µg/L	01/25/2018	05/02/2024	17		Yes	Yes	97.6	Increasing
MW-119S	Trichloroethene	µg/L	01/25/2018	05/02/2024	71		Yes	Yes	98.4	Increasing
MW-120D	Tetrachloroethene	µg/L	01/25/2018	05/07/2024	12		Yes	Yes	99.1	Decreasing
MW-120D	Trichloroethene	µg/L	01/25/2018	05/07/2024	170		Yes	Yes	87.2	No trend
MW-120S	Tetrachloroethene	µg/L	01/25/2018	05/07/2024	11		Yes	Yes	100	Decreasing
MW-120S	Trichloroethene	µg/L	01/25/2018	05/07/2024	110		Yes	Yes	99.7	Decreasing
MW-121	Trichloroethene	µg/L	10/07/2018	05/07/2024	9.1		Yes	Yes	NC	NC
MW-123	Tetrachloroethene	µg/L	04/25/2021	05/03/2024	4.4		No	Yes	93.3	Probably Increasing
MW-123	Trichloroethene	µg/L	04/25/2021	05/03/2024	50		Yes	Yes	61.8	Stable
MW-124	Tetrachloroethene	µg/L	04/12/2023	05/06/2024	4.3		No	Yes	NC	NC
MW-124	Trichloroethene	µg/L	04/12/2023	05/06/2024	90		Yes	Yes	NC	NC
MW-124	Vinyl chloride	µg/L	04/12/2023	05/06/2024	4.9		Yes	Yes	NC	NC
MW-125	Tetrachloroethene	µg/L	04/12/2023	05/06/2024	2.5		No	Yes	NC	NC
MW-125	Trichloroethene	µg/L	04/12/2023	05/06/2024	17		Yes	Yes	NC	NC
MW-125	Vinyl chloride	µg/L	04/12/2023	05/06/2024	8.8		Yes	Yes	NC	NC
RW-1	Tetrachloroethene	µg/L	01/26/2018	05/03/2024	12		Yes	Yes	77.4	Stable
RW-1	Trichloroethene	µg/L	01/26/2018	05/03/2024	140		Yes	Yes	64.6	Stable
RW-1	Vinyl chloride	µg/L	01/26/2018	05/03/2024	7.2		Yes	Yes	77.4	No trend
RW-2	Tetrachloroethene	µg/L	01/26/2018	05/07/2024	4.9		No	Yes	99.4	Decreasing
RW-2	Trichloroethene	µg/L	01/26/2018	05/07/2024	95		Yes	Yes	91.3	Probably Decreasing
RW-2	Vinyl chloride	µg/L	01/26/2018	05/07/2024	4		Yes	Yes	96.8	Increasing
RW-3	Tetrachloroethene	µg/L	01/26/2018	05/05/2024	2.4		No	Yes	94.6	Probably Decreasing
RW-3	Trichloroethene	µg/L	01/26/2018	05/05/2024	3.5		No	Yes	94.6	Probably Decreasing

See Section 4 Table Definitions

Table 4-2
Offsite Statistical Summary - VOCs
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Dataset			General				Confidence	Trend analysis	
Well ID	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	UCL > Standard	Confidence Level %	GSI Toolkit Trend
MW-103S	Trichloroethene	µg/L	08/09/2017	05/05/2024	0.43	J	Yes	52.2	No trend
MW-116S	Trichloroethene	µg/L	08/11/2017	05/06/2024	7.3		Yes	99.6	Decreasing

See Section 4 Table Notes

Table 4-3
Remediation System Extraction Well Statistical Summary - PCE and TCE
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Dataset			General				Confidence		Trend analysis	
Well ID	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	UCL > Standard	Confidence Level %	GSI Toolkit Trend
RW-10	Tetrachloroethene	µg/L	01/26/2018	05/06/2024	18		Yes	Yes	93.9	Probably Increasing
RW-10	Trichloroethene	µg/L	01/26/2018	05/06/2024	62		Yes	Yes	92.5	Probably Increasing
RW-15	Tetrachloroethene	µg/L	01/26/2018	05/06/2024	18		Yes	Yes	50	Stable
RW-15	Trichloroethene	µg/L	01/26/2018	05/06/2024	100		Yes	Yes	59.7	Stable
RW-17	Tetrachloroethene	µg/L	01/26/2018	05/06/2024	21		Yes	Yes	90.1	Probably Increasing
RW-17	Trichloroethene	µg/L	01/26/2018	05/06/2024	74		Yes	Yes	78.7	No trend
RW-4	Tetrachloroethene	µg/L	01/26/2018	05/06/2024	20		Yes	Yes	55.6	No trend
RW-4	Trichloroethene	µg/L	01/26/2018	05/06/2024	96		Yes	Yes	86.7	Stable
RW-5	Tetrachloroethene	µg/L	01/26/2018	05/06/2024	14		Yes	Yes	60.6	No trend
RW-5	Trichloroethene	µg/L	01/26/2018	05/06/2024	51		Yes	Yes	57.1	No trend
RW-9R	Tetrachloroethene	µg/L	01/26/2018	05/06/2024	14		Yes	Yes	63.5	Stable
RW-9R	Trichloroethene	µg/L	01/26/2018	05/06/2024	140		Yes	Yes	73.2	Stable

See Section 4 Table Notes

Table 4-4
Recent PCE and TCE Trends Comparison
Cell 1 Monitoring Wells

Well ID	Analytes	Spring 2023 Trend	Fall 2023 Trend	Spring 2024 Trend
MP-1	Tetrachloroethene	NC	Stable	No trend
MP-1	Trichloroethene	NC	No trend	No trend
MP-2	Tetrachloroethene	Stable	**Decreasing**	**Decreasing**
MP-2	Trichloroethene	Stable	**Decreasing**	**Decreasing**
MP-3	Tetrachloroethene	**Probably Increasing**	No trend	No trend
MP-3	Trichloroethene	No trend	No trend	Stable
MP-4	Tetrachloroethene	**Probably Increasing**	No trend	No trend
MP-4	Trichloroethene	No trend	Stable	No trend
MW-101S	Tetrachloroethene	**Increasing**	**Increasing**	**Increasing**
MW-101S	Trichloroethene	**Increasing**	**Increasing**	**Increasing**
MW-102S	Trichloroethene	No Trend	No trend	**Probably Increasing**
MW-105D	Tetrachloroethene	No trend	**Increasing**	**Increasing**
MW-105D	Trichloroethene	Stable	No trend	No trend
MW-105S	Tetrachloroethene	No trend	No trend	Stable
MW-105S	Trichloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-109D	Tetrachloroethene	**Probably Increasing**	No trend	**Probably Increasing**
MW-109D	Trichloroethene	Stable	Stable	No trend
MW-109S	Tetrachloroethene	No trend	No trend	No trend
MW-109S	Trichloroethene	No trend	No trend	Stable
MW-110D	Tetrachloroethene	NC	NC	No trend
MW-110D	Trichloroethene	Stable	Stable	No trend
MW-110S	Tetrachloroethene	**Increasing**	No trend	No trend
MW-110S	Trichloroethene	**Increasing**	**Increasing**	No trend
MW-111D	Trichloroethene	**Probably Increasing**	No trend	No trend
MW-112D	Tetrachloroethene	No trend	Stable	Stable
MW-112D	Trichloroethene	Stable	Stable	Stable
MW-112M	Tetrachloroethene	**Increasing**	No trend	No trend
MW-112M	Trichloroethene	**Probably Increasing**	No trend	Stable
MW-113D	Tetrachloroethene	**Probably Decreasing**	**Decreasing**	**Decreasing**
MW-113D	Trichloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-113S	Tetrachloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-113S	Trichloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-117R	Tetrachloroethene	NC	NC	No trend
MW-117R	Trichloroethene	NC	NC	**Probably Decreasing**
MW-118D	Tetrachloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-118D	Trichloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-119D	Tetrachloroethene	**Increasing**	**Increasing**	**Increasing**
MW-119D	Trichloroethene	**Increasing**	**Probably Increasing**	No trend
MW-119S	Tetrachloroethene	**Increasing**	**Increasing**	**Increasing**
MW-119S	Trichloroethene	**Increasing**	**Increasing**	**Increasing**
MW-120D	Tetrachloroethene	Stable	**Probably Decreasing**	**Decreasing**
MW-120D	Trichloroethene	**Increasing**	**Increasing**	No trend
MW-120S	Tetrachloroethene	**Decreasing**	**Decreasing**	**Decreasing**
MW-120S	Trichloroethene	**Probably Decreasing**	**Decreasing**	**Decreasing**
MW-123	Tetrachloroethene	NC	No trend	**Probably Increasing**
MW-123	Trichloroethene	Stable	Stable	Stable
RW-1	Tetrachloroethene	NC	NC	Stable
RW-1	Trichloroethene	NC	NC	Stable
RW-2	Tetrachloroethene	NC	**Decreasing**	**Decreasing**
RW-2	Trichloroethene	NC	Stable	**Probably Decreasing**
RW-3	Tetrachloroethene	Stable	Stable	**Probably Decreasing**
RW-3	Trichloroethene	Stable	Stable	**Probably Decreasing**

Table 4-5
Cell 1 Statistical Summary - Inorganics
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	UCL > Standard
MW-121	Yes	Arsenic	µg/L	10/07/2018	05/07/2024	120		Yes	Yes
MP-2	No	Iron	µg/L	04/28/2021	05/07/2024	8.7	U	No	Yes
MW-121	No	Iron	µg/L	10/07/2018	05/07/2024	25000		Yes	Yes
MW-124	No	Iron	µg/L	05/15/2023	05/06/2024	950		Yes	Yes
MW-125	No	Iron	µg/L	05/15/2023	05/06/2024	200	U	No	Yes
RW-2	No	Iron	µg/L	05/16/2023	05/07/2024	520		Yes	Yes
MP-2	No	Manganese	mg/L	04/28/2021	05/07/2024	0.0093		No	Yes
MW-121	No	Manganese	mg/L	10/07/2018	05/07/2024	0.87		Yes	Yes
MW-124	No	Manganese	mg/L	05/15/2023	05/06/2024	4.8		Yes	Yes
MW-125	No	Manganese	mg/L	05/15/2023	05/06/2024	1		Yes	Yes
RW-2	No	Manganese	mg/L	05/16/2023	05/07/2024	1.5		Yes	Yes

See Section 4 Table Notes

Table 4-6
Cell 2 Statistical Summary - VOCs
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Dataset				General					Confidence limits		Trend analysis	
Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	UCL > Standard	LCL > Standard	Confidence Level %	Direction
MW-12	Yes	1,2,4-Trichlorobenzene	µg/L	04/13/2018	05/01/2024	0.58	U	No	NC	NC	NC	NC
MW-12	Yes	1,2-Dichloroethane	µg/L	04/13/2018	05/01/2024	0.28	U	No	NC	NC	NC	NC
MW-12	Yes	Iodomethane	µg/L	04/13/2018	05/01/2024	2.6	U	NC	NC	NC	NC	NC
MW-13	Yes	1,1-Dichloroethane	µg/L	04/12/2018	05/05/2024	0.22	U	NC	NC	NC	NC	NC
MW-13	Yes	1,2-Dichloroethane	µg/L	04/12/2018	05/05/2024	0.28	U	No	NC	NC	NC	NC
MW-13	Yes	cis-1,2-Dichloroethene	µg/L	04/12/2018	05/05/2024	1.3		No	No	No	100	Increasing
MW-13	Yes	Dichlorodifluoromethane	µg/L	04/12/2018	05/05/2024	1.3	J	NC	NC	NC	98	Increasing
MW-13	Yes	Iodomethane	µg/L	04/12/2018	05/05/2024	2.6	U	NC	NC	NC	NC	NC
MW-13	Yes	Tetrachloroethene	µg/L	04/12/2018	05/05/2024	0.4	U	No	No	No	99.2	Increasing
MW-13	Yes	Trichloroethene	µg/L	04/12/2018	05/05/2024	0.51	J	No	No	No	NC	NC
MW-13	Yes	Trichlorofluoromethane	µg/L	04/12/2018	05/05/2024	0.2	U	NC	NC	NC	NC	NC
MW-8	Yes	Acetone	µg/L	04/12/2018	05/03/2024	6.6	U	NC	NC	NC	NC	NC
MW-8	Yes	Trichloroethene	µg/L	04/12/2018	05/03/2024	0.3	J	No	NC	NC	NC	NC
MW-9	Yes	1,2-Dichloroethane	µg/L	04/12/2018	05/06/2024	0.34	J	No	No	No	NC	NC
MW-9	Yes	Acetone	µg/L	04/12/2018	05/06/2024	6.6	U	NC	NC	NC	NC	NC
MW-9	Yes	Benzene	µg/L	04/12/2018	05/06/2024	0.59	J	No	No	No	NC	NC
MW-9	Yes	Dichlorodifluoromethane	µg/L	04/12/2018	05/06/2024	0.34	J	NC	NC	NC	NC	NC
MW-9	Yes	Vinyl chloride	µg/L	04/12/2018	05/06/2024	0.68	J	No	No	No	57.3	No Trend

See Section 4 Table Notes

Table 4-7
Cell 2 Statistical Summary - Inorganics
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	LCL > Standard	Latest Result > UPL of background	Confidence Level %	Direction
MW-12	Yes	Arsenic	µg/L	04/13/2018	05/01/2024	0.69	J	No	No	No	62	No Trend
MW-12	Yes	Barium	µg/L	04/13/2018	05/01/2024	50		No	No	No	95.9	Decreasing
MW-12	Yes	Beryllium	µg/L	04/13/2018	05/01/2024	0.3	U	No	No	No	NC	NC
MW-12	No	Calcium	µg/L	04/13/2018	05/01/2024	65000		NC	NC	No	75.2	No Trend
MW-12	Yes	Chromium	µg/L	04/13/2018	05/01/2024	3	U	No	No	No	80.4	No Trend
MW-12	Yes	Cobalt	µg/L	04/13/2018	05/01/2024	2.6		NC	NC	No	100	Decreasing
MW-12	Yes	Copper	µg/L	04/13/2018	05/01/2024	0.71	U	No	No	No	NC	NC
MW-12	No	Iron	µg/L	04/13/2018	05/01/2024	29	J	No	No	No	NC	NC
MW-12	Yes	Lead	µg/L	04/13/2018	05/01/2024	0.23	U	No	No	No	NC	NC
MW-12	No	Magnesium	µg/L	04/13/2018	05/01/2024	16000		NC	NC	No	67.3	No Trend
MW-12	No	Manganese	mg/L	04/13/2018	05/01/2024	0.00051	U	No	No	No	NC	NC
MW-12	Yes	Nickel	µg/L	04/13/2018	05/01/2024	0.83	U	NC	NC	No	NC	NC
MW-12	No	Potassium	µg/L	04/13/2018	05/01/2024	820	J	NC	NC	No	94.7	No Trend
MW-12	Yes	Selenium	µg/L	04/13/2018	05/01/2024	1	U	No	No	No	82.2	No Trend
MW-12	No	Sodium	µg/L	04/13/2018	05/01/2024	33000		NC	NC	No	50	No Trend
MW-12	Yes	Thallium	µg/L	04/13/2018	05/01/2024	0.21	U	No	No	No	NC	NC
MW-12	Yes	Vanadium	µg/L	04/13/2018	05/01/2024	2.1	J	NC	NC	No	NC	NC
MW-12	Yes	Zinc	µg/L	04/13/2018	05/01/2024	2.8	J	No	No	No	NC	NC
MW-13	Yes	Arsenic	µg/L	04/12/2018	05/05/2024	4.2	J	No	No	Yes	73.4	No Trend
MW-13	Yes	Barium	µg/L	04/12/2018	05/05/2024	120		No	No	Yes	60.7	No Trend
MW-13	Yes	Beryllium	µg/L	04/12/2018	05/05/2024	0.3	U	No	NC	No	NC	NC
MW-13	No	Calcium	µg/L	04/12/2018	05/05/2024	48000		NC	NC	No	90.4	No Trend
MW-13	Yes	Chromium	µg/L	04/12/2018	05/05/2024	0.94	J	No	No	No	98.7	Decreasing
MW-13	Yes	Cobalt	µg/L	04/12/2018	05/05/2024	0.68	J	NC	NC	No	62	No Trend
MW-13	Yes	Copper	µg/L	04/12/2018	05/05/2024	0.71	U	No	No	No	NC	NC
MW-13	No	Iron	µg/L	04/12/2018	05/05/2024	220	J+	No	No	Yes	68.8	No Trend
MW-13	Yes	Lead	µg/L	04/12/2018	05/05/2024	0.23	U	No	No	No	NC	NC
MW-13	No	Magnesium	µg/L	04/12/2018	05/05/2024	40000		NC	NC	Yes	77.6	No Trend
MW-13	No	Manganese	mg/L	04/12/2018	05/05/2024	0.0053		No	No	Yes	87.8	No Trend
MW-13	Yes	Nickel	µg/L	04/12/2018	05/05/2024	0.83	U	NC	NC	No	NC	NC
MW-13	No	Potassium	µg/L	04/12/2018	05/05/2024	2600		NC	NC	No	95.8	Decreasing
MW-13	Yes	Selenium	µg/L	04/12/2018	05/05/2024	1	U	No	No	No	93.1	No Trend
MW-13	No	Sodium	µg/L	04/12/2018	05/05/2024	37000		NC	NC	No	85.1	No Trend
MW-13	Yes	Thallium	µg/L	04/12/2018	05/05/2024	0.21	U	No	NC	No	NC	NC
MW-13	Yes	Vanadium	µg/L	04/12/2018	05/05/2024	1.5	J	NC	NC	No	NC	NC
MW-13	Yes	Zinc	µg/L	04/12/2018	05/05/2024	2	U	No	No	No	NC	NC
MW-8	Yes	Arsenic	µg/L	04/12/2018	05/03/2024	3.2	J	No	No	Yes	99.5	Decreasing
MW-8	Yes	Barium	µg/L	04/12/2018	05/03/2024	33		No	No	No	97.4	Decreasing
MW-8	Yes	Beryllium	µg/L	04/12/2018	05/03/2024	0.3	U	No	NC	No	NC	NC
MW-8	No	Calcium	µg/L	04/12/2018	05/03/2024	60000		NC	NC	No	59.7	No Trend
MW-8	Yes	Chromium	µg/L	04/12/2018	05/03/2024	0.5	U	No	No	No	NC	NC
MW-8	Yes	Cobalt	µg/L	04/12/2018	05/03/2024	0.33	U	NC	NC	No	NC	NC
MW-8	Yes	Copper	µg/L	04/12/2018	05/03/2024	0.71	U	No	No	No	NC	NC
MW-8	No	Iron	µg/L	04/12/2018	05/03/2024	8.7	U	No	No	No	NC	NC
MW-8	Yes	Lead	µg/L	04/12/2018	05/03/2024	0.23	U	No	NC	No	NC	NC
MW-8	No	Magnesium	µg/L	04/12/2018	05/03/2024	20000		NC	NC	Yes	64.7	No Trend

Table 4-7
Cell 2 Statistical Summary - Inorganics
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	LCL > Standard	Latest Result > UPL of background	Confidence Level %	Direction
MW-8	No	Manganese	mg/L	04/12/2018	05/03/2024	0.00051	U	No	No	No	96.3	Decreasing
MW-8	Yes	Nickel	µg/L	04/12/2018	05/03/2024	0.83	U	NC	NC	No	NC	NC
MW-8	No	Potassium	µg/L	04/12/2018	05/03/2024	530	J	NC	NC	No	86.4	No Trend
MW-8	Yes	Selenium	µg/L	04/12/2018	05/03/2024	1	U	No	No	No	73.1	No Trend
MW-8	No	Sodium	µg/L	04/12/2018	05/03/2024	45000		NC	NC	Yes	99.7	Decreasing
MW-8	Yes	Thallium	µg/L	04/12/2018	05/03/2024	0.21	U	No	NC	No	NC	NC
MW-8	Yes	Vanadium	µg/L	04/12/2018	05/03/2024	1.2	J	NC	NC	No	NC	NC
MW-8	Yes	Zinc	µg/L	04/12/2018	05/03/2024	2	U	No	No	No	NC	NC
MW-9	Yes	Arsenic	µg/L	04/12/2018	05/06/2024	2.5	J	No	No	Yes	84	No Trend
MW-9	Yes	Barium	µg/L	04/12/2018	05/06/2024	39		No	No	No	94.4	No Trend
MW-9	Yes	Beryllium	µg/L	04/12/2018	05/06/2024	0.3	U	No	NC	No	NC	NC
MW-9	No	Calcium	µg/L	04/12/2018	05/06/2024	330000		NC	NC	Yes	86.4	No Trend
MW-9	Yes	Chromium	µg/L	04/12/2018	05/06/2024	0.5	U	No	No	No	NC	NC
MW-9	Yes	Cobalt	µg/L	04/12/2018	05/06/2024	0.79	J	NC	NC	No	99.4	Decreasing
MW-9	Yes	Copper	µg/L	04/12/2018	05/06/2024	1.5	J	No	No	No	82.4	No Trend
MW-9	No	Iron	µg/L	04/12/2018	05/06/2024	1500		Yes	Yes	Yes	99.8	Increasing
MW-9	Yes	Lead	µg/L	04/12/2018	05/06/2024	0.82	J	No	No	Yes	NC	NC
MW-9	No	Magnesium	µg/L	04/12/2018	05/06/2024	270000		NC	NC	Yes	78.6	No Trend
MW-9	No	Manganese	mg/L	04/12/2018	05/06/2024	2.4		Yes	Yes	Yes	78.7	No Trend
MW-9	Yes	Nickel	µg/L	04/12/2018	05/06/2024	3.5		NC	NC	Yes	100	Decreasing
MW-9	No	Potassium	µg/L	04/12/2018	05/06/2024	4900		NC	NC	Yes	95	Decreasing
MW-9	Yes	Selenium	µg/L	04/12/2018	05/06/2024	2.4	J	No	No	Yes	NC	NC
MW-9	No	Sodium	µg/L	04/12/2018	05/06/2024	580000		NC	NC	Yes	83.6	No Trend
MW-9	Yes	Thallium	µg/L	04/12/2018	05/06/2024	0.21	U	No	NC	No	NC	NC
MW-9	Yes	Vanadium	µg/L	04/12/2018	05/06/2024	1.2	J	NC	NC	No	NC	NC
MW-9	Yes	Zinc	µg/L	04/12/2018	05/06/2024	120		No	No	Yes	99.4	Decreasing

See Section 4 Table Notes

Table 4-8
Cell 4 Statistical Summary - VOCs
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Dataset				General					Confidence	Trend analysis	
Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	LCL > Standard	Confidence Level %	Direction
MW-3A	Yes	1,2,4-Trichlorobenzene	µg/L	10/08/2018	05/06/2024	0.58	U	No	NC	NC	NC
MW-3A	Yes	1,4-Dichlorobenzene	µg/L	04/11/2018	05/06/2024	0.39	U	No	NC	NC	NC
MW-3A	Yes	Acrylonitrile	µg/L	04/11/2018	05/06/2024	1.7	U	NC	NC	NC	NC
MW-3A	Yes	Iodomethane	µg/L	04/11/2018	05/06/2024	2.6	U	NC	NC	NC	NC
MW-3A	Yes	Trichloroethene	µg/L	04/11/2018	05/06/2024	0.3	U	No	NC	NC	NC
MW-4A	Yes	Trichloroethene	µg/L	04/11/2018	05/02/2024	0.3	U	No	NC	NC	NC
MW-5AR	Yes	Carbon disulfide	µg/L	07/21/2021	05/05/2024	0.26	U	NC	NC	NC	NC
MW-5AR	Yes	Toluene	µg/L	07/21/2021	05/05/2024	0.32	U	No	No	NC	NC
MW-4	Yes	1,1,1-Trichloroethane	µg/L	04/11/2018	05/02/2024	0.39	U	No	No	NC	NC
MW-4	Yes	1,1-Dichloroethane	µg/L	04/11/2018	05/02/2024	0.84	J	NC	NC	99.9	Increasing
MW-4	Yes	1,2-Dichloroethane	µg/L	04/11/2018	05/02/2024	1.5		No	No	NC	NC
MW-4	Yes	Benzene	µg/L	04/11/2018	05/02/2024	0.58	J	No	No	99.9	Increasing
MW-4	Yes	Chlorobenzene	µg/L	04/11/2018	05/02/2024	0.092	U	No	NC	NC	NC
MW-4	Yes	Dichlorodifluoromethane	µg/L	10/05/2018	05/02/2024	0.3	U	NC	NC	50	No Trend
MW-4	Yes	Iodomethane	µg/L	04/11/2018	05/02/2024	2.6	U	NC	NC	NC	NC
MW-4	Yes	Tetrachloroethene	µg/L	04/11/2018	05/02/2024	2.1		No	No	99.9	Decreasing
MW-4	Yes	Trichloroethene	µg/L	04/11/2018	05/02/2024	0.88	J	No	No	99.5	Increasing
MW-4	Yes	Vinyl chloride	µg/L	04/11/2018	05/02/2024	2		No	No	99.8	Increasing
MW-4	Yes	Xylenes, total	µg/L	04/11/2018	05/02/2024	0.11	U	No	No	NC	NC
MW-4	Yes	cis-1,2-Dichloroethene	µg/L	04/11/2018	05/02/2024	2.8		No	No	98.6	Increasing
MW-4	No	o-xylene	µg/L	05/01/2019	05/02/2024	0.11	U	No	NC	NC	NC
MW-4	Yes	trans-1,2-Dichloroethene	µg/L	04/11/2018	05/02/2024	0.62	J	No	No	99.5	Increasing

See Section 4 Table Notes

Table 4-9
Cell 4 Statistical Summary - Inorganics
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	LCL > Standard	Latest Result > UPL of background	Confidence Level %	Direction
MW-3A	Yes	Arsenic	µg/L	04/11/2018	05/06/2024	0.5	U	No	NC	No	NC	NC
MW-3A	Yes	Barium	µg/L	04/11/2018	05/06/2024	150		No	No	No	83.8	No Trend
MW-3A	No	Calcium	µg/L	04/11/2018	05/06/2024	54000		NC	NC	No	82.3	No Trend
MW-3A	Yes	Chromium	µg/L	04/11/2018	05/06/2024	0.5	U	No	No	No	NC	NC
MW-3A	Yes	Cobalt	µg/L	04/11/2018	05/06/2024	0.33	U	NC	NC	No	NC	NC
MW-3A	Yes	Copper	µg/L	04/11/2018	05/06/2024	0.71	U	No	No	No	NC	NC
MW-3A	No	Iron	µg/L	04/11/2018	05/06/2024	51	J	No	No	No	86.5	No Trend
MW-3A	No	Magnesium	µg/L	04/11/2018	05/06/2024	27000		NC	NC	Yes	99.1	Decreasing
MW-3A	No	Manganese	mg/L	04/11/2018	05/06/2024	0.00067	J	No	No	No	57.3	No Trend
MW-3A	No	Potassium	µg/L	04/11/2018	05/06/2024	2200		NC	NC	No	89.2	No Trend
MW-3A	Yes	Selenium	µg/L	04/11/2018	05/06/2024	1	U	No	No	No	95.7	Increasing
MW-3A	No	Sodium	µg/L	04/11/2018	05/06/2024	43000		NC	NC	No	57.4	No Trend
MW-3A	Yes	Vanadium	µg/L	04/11/2018	05/06/2024	1.2	J	NC	NC	No	NC	NC
MW-3A	Yes	Zinc	µg/L	04/11/2018	05/06/2024	5.8	J	No	No	No	99.9	Decreasing
MW-4	Yes	Arsenic	µg/L	04/11/2018	05/02/2024	2.5	J	No	No	Yes	92.3	No Trend
MW-4	Yes	Barium	µg/L	04/11/2018	05/02/2024	220		No	No	Yes	98.5	Increasing
MW-4	No	Calcium	µg/L	04/11/2018	05/02/2024	180000		NC	NC	Yes	99.5	Increasing
MW-4	Yes	Chromium	µg/L	04/11/2018	05/02/2024	0.5	U	No	No	No	NC	NC
MW-4	Yes	Cobalt	µg/L	04/11/2018	05/02/2024	0.82	J	NC	NC	Yes	99.6	Decreasing
MW-4	Yes	Copper	µg/L	04/11/2018	05/02/2024	0.71	U	No	No	No	NC	NC
MW-4	No	Iron	µg/L	04/11/2018	05/02/2024	600		Yes	Yes	Yes	66.5	No Trend
MW-4	No	Magnesium	µg/L	04/11/2018	05/02/2024	69000		NC	NC	Yes	85.1	No Trend
MW-4	No	Manganese	mg/L	04/11/2018	05/02/2024	0.15		Yes	Yes	Yes	99.8	Decreasing
MW-4	No	Potassium	µg/L	04/11/2018	05/02/2024	3300		NC	NC	No	97	Decreasing
MW-4	Yes	Selenium	µg/L	04/11/2018	05/02/2024	1	U	No	NC	No	NC	NC
MW-4	No	Sodium	µg/L	04/11/2018	05/02/2024	59000		NC	NC	No	62.1	No Trend
MW-4	Yes	Vanadium	µg/L	04/11/2018	05/02/2024	2.7	J	NC	NC	Yes	99.8	Increasing
MW-4	Yes	Zinc	µg/L	04/11/2018	05/02/2024	2	U	No	No	No	NC	NC
MW-4A	Yes	Arsenic	µg/L	04/11/2018	05/02/2024	1.6	J	No	No	No	57.7	No Trend
MW-4A	Yes	Barium	µg/L	04/11/2018	05/02/2024	180		No	No	No	96.2	Decreasing
MW-4A	No	Calcium	µg/L	04/11/2018	05/02/2024	85000		NC	NC	No	95.2	Decreasing
MW-4A	Yes	Chromium	µg/L	04/11/2018	05/02/2024	0.5	U	No	No	No	NC	NC
MW-4A	Yes	Cobalt	µg/L	04/11/2018	05/02/2024	0.33	U	NC	NC	No	NC	NC
MW-4A	Yes	Copper	µg/L	04/11/2018	05/02/2024	0.71	U	No	No	No	NC	NC

Table 4-9
Cell 4 Statistical Summary - Inorganics
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	LCL > Standard	Latest Result > UPL of background	Confidence Level %	Direction
MW-4A	No	Iron	µg/L	04/11/2018	05/02/2024	8.7	U	No	No	No	NC	NC
MW-4A	No	Magnesium	µg/L	04/11/2018	05/02/2024	18000		NC	NC	No	99.2	Decreasing
MW-4A	No	Manganese	mg/L	04/11/2018	05/02/2024	0.00051	U	No	No	No	NC	NC
MW-4A	No	Potassium	µg/L	04/11/2018	05/02/2024	3200		NC	NC	No	99.5	Decreasing
MW-4A	Yes	Selenium	µg/L	04/11/2018	05/02/2024	1	U	No	No	No	90.4	No Trend
MW-4A	No	Sodium	µg/L	04/11/2018	05/02/2024	63000		NC	NC	No	93.2	No Trend
MW-4A	Yes	Vanadium	µg/L	04/11/2018	05/02/2024	2	J	NC	NC	No	93.9	No Trend
MW-4A	Yes	Zinc	µg/L	04/11/2018	05/02/2024	2	U	No	No	No	NC	NC
MW-5A	Yes	Arsenic	µg/L	04/11/2018	04/23/2021	1.1	J	No	No	No	97.6	Decreasing
MW-5A	Yes	Barium	µg/L	04/11/2018	04/23/2021	54		No	No	No	50	No Trend
MW-5A	No	Calcium	µg/L	04/11/2018	04/23/2021	61000		NC	NC	No	73.1	No Trend
MW-5A	Yes	Chromium	µg/L	04/11/2018	04/23/2021	2		No	No	No	50	No Trend
MW-5A	Yes	Cobalt	µg/L	04/11/2018	04/23/2021	0.19	J	NC	NC	No	77.6	No Trend
MW-5A	Yes	Copper	µg/L	04/11/2018	04/23/2021	0.56	U	No	No	No	85.6	No Trend
MW-5A	No	Iron	µg/L	04/11/2018	04/23/2021	100	U	No	No	No	50	No Trend
MW-5A	No	Magnesium	µg/L	04/11/2018	04/23/2021	21000		NC	NC	Yes	78.3	No Trend
MW-5A	No	Manganese	mg/L	04/11/2018	04/23/2021	0.005		No	No	No	67.6	No Trend
MW-5A	No	Potassium	µg/L	04/11/2018	04/23/2021	630	J	NC	NC	No	67.6	No Trend
MW-5A	Yes	Selenium	µg/L	04/11/2018	04/23/2021	0.47	J	No	No	No	91.4	No Trend
MW-5A	No	Sodium	µg/L	04/11/2018	04/23/2021	50000		NC	NC	No	96.7	Increasing
MW-5A	Yes	Vanadium	µg/L	04/11/2018	04/23/2021	1.2	U	NC	NC	No	NC	NC
MW-5A	Yes	Zinc	µg/L	04/11/2018	04/23/2021	2.6	J	No	No	No	95.3	Decreasing
MW-5AR	Yes	Arsenic	µg/L	07/21/2021	05/05/2024	0.5	U	No	NC	No	NC	NC
MW-5AR	Yes	Barium	µg/L	07/21/2021	05/05/2024	94		No	No	No	50	No Trend
MW-5AR	No	Calcium	µg/L	07/21/2021	05/05/2024	83000		NC	NC	No	95.3	Increasing
MW-5AR	Yes	Chromium	µg/L	07/21/2021	05/05/2024	0.5	U	No	NC	No	NC	NC
MW-5AR	Yes	Cobalt	µg/L	07/21/2021	05/05/2024	0.33	U	NC	NC	No	99.6	Decreasing
MW-5AR	Yes	Copper	µg/L	07/21/2021	05/05/2024	0.71	U	No	NC	No	NC	NC
MW-5AR	No	Iron	µg/L	07/21/2021	05/05/2024	200	U	No	No	No	91	No Trend
MW-5AR	No	Magnesium	µg/L	07/21/2021	05/05/2024	26000		NC	NC	Yes	97.6	Increasing
MW-5AR	No	Manganese	mg/L	07/21/2021	05/05/2024	0.0026	J	No	No	No	99.9	Decreasing
MW-5AR	No	Potassium	µg/L	07/21/2021	05/05/2024	2600		NC	NC	No	99.5	Decreasing
MW-5AR	Yes	Selenium	µg/L	07/21/2021	05/05/2024	1	U	No	No	No	NC	NC
MW-5AR	No	Sodium	µg/L	07/21/2021	05/05/2024	260000		NC	NC	Yes	85.6	No Trend

Table 4-9
Cell 4 Statistical Summary - Inorganics
Spring 2024 Semiannual Monitoring Report
Fort Hall Mine Landfill

Well ID	RCRA regulated chemical	Analyte	Unit	Min Date	Max Date	Latest Result	Last Q	Latest Result > Standard	LCL > Standard	Latest Result > UPL of background	Confidence Level %	Direction
MW-5AR	Yes	Vanadium	µg/L	07/21/2021	05/05/2024	1.1	U	NC	NC	No	NC	NC
MW-5AR	Yes	Zinc	µg/L	07/21/2021	05/05/2024	2	U	No	NC	No	NC	NC
MW-6A	Yes	Arsenic	µg/L	04/11/2018	05/01/2024	0.61	J	No	No	No	74.9	No Trend
MW-6A	Yes	Barium	µg/L	04/11/2018	05/01/2024	190		No	No	No	94.3	No Trend
MW-6A	No	Calcium	µg/L	04/11/2018	05/01/2024	73000		NC	NC	No	94.5	No Trend
MW-6A	Yes	Chromium	µg/L	04/11/2018	05/01/2024	3	U	No	No	No (ND)	NC	NC
MW-6A	Yes	Cobalt	µg/L	04/11/2018	05/01/2024	0.33	U	NC	NC	No	NC	NC
MW-6A	Yes	Copper	µg/L	04/11/2018	05/01/2024	0.9	J	No	No	No	NC	NC
MW-6A	No	Iron	µg/L	04/11/2018	05/01/2024	30	J	No	No	No	NC	NC
MW-6A	No	Magnesium	µg/L	04/11/2018	05/01/2024	40000		NC	NC	**Yes**	99.5	**Decreasing**
MW-6A	No	Manganese	mg/L	04/11/2018	05/01/2024	0.001	J	No	No	No	85.1	No Trend
MW-6A	No	Potassium	µg/L	04/11/2018	05/01/2024	1700		NC	NC	No	99.7	**Decreasing**
MW-6A	Yes	Selenium	µg/L	04/11/2018	05/01/2024	1	U	No	No	No	90.2	No Trend
MW-6A	No	Sodium	µg/L	04/11/2018	05/01/2024	50000		NC	NC	No	96.7	**Decreasing**
MW-6A	Yes	Vanadium	µg/L	04/11/2018	05/01/2024	1.3	J	NC	NC	No	NC	NC
MW-6A	Yes	Zinc	µg/L	04/11/2018	05/01/2024	4	J	No	No	No	NC	NC

See Section 4 Table Notes

Table 5-1
Recommendations for Fall 2024 Sampling

Location Group	Location	Sampling Approach	Water Levels	Field parameters[1]	Appendix II RCRA Subtitle D Parameters														
					Appendix I				Additional Appendix II										
					VOCs			Total metals	SVOCs		O/C Pest[2]	O/P Pest	Chlor Herb	PCBs[2]	Dioxin/ Furan	Mercury	Cyanide	Total Sulfide
				water quality meter	8260D	8260D unpreserved	8011	6020B/ 6010C	8270E	8270E SIM	8081B	8141B	8321B	8082A	8290	7470A	SM4500-CN-E	SM 4500S-2
Cell 1	MP-1	Passive	X	X	X													
Cell 1	MP-2	Portable Pump	X	X	X													
Cell 1	MP-3	Passive	X	X	X													
Cell 1	MP-4	Passive	X	X	X													
Cell 1	MP-9	NA	X															
Cell 1	MW-1	NA	X															
Cell 1	MW-101S	Passive	X	X	X													
Cell 1	MW-102S	Dedicated Pump	X	X	X													
Cell 1	MW-104D	NA	X															
Cell 1	MW-104S	NA	X															
Cell 1	MW-105D	Dedicated	X	X		X												
Cell 1	MW-105S	Dedicated	X	X		X												
Cell 1	MW-109D	Passive	X	X	X													
Cell 1	MW-109S	Passive	X	X	X													
Cell 1	MW-110D	Passive	X	X	X													
Cell 1	MW-110S	Passive	X	X	X													
Cell 1	MW-111D	Dedicated	X	X		X												
Cell 1	MW-111S	Passive	X	X	X	X												
Cell 1	MW-112D	Dedicated Pump	X	X	X													
Cell 1	MW-112M	Passive	X	X	X													
Cell 1	MW-112S	Bail (If Not DRY)	X															
Cell 1	MW-113D	Passive	X	X	X													
Cell 1	MW-113S	Dedicated	X	X	X													
Cell 1	MW-117R	Passive	X	X	X													
Cell 1	MW-118D	Dedicated	X	X	X													
Cell 1	MW-119D	Dedicated	X	X	X													
Cell 1	MW-119S	Dedicated	X	X	X													
Cell 1	MW-120D	Dedicated	X	X	X													
Cell 1	MW-120S	Dedicated	X	X	X													
Cell 1	MW-121	Portable Pump	X	X	X			X										
Cell 1	MW-122	Bail (If Not DRY)	X	X	X													
Cell 1	MW-123	Passive	X	X	X													
Cell 1	MW-124	Portable Pump	X	X	X													
Cell 1	MW-125	Portable Pump	X	X	X													
Cell 1	RW-1	Passive	X	X	X													
Cell 1	RW-16	Passive	X															
Cell 1	RW-2	Portable Pump	X	X	X													
Cell 1	RW-3	Passive	X	X	X													
Cell 2	MW-12	Dedicated	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Cell 2	MW-13	Dedicated	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Cell 2	MW-7	NA	X															
Cell 2	MW-8	Dedicated	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Cell 2	MW-9	Dedicated	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Cell 4	MW-3A	Dedicated	X	X	X		X	X										
Cell 4	MW-4	Dedicated	X	X	X		X	X										
Cell 4	MW-4A	Dedicated	X	X	X		X	X										
Cell 4	MW-5AR	Dedicated	X	X	X		X	X										
Cell 4	MW-6A	Dedicated	X	X	X		X	X										

Table 5-1
Recommendations for Fall 2024 Sampling

Location Group	Location	Sampling Approach	Water Levels	Field parameters[1]	Appendix II RCRA Subtitle D Parameters													
					Appendix I				Additional Appendix II									
					VOCs			Total metals	SVOCs		O/C Pest[2]	O/P Pest	Chlor Herb	PCBs[2]	Dioxin/ Furan	Mercury	Cyanide	Total Sulfide
				water quality meter	8260D	8260D unpreserved	8011	6020B/ 6010C	8270E	8270E SIM	8081B	8141B	8321B	8082A	8290	7470A	SM4500-CN-E	SM 4500S-2
Offsite	MW-103D	NA	X															
Offsite	MW-103S	Dedicated	X	X	X													
Offsite	MW-106D	NA	X															
Offsite	MW-106S	NA	X															
Offsite	MW-115D	NA	X															
Offsite	MW-115S	Passive	X	X	X													
Offsite	MW-116D	NA																
Offsite	MW-116S	Portable Pump		X	X													
RSE	RW-10	Tap		X	X													
RSE	RW-15	Tap		X	X													
RSE	RW-17	Tap		X	X													
RSE	RW-4	Tap		X	X													
RSE	RW-5	Tap		X	X													
RSE	RW-9R	Tap		X	X													
System Effluent*	INJ-1R	Tap			X		X	X	X	X	X	X	X	X	X	X	X	X

Notes

Parameters specified for analysis are for routine monitoring and may not include those analyzed for pilot or tracer study monitoring.

* INJ-1R will also be sampled for VOCs (8260B) in the winter and summer

[1] Field parameters include pH, oxidation reduction potential, turbidity, dissolved oxygen, specific conductivity, and temperature

[2] PCBs and O/C Pest are collected in the same bottle

[3] Anions include sulfate, chloride, and bromide

Acronyms and Abbreviations

Chlor Herb = chlorinated herbicides
Herb = herbicide
O/C = organochlorine
O/P = organophosphate
PCBs = polychlorinated biphenyls
Pest = pesticide
RCRA = Resource Conservation and Recovery Act
RSE = remediation system extraction
SVOCs = semivolatile organic compounds
VOCs = volatile organic compounds