FINAL

Fort Hall Mine Landfill

1500 North Fort Hall Mine Road
Pocatello, Idaho 83204

2017 Offsite Groundwater Monitoring Report

Prepared for:

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1 2017 Offsite Groundwater Monitoring Laboratory Reports

Acronyms and Abbreviations

µg/L	Microgram(s) per liter
µS/cm	MicroSiemens per centimeter
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below ground surface
BHHRA	Baseline Human Health Risk Assessment
cis-1,2-DCE	cis-1,2-Dichloroethylene
COC	Contaminants of Concern
COPCs	Contaminants of Potential Concern
CSF	Chronic Slope Factor
CSM	Conceptual site model
DO	Dissolved oxygen
DWSIA	Domestic Water Source Inventory Area
EDMS	Environmental Data Management System
EPA	U.S. Environmental Protection Agency
FHML	Fort Hall Mine Landfill
ft	Feet (foot)
Fm	Formation
HEAST	Health Effects Assessment Summary Table
ID	Identification
IDEQ	Idaho Department of Environmental Quality
IDWR	Idaho Department of Water Resources
IRIS	Integrated Risk Information System
J	Estimated laboratory result that is higher than the MDL but less than the RDL
LPVA	Lower Portneuf Valley Aquifer
LPRV	Lower Portneuf River Valley
MCL	Maximum Contaminant Level
MDL	Method detection limit
mg/kg	Milligram(s) per kilogram
mg/L	Milligram(s) per liter
MRLs	Minimal Risk Levels

MW	Monitoring well
NTU	Nephelometric unit
ORP	Oxidation-reduction potential
PCE	Tetrachloroethene
PPRTVs	Provisional Peer Reviewed Toxicity Values
QAPP	Quality Assurance Project Plan
RDL	Reporting detection limit
RfD	Reference Dose
RSL	Regional Screening Limit
RW	Residential well
SAP	Sampling and Analysis Plan
SCEM	Site Conceptual Exposure Model
SL	Screening Level
SOP	Standard Operating Procedure
STSC	Superfund Health Risk Technical Support Center
TCE	Trichloroethene
µg/L	Microgram(s) per liter
µg/m	Micrograms per cubic meter
VISL	Vapor Intrusion Screening Level
VOC	Volatile organic compound
WP	Fort Hall Mine Landfill Offsite Groundwater Monitoring Work Plan

1.0 Introduction

AEEC has prepared this Monitoring Report on behalf of Bannock County to document the results of the 2017 offsite groundwater monitoring conducted at monitoring wells and domestic supply wells downgradient of the Fort Hall Mine Landfill (FHML). Fieldwork, laboratory results, data verification and validation, contaminant concentrations, an offsite conceptual model, and a screening level risk assessment are presented in this report.

1.1 Background

The FHML is located on North Fort Hall Mine Road in Bannock County, Idaho, approximately 7 miles southwest of Pocatello, Idaho (Figure 1-1). Landfill operations reportedly started at the site around 1943, with receipt of household waste from the City of Pocatello, as well as commercial and industrial waste from local entities, including 55-gallon drums of unknown contents and tanker truckloads of liquid wastes (Maxim, 2000). The historical unlined landfill (also known as Cell 1) was closed in 1993, prior to the October 9, 1993 deadline set forth in the 40 CFR Part 258, "Criteria for Municipal Solid Waste Landfills". A final cover was installed on Cell 1 in accordance with the requirements of Part 258 (Maxim, 2000).

In October 1991, volatile organic compound (VOC) impacts to groundwater were discovered near the FHML. By 1993, high concentrations of trichloroethene (TCE) were observed in downgradient domestic wells within the Portneuf Valley, and two municipal wells in the Lower Portneuf Valley Aquifer (LPVA) were subsequently closed due to high TCE concentrations (Brown and Caldwell, 1994). In 2002, Bannock County installed a groundwater pump-and-treat remediation system located downgradient of Cell 1, at the mouth of the Fort Hall Mine Canyon. The purpose of the remediation system has been to capture and treat groundwater that has been impacted by the unlined Cell 1, before the groundwater enters the LPVA. The LPVA is the sole source of drinking water for the Pocatello and Chubbuck communities, as well as surrounding unincorporated county land.

Water samples were collected from 35 domestic water wells in the Portneuf Valley between 1992 and 2012 to assess the extents of the offsite groundwater impacts, and to monitor contaminant concentrations in those domestic water wells that were impacted. Twelve monitoring wells were installed between 1994 and 2000 on offsite properties within the Portneuf Valley to monitor contaminant concentrations (MW-103S, MW-103D, MW-106S, MW-106D, MW-107S, MW-107D, MW-108S, MW-108D, MW-115S, MW-115D, MW-116S, and MW-116D). Four monitoring wells were installed in 2000 on the northern FHML property boundary (MW-102S, MW-117S, MW-117D, and MW-118D) to monitor contaminant concentrations in groundwater leaving the FHML property. Figure 1-2 depicts the locations of the domestic water wells sampled most frequently between 1992 and 2012, as well as the locations of the offsite FHML monitoring wells and the FHML monitoring wells located on the FHML property boundary.

The main contaminants of concern in groundwater downgradient of the FHML are TCE and tetrachloroethene (PCE), although TCE concentrations usually exceed PCE concentrations; therefore,

TCE is used as the indicator analyte for offsite groundwater impacts. Other than TCE and PCE, the only other contaminant that has been historically detected in offsite groundwater samples at concentrations that exceed the analyte Maximum Contaminant Levels (MCLs) is 1,2-dichloroethane (MCL of 5 micrograms per liter [µg/L]).

1.2 Historical Impacts to Offsite Groundwater

1.2.1 Historical Impacts to Groundwater Detected in Domestic Wells in the Lower Portneuf Valley Aquifer

Offsite TCE concentrations have historically been as high as 290 µg/L in 1993 (which exceeds the TCE MCL of 5 µg/L) in a domestic water well located at 2076 North Fort Hall Mine Road (RW-2076F), located approximately 800 feet north of the FHML property boundary. TCE concentrations in RW-2076F decreased to nondetect by 1998 but rebounded up to 80 µg/L in April 2002. By January 2005, TCE concentrations had gradually decreased down to 38 µg/L. Time series plots of TCE and PCE concentrations in RW-2076F are depicted on Figure E-16 in Appendix E.

Many additional domestic wells located downgradient of the FHML have been sampled since 1992 to assess human health and environmental impacts from FHML Cell 1 (Figure 1-2). The TCE and PCE concentrations in these wells are summarized in Table 3-3 of Section 3. Samples from several of these domestic wells revealed TCE and PCE concentrations at or above laboratory MDLs, and in some cases TCE and/or PCE concentrations were at or above the MCL of 5 µg/L.

Many of the domestic wells sampled between 1992 and the early 2000's had no TCE impacts (TCE concentrations were below laboratory MDLs).

1.2.2 Historical Impacts to Groundwater Detected in Offsite Landfill Monitoring Wells

Several monitoring wells were installed in areas downgradient of the FHML to monitor impacts to groundwater in areas where TCE and/or PCE had been detected in domestic wells at concentrations above laboratory MDLs (and above the MCL in some cases) (Figure 1-2). A summary of the TCE and PCE concentrations in these offsite monitoring wells are presented in Table 3-3 of Section 3.

Offsite FHML monitoring wells MW-103S and MW-103D were installed in 1994 to monitor groundwater concentrations in the vicinity of the highly impacted domestic well RW-2076F.

- TCE concentrations in MW-103S appear to be oscillating, as depicted on Figure E-3, with a minimum TCE concentration of 0.7 µg/L in 1997, and a maximum TCE concentration of 77.6 µg/L in 2009 (although the TCE concentration was 110 µg/L shortly after the monitoring well was installed in 1994). The TCE concentrations in MW-103S correlate well to the TCE concentrations in RW-2076F during the sampling events in which both wells were sampled.

- TCE concentrations in MW-103D have remained below the MCL (usually nondetect) except for one sample in 1997 that had a TCE concentration of 8.2 µg/L, as depicted on Figure E-2. Unlike monitoring well MW-103S, TCE concentrations do not appear to be representative of the TCE concentrations in the domestic well RW-2076F. TCE concentrations in MW-103D were nondetect from April 1999 through July 2002.

Offsite monitoring well MW-106S was installed in 1994 and monitoring well MW-106D was installed in 1999 to monitor groundwater contaminant concentrations in the vicinity of RW-7677P and RW-7773P. Both monitoring wells have had nondetectable TCE and are not representative of TCE concentrations in the domestic well RW-7677P and are questionably representative of TCE concentrations in RW-7953P.

Offsite monitoring wells MW-107S, MW-107D, MW-108S and MW-108D were installed in 1999 to monitoring groundwater contaminant concentrations north of the FHML property, northwest of the mouth of the Fort Hall Mine Canyon. While these wells were monitored between 1999 and 2000, monitoring wells MW-107D and MW-108D had no detections of TCE above MDLs. Monitoring well MW-108S was dry during this time, and no samples have been collected from this well. TCE concentrations in MW-107S decreased from 55 µg/L in 1999 to as low as 3 µg/L in 2000, with a slight increase up to 17 µg/L during the last sampling event in April 2002, as depicted on Figure E-7.

Offsite monitoring wells MW-115S and MW-115D were installed in 1999 to monitor groundwater contaminant concentrations in the vicinity of RW-7677P, which had TCE concentrations ranging between 6 µg/L and 32 µg/L between 1992 and 2000. Both monitoring wells were sampled between 1999 and 2002, and TCE concentrations in MW-115D were all nondetect. TCE concentrations in MW-115S were low, ranging between nondetect and 2 µg/L, during the sampling period, as depicted on Figure E-10. It does not appear that TCE concentrations in either MW-115S or MW-115D were representative of TCE concentrations in RW-7677P.

Offsite monitoring wells MW-116S and MW-116D were installed in 1999 to monitor groundwater contaminant concentrations in the vicinity of the highly impacted domestic wells RW-2140H and RW-2151H.

- TCE concentrations in monitoring well MW-116D were below MDLs from the time of its installation through July 2002, and do not appear to be representative of TCE concentrations in domestic wells RW-2140H and RW-2151H.

- TCE concentrations in monitoring well MW-116S decreased from 65 µg/L shortly after the monitoring well was installed, down to 5 µg/L in 2005, as depicted on Figure E-12. This decreasing TCE concentration trend is similar to the trends observed in RW-2140H and RW-2151H from 1992 through 2001. It is likely that the TCE concentrations in MW-116S are representative of groundwater concentrations around these domestic wells.

1.2.3 Historical Impacts to Groundwater Detected in Landfill Monitoring Wells Located on the Northern Landfill Property Boundary

Four monitoring wells located on the northern FHML property boundary have been monitored as compliance points for groundwater impacts from Cell 1 of the FHML (Figure 1-2). These monitoring wells include MW-102S, MW-117S, MW-117D, and MW-118D. A summary of the TCE and PCE concentrations in these offsite monitoring wells are presented in Table 3-3 of Section 3.

- TCE concentrations in MW-102S are generally at or below the MCL of 5 µg/L but have spiked three times since the monitoring well was installed in 1994 (Figure E-1). The first spike occurred from 1997 through 1998 (up to 184.1 µg/L); the second spike occurred in 2011 (up to 67 µg/L); and the last spike occurred in 2013 (up to 26.1 µg/L). These concentration spikes are consistent with either slugs of contaminant moving past monitoring well MW-102S or may be related to changes in groundwater elevation in the vicinity of MW-102S.

- TCE concentrations in MW-117S appear to be oscillating, as depicted in Figure E-14, similar to TCE concentrations in nearby downgradient monitoring well MW-103S. Peaks and valleys of the oscillations in MW-117S and MW-103S correlate well, although TCE concentrations in MW-103S are lower than in MW-117S due to attenuation. TCE concentrations have ranged from 36.7 µg/L in January 2015 up to 160 µg/L in January 2010.

- As depicted on Figure E-13, TCE concentrations in MW-117D were at or below the MCL of 5 µg/L (except for a few spikes) from the time the well was installed in 2000 until 2005. Between October 2007 and March 2009, TCE concentrations suddenly increased in MW-117D to as high as 101 µg/L and appear to have been decreasing since that time. However, in July 2012, TCE concentrations suddenly decreased to just above detection limits, and have been variable since that time. This likely corresponds to an incident where the monitoring well was reportedly damaged by a vehicle (unknown date but reported to be a few years ago). The cement surface seal of MW-117D was likely compromised, allowing fresh water into the screened interval, which would account for the anomalously low TCE concentrations from July 2012 through October 2013 (between 0.16 µg/L and 1.1 µg/L). The variable nature of TCE concentrations since 2012 (from 6.6 µg/L up to 160 µg/L) is likely due to mixing of fresh water and groundwater within the screened zone of the monitoring well.

- An increasing trend in TCE concentrations in MW-118D is apparent, as depicted on Figure E-15. TCE concentrations started around 49 µg/L shortly after the monitoring well was installed in 2000 and have increased to as high as 274 µg/L in 2015.

1.3 Purpose of 2017 Offsite Groundwater Monitoring

The overall purpose of the 2017 offsite groundwater monitoring is to assess the impacts to human health and the environment due to continued transport of landfill contaminants in groundwater to the Lower Portneuf Valley Aquifer (LPVA). Specific goals of the 2017 offsite groundwater monitoring include:

- Identify and quantify potential risks to residents using domestic water wells as their sole source of household water. The risk of exposure to impacted groundwater from residential wells is discussed in Section 5.3.

- Identify and quantify potential risks to residents using domestic water wells for irrigation. The risks of exposure to impacted groundwater used for irrigation has not been assessed. Sections 5.6 and 6.3 discuss additional actions that will be necessary to evaluate this potential risk.

- Define the lateral and vertical extents of impacted groundwater downgradient from the FHML. The known extent of contaminant plumes in the LPVA is discussed in Section 4.3.

- Identify and quantify potential vapor intrusion risks to residents living in properties located above impacted groundwater. The potential risks associated with vapor intrusion are discussed in Section 5.4.

- Identify and quantify potential future risks to City of Pocatello Water Department municipal wells located in the LPVA. Potential risks have been identified at the screening level by comparing COC concentrations in groundwater from three monitoring wells and an extraction well on the LDS agricultural field to EPA Regional Screening Levels and is discussed in Section 4.3.

- Update the offsite CSM based on information gathered through detailed review of domestic and monitoring well boring logs, historical geophysical studies, and historical and current contaminant concentrations and hydrogeochemical studies. The CSM is discussed in Section 4 of this report.

- Identify data gaps that need to be filled to provide a more complete assessment of potential risks to human health and the environment from contaminated groundwater originating from the FHML. Data gaps are identified in Section 6.3 of this report.

1.4 Report Organization

The 2017 Offsite Groundwater Monitoring Report is organized as follows:

- ***Section 1.0 – Introduction –*** *Describes the background of the Fort Hall Mine Landfill and historical offsite groundwater impacts. Also describes the organization of the Report.*

- ***Section 2.0 – 2017 Offsite Groundwater Monitoring Activities –*** *Provides a summary of the 2017 offsite groundwater monitoring event, including water well access and consent forms, field data collection, sampling methodologies, data verification and validation, and analytical results.*

- ***Section 3.0 – 2017 Offsite Groundwater Monitoring Results –*** *Presents discussions of the 2017 offsite potentiometric surface map, field parameters, geochemistry, TCE and PCE concentrations relative to MCLs and historical concentrations, and metals concentrations.*

- ***Section 4.0 – Offsite Conceptual Model –*** *Presents a conceptual model identifying the regional geology and hydrogeology, and the effects that specific hydrogeological characteristics of the Lower Portneuf Valley Aquifer have on the fate and transport of contaminants, specifically organic volatile contaminants from the FHML.*

- ***Section 5.0 – Screening Level Risk Assessment –*** *Presents a preliminary, screening level risk assessment (SLRA) based on comparison of groundwater data with EPA Regional Screening Levels for tap water and Vapor Intrusion Screening Levels estimated from groundwater concentrations including data validation and evaluation, toxicity assessment, exposure assessment, risk characterization, and uncertainty analysis.*

- ***Section 6.0 – Conclusions –*** *Provides conclusions based on the results of the 2017 offsite groundwater monitoring event.*

- ***Section 7.0 – Recommendations –*** *Provides recommendations based on the results of the 2017 offsite groundwater monitoring event.*

- ***Section 8.0 – References –*** *Provides a list of references cited in this report*

- ***Appendix A – 2017 Offsite Groundwater Monitoring Field Documentation***

- ***Appendix B – 2017 Offsite Groundwater Monitoring Sampling Summary***

- ***Appendix C – 2017 Offsite Groundwater Monitoring Data Validation***

- ***Appendix D – 2017 Offsite Groundwater Monitoring Analytical Data***

- ***Appendix E – Historical TCE and PCE Concentrations Time Series Plots***

- ***Attachment 1 – 2017 Offsite Groundwater Monitoring Laboratory Reports***

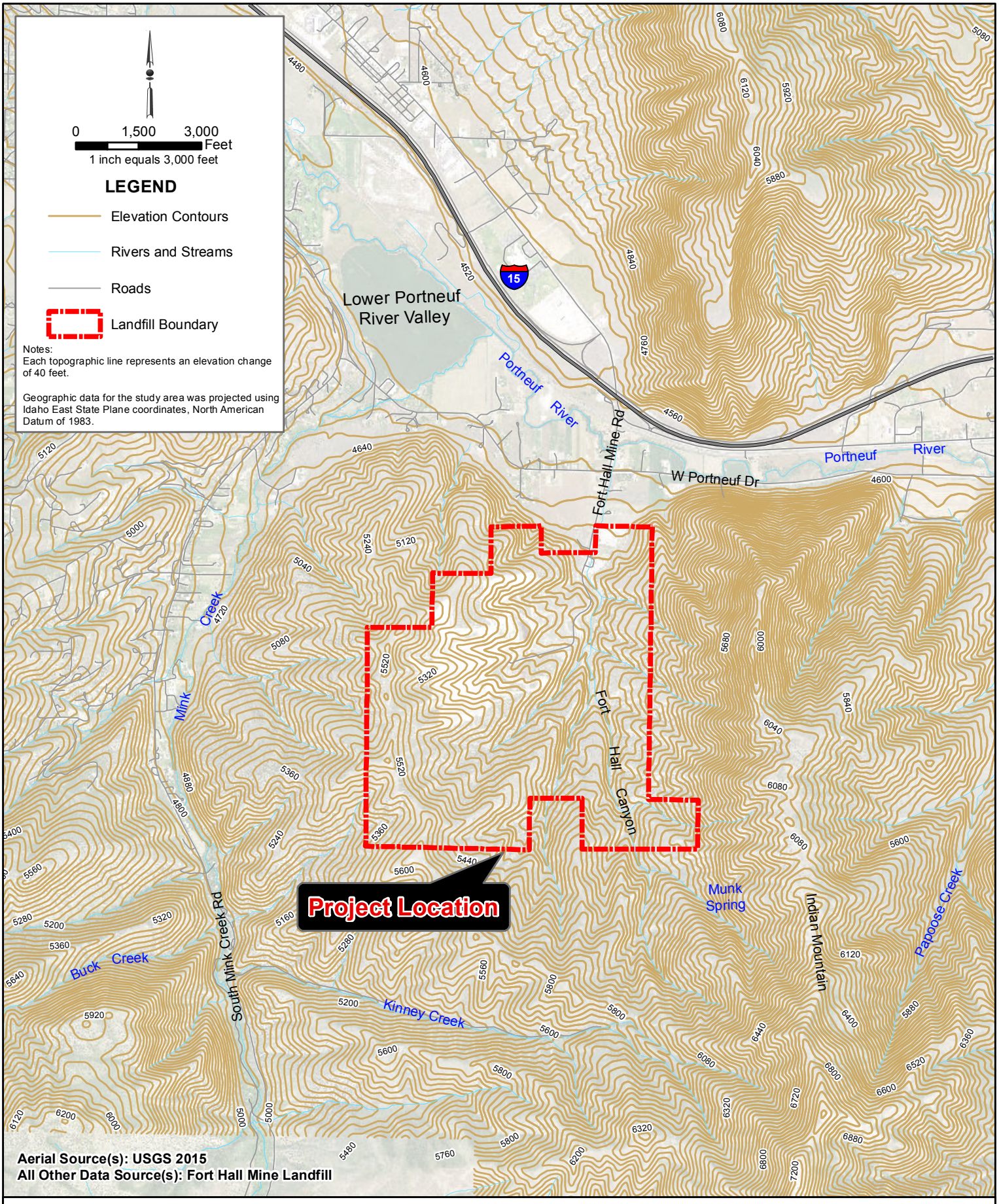


FIGURE 1-1
SITE LOCATION MAP
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

DETAIL A

MW-118D
INJ-1R
RW-2
MW-120S
MW-120D
MW-121
RW-3
MW-119S
MW-119D
RW-4
RW-10
RW-5
MW-113S
MW-113D
MW-112S
MW-112M
MW-112D
MW-111S
MW-111D
RW-1
RW-16
RW-15
RW-17
MW-1
MW-101S
MW-105S
MW-105D
RW-9
RW-9R
MW-104S
MW-104D
MW-110S
MW-110D
1 inch = 600 feet
MW-109S
MW-109D

RW-3259B
PA-6
PA-9
PA-10
RW-7070B
PA-7
PA-8
RW-7091R
PA-1
PA-3
PA-4
PA-2
RW-8000B
CW-2-EXT
PA-5
RW-2879M
RW-8249P
RW-8209P
RW-8105PN
RW-8105PS
RW-8048P
RW-8030P
RW-8035P
RW-8012P
RW-7953P
RW-7773P
RW-7776P
MW-106S
MW-106D
RW-7588P
RW-7688P
RW-7498P
RW-7492P
RW-7350P
RW-7310P
MW-115S
MW-115D
RW-7677P
RW-7586P
RW-7244P
RW-7288P
RW-7549P
RW-2237H
RW-2203H
RW-7505P
RW-2172H
RW-2213F
RW-7077P
RW-2172F
RW-2151H
RW-2140H
MW-103S
MW-103D
RW-2076F
MW-108S
MW-108D
MW-116S
MW-116D
MW-102S
MW-107S
MW-107D
See Detail A
Fort Hall Mine Rd
W Portneuf Rd
CELL #3
MW-9
MW-8
MW-7
OLD LANDFILL CELL #1
ACTIVE LANDFILL CELL #2
MW-13
MW-12
MW-5A
MW-6A
MW-4
ACTIVE LANDILL CELL #4
MW-4A
MW-3A
POTENTIAL FUTURE CELL #6

0 750 1,500 Feet
1 inch = 1,500 feet

LEGEND

- City of Pocatello Monitoring Well
- Injection Well
- Monitoring Well
- Remediation Well
- Residential Well
- Domestic Water Source Inventory Area
- Landfill Cell
- Landfill Boundary

Notes:
Geographic data for the study area was projected using Idaho East State Plane coordinates, North American Datum of 1983.

Aerial Source(s): USGS 2015
All Other Data Source(s): Fort Hall Mine Landfill

FIGURE 1-2
OFFSITE DOMESTIC WELLS AND LANDFILL MONITORING WELLS
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

2.0 2017 Offsite Monitoring Activities

This section presents the results of the 2017 offsite groundwater monitoring and measurement activities for monitoring and domestic wells downgradient of the FHML (Figure 2-1). Results of groundwater monitoring and measurement activities for monitoring wells at the FHML Northern Landfill Property Boundary (MW-102S, MW-117S/D; MW-118D) are presented in *Remediation Monitoring Report, Fall 2016 – Winter 2017 (AEEC 2018a)*, and the *Remediation Monitoring Report, Spring 2017 – Summer 2017 (AEEC 2018b)*. Specific 2017 offsite groundwater monitoring and measurement activities included:

- Contacting property owners to obtain sampling access and consent;
- Measuring groundwater elevations from 12 groundwater monitoring wells;
- Obtaining field water quality parameters from 12 groundwater monitoring wells and 34 domestic wells;
- Collecting and analyzing groundwater samples from 12 groundwater monitoring wells and 34 domestic wells;
- Collecting and analyzing field quality control samples, including field duplicate (FD) samples, matrix spike/matrix spike duplicate (MS/MSD), trip blanks (TB), equipment blanks (EB), and source blanks (SB);
- Validating 100% of the Level IV laboratory analytical results; and
- Sending follow-up letters to property owners with laboratory data report results.

Groundwater samples from the 12 groundwater monitoring wells and 34 domestic wells are considered cumulatively as a single sampling event; therefore, field quality control samples apply to all 2017 offsite sampling event groundwater samples, and data verification and validation was conducted for all samples as a whole.

Tabulated summaries of the 2017 offsite sampling event are presented as appendices to this report, as described below:

- Appendix A contains field documentation of the 2017 offsite sampling groundwater monitoring activities including equipment calibration forms, groundwater sampling logs, chain of custody forms, and a chain of custody variance summary table for all monitoring locations sampled;
- Appendix B contains tabulated summaries of the 2017 offsite sampling groundwater monitoring locations and analytical methods (number and types of samples collected, and requested laboratory analyses), field parameter data, monitoring location-specific sampling variances, and groundwater elevation measurement data;

- Appendix C contains the results of the 2017 offsite monitoring field quality control sample analysis performed by the program laboratory for samples collected in the 2017 offsite sampling event, the laboratory quality control (QC) data associated with the field QC samples, and the 2017 offsite sampling event Data Validation Report; and

- Appendix D contains all validated analytical results for the monitoring wells sampled during the 2017 offsite sampling event.

2.1 Water Well Access and Consent Forms

Consent was requested from property owners or current residents to access properties and collect samples from domestic water wells and/or offsite groundwater monitoring wells included in the Final Fort Hall Mine Landfill Offsite Groundwater Work Plan (WP) Sampling and Analysis Plan (SAP) (AEEC, 2017b). Property owners were contacted by sending a resident contact letter along with a Water Well Access and Sampling Consent Form and a return envelope that was pre-addressed and postage-paid by mail. The resident contact letter contained contact information for representatives of IDEQ, Bannock County, and AEEC.

If property owners/current residents did not respond to the initial mailing, a second mailing was sent out, followed by a site visit(s) by a representative from AEEC. If there was nobody at the residence at the time of the site visit, a door hanger was left notifying the residents of the attempted contact, and information to follow-up. A log of all mailings, conversations, and site visits was kept to document date and time of attempted resident contact, to summarize of any conversations with the resident and the outcome of the telephone conversation/site visit, and to document any necessary follow-up actions.

Consent was never received for the following locations grouped by Map Key Parcel ID (Figure 2-2):

- Map Key Parcel ID 17
    - RW-7474P (Domestic-Single Residence, Stock Well. No Historical PCE or TCE data available).

- Map Key Parcel ID 24
    - MW-108S (Monitoring Well; no Historical PCE or TCE data available);
    - MW-108D (Monitoring Well. No Historical PCE and TCE concentrations detected); and
    - RW-7201P (Domestic-Single Residence Well. No Historical PCE or TCE data available).

- Map Key Parcel ID 88
    - MW-107S (Monitoring Well. Historical PCE concentrations were below the MCL; TCE was above the MCL);
    - MW-107D (Monitoring Well. No Historical PCE or TCE detected); and
    - RW-7455P (Irrigation Well. No Historical PCE or TCE detected).
- Map Key Parcel ID 157
    - RW-7070B (Domestic-Single Residence Well. Historical PCE below MCL; TCE above MCL).

Consent was eventually received for all other locations identified on the SAP though not at the same time. As a result, sampling was conducted over a range of different date periods:

- July 12 – 14, 2017;
- August 1 – 3, 2017;
- August 8 – 11, 2017;
- August 15 – 16, 2017; and
- November 16, 2017.

According to the resident at Map Key Parcel ID 227, there is no domestic well on the property.

Two locations not originally specified in the SAP were selected in September 2017 for additional sampling in accordance with the WP based on the results of samples:

- RW-7091R (Map Key Parcel ID 143); and
- RW-8048P (Map Key Parcel ID 220).

Neither property owner responded to the letters sent by mail. In late October 2017, contact was made with the property owner of RW-8048P and consent was received. At that time, however, they had already winterized their system, which they use to water their lawn. Multiple attempts have been made to contact the property owner of RW-7091R. Both are connected to city water for domestic use. Both locations will be included in the 2018 SAP.

2.2 Locations Sampled

The wells sampled during the 2017 offsite sampling event included:

- Monitoring wells, including MW-103S/D, MW-106S/D, MW-115S/D, and MW-116S/D;
- City of Pocatello monitoring wells, including PA-1, PA-3, and PA-4;

- City of Pocatello extraction well CW-2-EXT (considered as a monitoring well for the offsite sampling program); and

- Domestic wells, including RW-2076F, RW-2140H, RW-2151H, RW-2172F, RW-2172H, RW-2203H, RW-2213F, RW-2237H, RW-2879M, RW-3259B, RW-7077P, RW-7244P, RW-7288P, RW-7310P, RW-7350P, RW-7492P, RW-7498P, RW-7505P, RW-7549P, RW-7586P, RW-7588P, RW-7677P, RW-7688P, RW-7773P, RW-7776P, RW-7953P, RW-8000B, RW-8012P, RW-8030P, RW-8035P, RW-8105PN, RW-8105PS, RW-8209P, and RW-8249P.

The horizontal and vertical coordinates of the offsite FHML monitoring wells and the City of Pocatello monitoring wells and extraction well were surveyed per the requirements of the FHML Environmental Program Quality Assurance Program Plan (QAPP) Standard Operating Procedure (SOP) 4, *Location and Topographical Survey* (AEEC, 2017a) in November 2017. The coordinates of these wells are presented in Table 2-1.

The horizontal positions of the sampled domestic wells have been estimated using Google Earth and are presented in Table 2-2.

2.3 Groundwater Elevation Measurements

Static groundwater elevations were measured in monitoring wells during the 2017 monitoring event per the FHML QAPP SOP 20, *Groundwater Elevation Measurements* (AEEC, 2017a). Depth to water was measured prior to purging to help calculate the purge volumes, and during purging to monitor the low flow sampling process. Groundwater elevations were recorded during well purging on Groundwater Sampling Logs (Sub-Appendix A-2). Table B-4 (Appendix B) presents the depth to groundwater and the calculated groundwater elevation for monitoring points measured.

2.4 Sampling Procedures

The general field procedures and analytical methods employed for sampling wells in the 2017 offsite sampling event are described in the QAPP (AEEC, 2017a). Field documentation of the 2017 offsite sampling event was conducted in accordance with the QAPP SOP 3, *Field Documentation.*

Two different sampling techniques were used to collect groundwater samples, in accordance with the QAPP SOP 17, *Groundwater Sampling for Chemical Analysis*, from offsite monitoring and domestic wells:

- Spigot samples were collected from offsite domestic wells with the exception of RW-2203H, and;

- Low flow samples were collected with a portable or dedicated bladder pump from offsite monitoring and domestic well RW-2203H. The portable bladder pump was decontaminated and a new bladder installed prior to, and in between well samples.

Samples were managed, shipped, and tracked in accordance with QAPP SOP 13, *Sample Handling and Shipping*.

Field groundwater quality measurements were obtained using a flow-through cell connected to a YSI multi-parameter meter, and included temperature, pH, specific conductivity, turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP). The YSI meter was calibrated daily in accordance with the QAPP SOP 1, *Field Equipment Calibration* (AEEC, 2017a). The results of each daily calibration are documented on Equipment Calibration Forms (Sub-Appendix A-1). Well purging and field parameter details for each offsite well sampled during the 2017 monitoring event were recorded on Groundwater Sampling Logs (Sub-Appendix A-2) along with observations of color, clarity, and odor of the groundwater sample. Final readings of field parameters measured at the time of sampling are presented in Appendix B, Table B-2.

2.5 Sample Analysis

Groundwater samples collected from the offsite wells were analyzed per the SAP. A summary of all 2017 offsite sampling event samples collected and requested laboratory analyses is presented in Appendix B, Table B-1. Chain of custody forms for all groundwater samples collected during the 2017 offsite sampling event are presented in Sub-Appendix A-3.

2.6 Sampling Variances

Table B-3 (Appendix B) summarizes specific variances to sampling procedures that occurred during the 2017 offsite sampling event. This table also includes a summary of the purging flow rates, required purged volume removed, groundwater drawdown levels observed during purging, and documents the stabilization of field parameters and field meter calibration. If a variance was identified, a brief description of the variance is included as a comment in the table.

The turbidity measurements at RW-2203H exceeded 5 NTU during the purging and sampling process. An additional two volumes were purged and a representative sample was obtained as the turbidity measurements stabilized.

The following chain of custody variance was noted (Appendix A, Table A-1):

- VOC results by SW846 Method 8011 for trip blank sample TB-20170810 were not reported due to possible cross contamination with another sample during sample preparation as determined by the laboratory. The samples associated with this trip blank are CW-2-EXT, EB-20170810, PA-1, PA-3, PA-4, RW-2879M, RW-8105PN, and RW-8105PS. The results for these samples may be biased high.

2.7 Sampling Quality Assurance Audit

Field records were reviewed on receipt (daily) to evaluate recordkeeping and sampling procedures. The daily reviews were used as necessary to discuss modifications to field procedures and sampling methodology with field personnel. Findings of the daily evaluations are noted in Table B-3 (Appendix B).

2.8 Quality Assurance/Quality Control

The quality control program for this project consists of both field and laboratory control measurements. Trip blanks, equipment blanks, source water blanks, and laboratory method blanks are analyzed to assess contamination. Laboratory control samples are analyzed to assess laboratory accuracy and precision. Matrix spike and matrix spike duplicate samples are analyzed to evaluate accuracy and precision in the sample matrix. Field duplicate samples are analyzed to evaluate sample homogeneity and precision. Surrogates and internal standards are analyzed to assess accuracy, matrix interferences and analytical deviations. U.S. EPA methods are followed to provide proper calibration and batch control. Analyses were conducted by ESC Lab Sciences (ESC) in Mt. Juliet, Tennessee.

The quantitation requirements for the MCLs were met for all samples. ESC reported detected results for all samples to the Method Detection Limit (MDL). ESC reported non-detected results as not detected at the Reporting Limit (RL). The RL for each analyte is below the respective MCL, where applicable. The data were evaluated based on the Quality Control (QC) results reported in the data packages and qualified using a 100% modified Tier III review. The cumulative effect of the non-compliant definitive data results for the project samples and potential usability issues are discussed in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) criteria in the Data Validation Report (Appendix C).

The data review process provided information on the analytical limitations of the laboratory sample data based on the results of the field and laboratory QC measurements. All of the submitted analytical data for this field event was reviewed. All field samples were analyzed within the analytical holding time requirements. The laboratory reported results for all requested analyses for the field samples. No systemic problems were detected with the analyses during validation.

The cis-1,2-dichloroethene detection level for sample RW-8030P and the toluene detection levels for samples RW-0802A and RW-2213F were elevated above the laboratory Reporting Limits (RLs) due to method blank contamination. The method blank contamination did not elevate the detection levels above the laboratory RLs for any additional field sample results. The samples associated with the unreportable trip blank (TB-20170810) data for SW846 Method 8011 are CW-2-EXT, EB-20170810, PA-1, PA-3, PA-4, RW-2879M, RW-8105PN, and RW-8105PS and therefore may be biased high because no assessment can be made based on potential laboratory cross contamination with another sample during sample preparation. The data are usable as qualified.

The majority of the field sample results did not require qualification due to non-compliant QC results. There were 4,732 primary and field duplicate sample results validated for this round of data. Two results

were qualified as rejected (R) due to Matrix Spike (MS)/Matrix Spike Duplicate (MSD) recoveries of less than 10%. Therefore, completeness is 99.96% for the project and the greater than 95% completeness goal for the project is met.

With the exception of the two results qualified as rejected (R), all other field sample results including those with limitations due to non-compliant QC results as qualified in the Data Validation Report (Appendix C) are usable for decision-making purposes. There are no additional analytical limitations on the analytical data based on the results of the field and laboratory quality control measurements reviewed.

2.9 Analytical Results

Validated analytical results for all groundwater samples collected during the 2017 offsite sampling event are presented in Appendix D.

2.10 Property Owners Laboratory Results Notification Letters

Letters with laboratory results were sent by certified mail to property owners in the following groupings:

- Sample VOC results of domestic wells that were above a MCL and property is not connected to city water (three property owners);
- Sample VOC results of domestic or monitoring wells that were above a MCL and property is connected to city water (six property owners);
- Sample VOCs results of a monitoring well that were above a MCL and property is not connected to city water (one property owner);
- Sample VOC results were detected above the laboratory method detection limit (MDL) but below the MCL (six property owners); and
- No VOCs detected above the laboratory Reporting Detection Limit (RDL) (20 property owners).

Additionally, the letters with laboratory reports were hand delivered on September 3, 2017 to property owners with results above a MCL for samples collected through August 2017.

TABLE 2-1

Offsite Monitoring Well Coordinates and Monitoring Point Elevations

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Northing [1] (US Survey Feet)	Easting [1] (US Survey Feet)	Monitoring Point Elevation (ft amsl)
MW-103S	410112.39	603129.08	4559.79
MW-103D	410107.66	603103.39	4560.10
MW-106S	411853.60	600104.55	4516.90
MW-106D	411850.82	600093.80	4516.12
MW-107S[3]	409534.08	602158.83	--
MW-107D[3]	409534.08	602158.83	--
MW-108S[3]	409768.25	602386.61	--
MW-108D[3]	409768.25	602386.61	--
MW-115S	411522.93	600134.12	4538.74
MW-115D	411517.23	600137.10	4538.81
MW-116S	410222.65	601412.65	4535.81
MW-116D	410224.99	601405.50	4535.66
CW-2-EXT[2]	415075.59	596694.57	4503.87
PA-1[2]	415607.75	596644.63	4504.76
PA-3[2]	415606.15	596636.44	4505.18
PA-4[2]	415438.08	596422.76	4520.60

NOTES:

[1] Monitoring point elevations and coordinates were surveyed in November 2017 by A&E Engineering. Northings and eastings presented are Idaho East State Plane Coordinates (US Survey Feet), North American Datum of 1983.

[2] City of Pocatello monitoring well.

[3] Coordinates were approximated using Google Earth mapping.

-- = Monitoring point elevation unknown

ft amsl = Feet above mean sea level

TABLE 2-2

Offsite Residential Wells Approximated Coordinates

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Northing [1]	Easting [1]	Latitude [2]	Longitude [2]
RW-2076F	410006.10	603437.23	42.791633	-112.363130
RW-2140H	410184.78	601376.86	42.792109	-112.370807
RW-2151H	410194.52	601048.98	42.792134	-112.372029
RW-2172F	410422.16	603482.95	42.792774	-112.362963
RW-2172H	410331.91	601343.83	42.792513	-112.370932
RW-2203H	410582.10	600946.89	42.793197	-112.372413
RW-2213F	410649.06	603049.07	42.793394	-112.364581
RW-2237H	410646.63	600946.28	42.793374	-112.372416
RW-2879M	414104.78	596669.00	42.802833	-112.388385
RW-3259B	416438.22	594495.17	42.809219	-112.396509
RW-7077P	410677.90	603739.27	42.793478	-112.362010
RW-7244P	411021.11	602788.42	42.794413	-112.365556
RW-7288P	410895.91	602614.56	42.794069	-112.366202
RW-7310P	410999.42	602494.11	42.794352	-112.366652
RW-7350P	410989.24	602205.90	42.794322	-112.367726
RW-7492P	411018.44	601651.64	42.794399	-112.369791
RW-7498P	411151.63	601494.97	42.794763	-112.370376
RW-7505P	410668.29	601500.56	42.793437	-112.370351
RW-7549P	410856.03	601236.33	42.793950	-112.371337
RW-7586P	411049.39	601346.41	42.794482	-112.370929
RW-7588P	411873.88	601021.80	42.796742	-112.372145
RW-7677P	411172.79	600583.75	42.794815	-112.373771
RW-7688P	411431.95	600717.61	42.795527	-112.373275
RW-7773P	411880.17	599883.88	42.796751	-112.376385
RW-7776P	411824.67	600381.28	42.796602	-112.374532
RW-7953P	412016.83	599137.44	42.797121	-112.379168
RW-8000B	415221.06	596563.26	42.805895	-112.388790
RW-8012P	412310.47	598785.56	42.797924	-112.380482
RW-8030P	412350.16	598785.81	42.798033	-112.380481
RW-8035P	411952.19	597872.24	42.796935	-112.383881
RW-8105PN	412531.91	597739.48	42.798525	-112.384381
RW-8105PS	412531.91	597739.48	42.798525	-112.384381
RW-8209P	412840.54	597273.64	42.799368	-112.386120
RW-8249P	413023.10	597087.90	42.799868	-112.386814

NOTES:

[1] Idaho East State Plane Coordinates (US Survey Feet), North American Datum of 1983.

[2] Coordinates of residential wells were estimated using Google Earth mapping.

RW = Residential well.

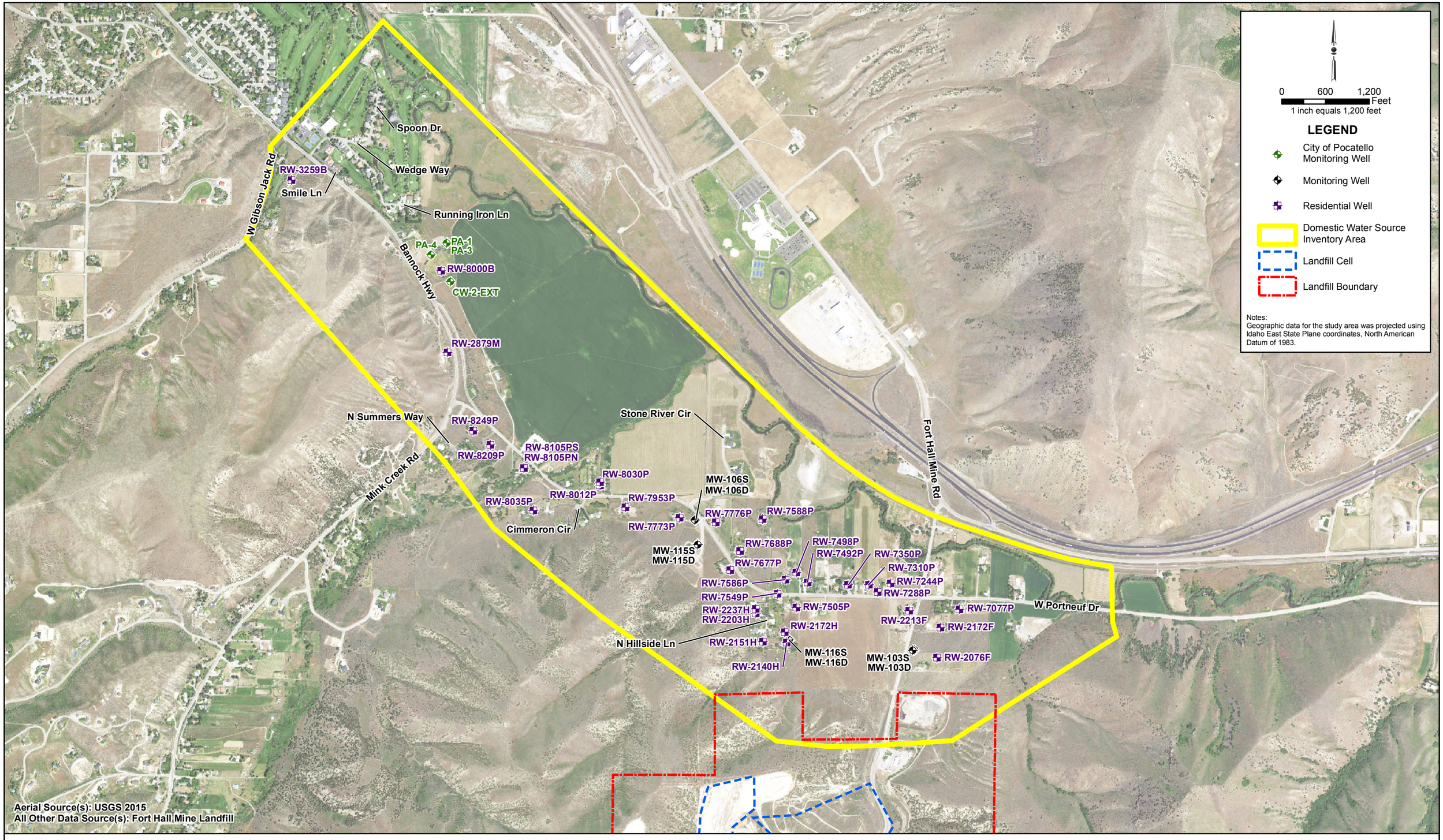


FIGURE 2-1

OFFSITE DOMESTIC WELLS AND LANDFILL MONITORING WELLS SAMPLED IN 2017

2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

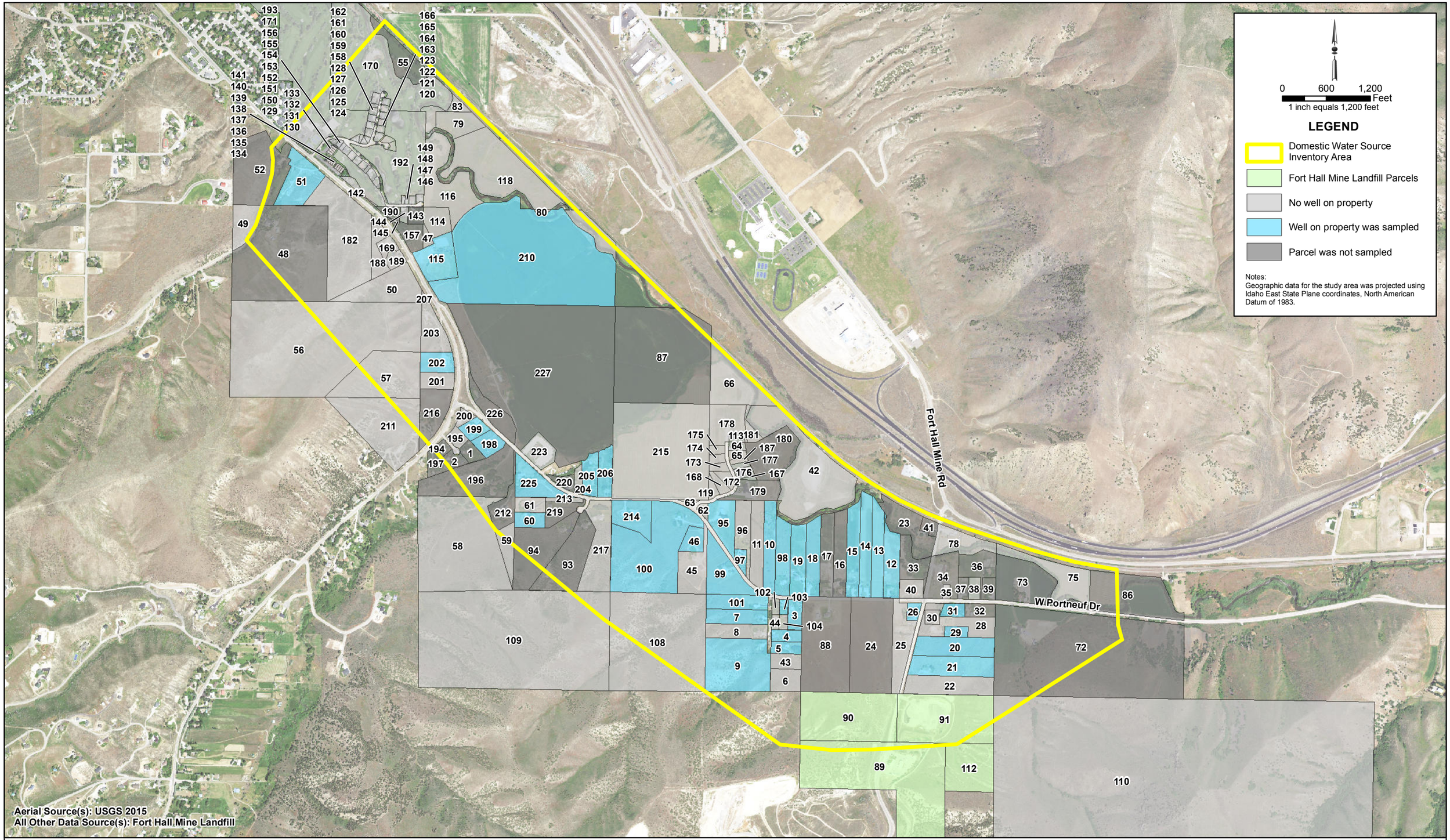


FIGURE 2-2

DOMESTIC WATER SOURCE INVENTORY AREA PARCEL AND WELL INFORMATION

2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

3.0 2017 Offsite Monitoring Results

3.1 Groundwater Flow Patterns

A groundwater level survey was conducted during the 2017 offsite and onsite sampling event, and the results of the survey are summarized in Table 3-1. During the survey, the depth to groundwater was measured from the top of casing (the monitoring point elevation [MPE]) of each monitoring well with a 500-foot (ft) Solinst water level meter, in accordance with SOP 20, *Groundwater Elevation Measurements* in the FHML QAPP (AEEC, 2017a). Of note, groundwater elevation data from the 2017 offsite sampling event has been derived from the depth to water (DTW) measurements documented on the Groundwater Sampling Logs because a separate depth to water survey was not conducted.

Several nested monitoring wells were included in the 2017 offsite and onsite groundwater level survey, including MW-103S/D, MW-106S/D, MW-115S/D, MW-116S/D, MW-117S/D, MW-119S/D, and MW-120S/D. Review of the groundwater elevations from the offsite monitoring wells reveals:

- There is a moderate downward gradient in the MW-116S/D nested monitoring wells, with the groundwater elevation in the shallow screened interval 9.05 ft higher than the deep screened interval. The deeper screened interval is approximately 40 feet deeper than nearby domestic wells and has historically not been impacted by TCE. The shallow screened interval, which has historically had TCE concentrations above the MCL, is screened in the same vicinity as nearby domestic wells that also exhibit elevated TCE concentrations. Therefore, the groundwater elevation in the shallow screened interval is more likely to represent the groundwater elevation of the portion of the LPVA that is impacted by TCE in the vicinity of Hillside Lane.

- There appears to be a downward gradient in the MW-103S/D nested monitoring wells, with the groundwater elevation in the shallow screened interval 2.35 ft higher than the deep screened interval. However, as discussed in Section 4.1.2 below, the groundwater elevation in MW-103D may be related to the Fort Hall Canyon Fault, not to regional aquifer hydrodynamics.

- The groundwater elevations in the MW-106S/D nested monitoring wells are within 0.03 ft of each other, indicating virtually no vertical hydraulic gradient in the vicinity. Both screened intervals have historically not been impacted by TCE.

- There may be a slight upward gradient in the MW-115S/D nested monitoring wells, with the groundwater elevation in the deep screened interval approximately 0.08 ft higher than the shallow screened interval. Nevertheless, no TCE has historically been detected in the deeper screened interval, whereas small concentrations of TCE have been detected in the shallow screened interval.

Review of the groundwater elevations from the onsite nested monitoring wells reveals an apparent downward vertical hydraulic gradient in nested monitoring wells near the Fort Hall Mine Creek. A strong downward vertical hydraulic gradient is observed in the MW-105S/D nested monitoring wells, and a

similar downward vertical hydraulic gradient is seen in the MW 119S/D nested monitoring wells, although weaker. A very slight downward vertical hydraulic gradient is seen in the MW 120S/D nested monitoring wells. There is a very slight upward vertical hydraulic gradient observed in the MW-117S/D nested monitoring wells; however, there are well documented issues with the MW-117D bentonite, making interpretation of a vertical hydraulic gradient ambiguous in this area. The downward vertical hydraulic gradient appears to decrease with increasing lateral distance from the creek upgradient of the stormwater retention ponds (which collect all stormwater flowing from the Fort Hall Mine Canyon). The nature of the downward vertical hydraulic gradients observed in these nested monitoring wells suggests that the Fort Hall Mine Creek is, at least in part, a losing stream that is recharging the shallow unconfined aquifer in the Fort Hall Mine Canyon valley floor. Given the losing stream/shallow aquifer recharge hypothesis, the groundwater elevations from the deeper screened intervals of the nested monitoring wells would provide a more realistic representation of the valley-wide groundwater table, and therefore were used to construct a potentiometric surface map for the FHML. The groundwater elevation from the shallow screened interval of the MW-117S/D was used due to known issues with compromise of the MW-117D well seal.

A potentiometric surface map has been constructed based on the 2017 offsite groundwater level survey and the Summer 2017 onsite groundwater level survey, using Surfer 14 and ArcMap 10.4.1, and is presented as Figure 3-1. Specific nested monitoring wells within the Fort Hall Mine Canyon were used to assess the potentiometric surface as described in the Spring/Summer 2017 Remediation Monitoring Report for the Fort Hall Mine Landfill (*Draft)* (AEEC, 2018b). In addition, the shallow screened intervals for the offsite monitoring wells (MW-116S, MW-103S, MW-106S and MW-115S) were used to construct the potentiometric surface map, as discussed above.

Groundwater flows in a northeasterly direction through the valley of Fort Hall Mine Canyon with a gradient of approximately 0.1 ft/ft. Approximately 600 feet north of the mouth of the canyon, groundwater flow turns northwesterly in response to encountering the rapidly moving Lower Portneuf Valley aquifer, with a markedly lower gradient of approximately 0.0009 ft/ft.

3.2 Field Parameters

Field parameters, including pH, specific conductivity, temperature, turbidity, dissolved oxygen (DO), and oxidation/reduction potential (ORP) were measured during the 2017 offsite sampling event. A summary of the current field parameter readings is presented in Table 3-2.

3.2.1 pH

The 2017 offsite groundwater pH measurements ranged from 6.83 to 7.86.

3.2.2 Specific Conductivity

The 2017 offsite groundwater specific conductivity measurements ranged from 640.1 to 1,580.2 microSiemens per centimeter (µS/cm) with the exceptions of MW-116D (371.2 µS/cm), RW-3259B (433.5 µS/cm), and RW-8209P (3,489.4 µS/cm).

3.2.3 Temperature

The 2017 offsite groundwater temperature measurements ranged from 10.57 to 20.08 degrees Celsius (^{0}C), which is an expected range of temperatures for groundwater derived from mountain snowpack in contributing watersheds. Of note, the groundwater temperature in monitoring well MW-103D was slightly higher at 23.68 ^{0}C than all other sampled wells and may correlate to the theory that the deep screened interval in this monitoring well intersects the Fort Hall Canyon fault.

3.2.4 Turbidity

The 2017 offsite groundwater turbidity measurements ranged from 0.26 to 4.82 Nephelometric Turbidity Unit (NTU) with the exceptions of RW-7549P (74.70 NTU) and RW-2203H (106.25 NTU). RW-2203H also had a DO measurement below 1.0 mg/L and strong negative ORP measurement and was reddish-brown in color when first pumped from the well. After purging, the groundwater from RW-2203H was light yellow at the time of sampling.

3.2.5 Dissolved Oxygen

The 2017 offsite groundwater DO measurements ranged from 2.73 to 9.01 mg/L with the exceptions of RW-2203H (0.06 mg/L), RW-8105PS (0.13 mg/L), and MW-116D (0.79 mg/L). The DO measurements for these three locations correlate with very low ORP measurements and are indicative of anaerobic conditions. The groundwater from RW-2203H, which has reportedly not been used in years, was reddish-brown in color and highly turbid, consistent with the presence of iron oxidizing bacteria (i.e. biofouling). Iron oxidizing bacteria combine iron and/or manganese (typically from steel casings and/or unused downhole pump components) and oxygen to form deposits of rust and bacterial cells ("slime" material), resulting in decreased oxygen and ORP. Slightly reddish-brown turbid groundwater indicative of biofouling was also observed in MW-116D, although not to the extent of that seen in RW-2203H.

The low DO in RW-8105PS is likely due to biological decay of surface plants or stagnant water. RW-8105PS and RW-8105PN are from a naturally occurring stream and a very shallow hand-dug well (i.e. <10 ft. deep).

The remaining DO measurements from offsite monitoring wells and domestic wells are indicative of relatively aerobic conditions within the offsite aquifer, which are not generally conducive to chlorinated solvent biodegradation. PCE, which readily biodegrades to TCE in even relatively moderate reducing aquifer conditions, has been found as far as 1 mile downgradient from the mouth of the Fort Hall Mine Canyon. The absence of significant concentrations of cis-1,2-dichloroethene, a relatively stable daughter product of PCE (and TCE), is also indicative of the general aerobic conditions within the offsite aquifer.

3.2.6 Oxidation-Reduction Potential

The 2017 offsite groundwater ORP measurements ranged from 29.9 to 213.9 millivolts (mV) with the exceptions of RW-2203H (-224.1 mV), RW-8105PS (-95.8 mV), MW-116D (-89.3 mV), and RW-2151H

(-9.8 mV). The negative ORP measurements are indicative of reducing conditions. The strong negative ORP measurements at RW-2203H and MW-116D correlate well with corresponding low DO readings, indicative of anaerobic conditions resulting from biofouling within the wells. Some iron oxidizing biofouling was also observed briefly in RW-2151H when purging was started, but not to the same extent as RW-2203H. Of note, RW-2151H has reportedly not been used for many years, although the pump within the well is still functional.

3.3 Laboratory Analytical Results

TCE and PCE concentrations in domestic water wells, offsite monitoring wells, and FHML Northern Landfill Property Boundary monitoring wells during the 2017 offsite sampling event are presented in Table 3-2. A summary of TCE and PCE concentrations in domestic water wells, offsite monitoring wells, and FHML Northern Landfill Property Boundary monitoring wells sampled between 1992 and 2017 is presented in Table 3-3 and corresponding time series plots are presented in Appendix E.

3.3.1 TCE and PCE in Domestic Wells in the Lower Portneuf Valley Aquifer

TCE concentrations in offsite domestic wells ranged from nondetect (22 of 34 wells) to 44.3 µg/L (RW-2237H). PCE concentrations ranged from nondetect (26 of 34 wells) to 7.84 µg/L (RW-2237H). All 22 wells that were nondetect for TCE were also nondetect for PCE:

- RW-2172F
- RW-2213F
- RW-2879M
- RW-3259B
- RW-7077P
- RW-7244P
- RW-7288P
- RW-7310P
- RW-7350P
- RW-7492P
- RW-7498P
- RW-7505P
- RW-7586P
- RW-7588P
- RW-7688P
- RW-7773P
- RW-7776P
- RW-8035P
- RW-8105PN
- RW-8105PS
- RW-8209P
- RW-8249P

TCE was detected above the laboratory MDL but below the TCE MCL at domestic well RW-2076F. The prior TCE concentration was 38 µg/L in 2005. The PCE concentration was nondetect. The prior PCE concentration was 7 µg/L in 2005.

Two wells had TCE and PCE concentrations detected above the respective laboratory MDL but below the respective MCL:

- RW-8012P – The TCE concentration of 2.08 µg/L is near the prior concentration of 2.3 µg/L in 2015. A trace concentration of PCE was detected and near the prior concentration of 0.33 µg/L in 2015; and
- RW-8000B - The TCE concentration of 4.65 µg/L is near the prior concentration of 3.7 µg/L in 2015. A trace concentration of PCE was detected and is near the prior concentration of 0.54 µg/L in 2015.

Five wells had TCE concentrations above the TCE MCL and PCE concentrations detected above the respective laboratory MDL but below the PCE MCL:

- RW-7549P – The TCE concentration of 5.5 µg/L is just above the TCE MCL, a new maximum concentration, and approximately 94 percent higher than the prior maximum in 1993. A trace concentration of PCE was detected. Prior PCE concentrations have been nondetect with the exception of one low level detection in September 1993;

- RW-7953P – The TCE concentration of 5.61 µg/L is just above the TCE MCL and approximately 12 percent lower than the maximum in 2012. A trace concentration of PCE was detected. Trace PCE concentrations were also detected in September 2010 and during 2012. All other PCE concentrations have been nondetect;

- RW-8030P – The TCE concentration of 16.4 µg/L is near the concentrations during 2012 and approximately 45 percent lower than the maximum in 1992. The PCE concentration of 2.67 µg/L is approximately 11 percent lower than the maximum in 2000 and near the concentration of 2.1 µg/L in September 2010, January 2011, and during 2012;

- RW-2203H – The TCE concentration of 27.5 µg/L is a new minimum and approximately 44% lower than the prior minimum in June 1999. The PCE concentration of 2.5 µg/L is a new minimum and approximately 38% lower than the prior minimum in June 1999; and

- RW-2151H – The TCE concentration of 34.4 µg/L is near the prior result of 40 µg/L in 2000. The PCE concentration of 4.66 µg/L is near the prior result of 4 µg/L in 2000.

Four wells had TCE and PCE concentrations detected above their respective MCLs. In general, TCE concentrations were about six to nine times higher than its MCL whereas PCE concentrations were much closer to its MCL, within about 0.5 to 3.0 µg/L:

- RW-7677P – The TCE concentration of 33.8 µg/L is just above the prior maximum concentration of 32 µg/L that occurred in 1992, 1994, and 1995. The PCE concentration of 5.45 µg/L is a new maximum and approximately 76 percent higher than the prior maximum in 1994;

- RW-2140H – The TCE concentration of 33.9 µg/L is lower than concentrations prior to July 2000, however, it is a significant increase over the low concentrations and nondetect result from July 2000 through October 2001. The PCE concentration of 5.68 µg/L is similar as it is within the range of concentrations prior to July 2000, however, it is a significant increase over the nondetect results from July 2000 through October 2001;

- RW-2172H – The TCE concentration of 37.7 µg/L is approximately 48% lower than the prior minimum in 1999. The PCE concentration of 6.69 µg/L is near the prior minimum of 7 µg/L in 1999; and

- RW-2237H – The TCE concentration of 44.3 µg/L is approximately 34 percent higher than the prior maximum in 1992. The PCE concentration of 7.84 µg/L is approximately 26 percent higher than the prior maximum in 1992.

3.3.2 TCE and PCE in Offsite Landfill Monitoring Wells

TCE concentrations at offsite landfill monitoring wells CW-2-EXT, MW-103S/D, MW-106S/D, MW-115S/D, MW-116S/D, PA-1, PA-3, and PA-4 ranged from non-detect to 21.6 µg/L (MW-116S) and PCE concentrations ranged from nondetect to 2.93 µg/L (MW-116S):

- TCE and PCE continue to be nondetect at MW-103D, MW-106S/D, and MW-116D;

- The TCE concentration is 2.17 µg/L at MW-115D. All prior TCE concentrations were nondetect. The PCE concentration continues to be nondetect;

- TCE and PCE concentrations in MW-103S were much lower than recent samples and may be anomalous.

- The TCE concentration in MW-115S is a new maximum (11.6 µg/L), above the TCE MCL, and a significant increase over prior concentrations that have ranged from nondetect to 2 µg/L. The PCE concentration is 1.44 µg/L. All prior PCE concentrations were nondetect.

- The TCE concentration of 21.6 µg/L in MW-116S is within the historical range but significantly higher than the most recent sample concentrations in 2004 and 2005. The PCE concentration of 2.93 µg/L is within the historical range as well. The most recent samples PCE concentrations in 2004 and 2005 were nondetect.

- CW-2-EXT – The TCE concentration is 2.94 µg/L. A trace concentration of PCE was detected. No historical TCE or PCE data have been identified for this well.

- PA-1 – The TCE concentration is 2.12 µg/L and near the lower end of its historical range. The PCE concentration was nondetect. Historical PCE concentrations have typically been low or nondetect;

- PA-3 – The TCE concentration is 1.66 µg/L and is a new minimum. The PCE concentration continues to be nondetect; and

- PA-4 – The TCE concentration is 2.18 µg/L and is a new minimum. The PCE concentration was nondetect. Historical PCE concentrations have typically been low or nondetect.

3.3.3 TCE and PCE in Landfill Monitoring Wells Located on the Northern Landfill Property Boundary

TCE concentrations at FHML Northern Landfill Property Boundary monitoring wells MW-102S, MW-117S/D, and MW-118D ranged from 4.1 (MW-117D) to 171 µg/L (MW-118D) and PCE concentrations ranged from 2.11 (MW-117D) to 28.3 (MW-118D) µg/L:

- TCE and PCE concentrations at MW-117D are both below their respective MCLs and near the lower end of their historical ranges;

- The TCE concentration of 8.02 µg/L at MW-102S is near recent highs and continues the recent trend of being above the TCE MCL. The PCE concentration of 3.38 µg/L is the highest since October 2011;

- The TCE concentration of 43.5 µg/L in MW-117S is near the lower end of its historical range. The PCE concentration of 8.53 µg/L in MW-117S is also near the lower end of its historical range; and

- The TCE concentration of 171 µg/L in MW-118D is near the lower end of recent concentrations. The PCE concentration of 28.3J µg/L in MW-118D is within the range of recent concentrations.

3.3.4 Metals

Results for metals are provided in Appendix D. Arsenic was detected above its MCL in MW-116D at a concentration of 12.1 µg/L. Arsenic was detected above its RDL in MW-103S, MW-115S, MW-115D, and RW-8105PS ranging from a concentration of 2.03 to 2.31 µg/L. Lead was detected above its MCL in RW-7549P at a concentration of 19.8 µg/L. Lead was also detected above its RDL in RW-3259B (12.9 µg/L), RW-8209P (12 µg/L), RW-2151H (5.99 µg/L), and RW-2879M (5.05 µg/L).

TABLE 3-1

Groundwater Level Survey Data

Summer 2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Northing	Easting	Latitude [1]	Longitude [1]	Monitoring Point Elevation [2] (ft amsl)	Summer 2017	
						Depth to Groundwater (ft bmp)	Groundwater Elevation (ft amsl)
MW-1	408171.01	602884.14	42.786587	-112.365162	4664.89	60.04	4604.85
MW-102S	409527.94	602985.40	42.790311	-112.364797	4594.18	122.58	4471.60
MW-105S	408312.75	602647.98	42.786975	-112.366043	4662.56	55.00	4607.56
MW-105D	408312.73	602648.19	42.786975	-112.366042	4662.63	57.79	4604.84
MW-111D	408278.97	602441.43	42.786881	-112.366812	4699.11	63.74	4635.37
MW-112D	408428.14	603033.57	42.787294	-112.364608	4647.97	61.21	4586.76
MW-113S	408446.94	602321.27	42.787340	-112.367261	4711.42	25.02	4686.40
MW-116S	410222.65	601412.65	42.792207	-112.370662	4535.81	66.95	4468.86
MW-116D	410224.99	601405.50	42.792214	-112.370689	4535.66	75.85	4459.81
MW-103S [3]	410112.39	603129.08	42.791916	-112.364266	4559.79	90.00	4469.79
MW-103D [3]	410107.66	603103.39	42.791903	-112.364362	4560.10	92.65	4467.45
PA-1	415607.75	596644.63	42.806950	-112.388479	4504.76	41.90	4462.86
PA-3	415606.15	596636.44	42.806946	-112.388509	4505.18	42.45	4462.73
PA-4	415438.08	596422.76	42.806483	-112.389304	4520.60	57.80	4462.80
MW-115S	411522.93	600134.12	42.795767	-112.375438	4538.74	71.85	4466.89
MW-115D	411517.23	600137.10	42.795751	-112.375426	4538.81	71.84	4466.97
MW-106S	411853.60	600104.55	42.796674	-112.375551	4516.90	50.10	4466.80
MW-106D	411850.82	600093.80	42.796666	-112.375591	4516.12	49.35	4466.77
CW-2-EXT	415075.59	596694.57	42.805491	-112.388288	4503.87	40.60	4463.27
MW-117S	409524.90	603340.08	42.790305	-112.363475	4578.08	106.60	4471.48
MW-117D	409525.14	603340.11	42.790306	-112.363475	4578.24	106.48	4471.76
MW-118D	408888.74	602707.80	42.788556	-112.365825	4641.45	85.69	4555.76
MW-119S	408687.06	603024.89	42.788004	-112.364642	4641.40	64.93	4576.47
MW-119D	408687.13	603024.86	42.788005	-112.364642	4641.45	68.45	4573.00
MW-120S [3]	408697.16	602838.70	42.788031	-112.365335	4644.25	76.30	4567.95
MW-120D [3]	408697.20	602838.95	42.788031	-112.365334	4644.13	76.18	4567.95

NOTES:

Wells used for potentiometric surface map.

[1] Monitoring point latitude and longitude conversion is based on Idaho East State Plane Coordinates, as summarized on Table 1-1 of the Final FHML Monitoring Point Maintenance Plan (AEEC, 2017b).

[2] Monitoring point elevations presented on this table are from the October 2016 survey by Klatt Surveying (except as noted), as summarized on Table 1-1 of the Final FHML Monitoring Point Maintenance Plan (AEEC, 2017b).

[3] Northing and easting (and hence lattitude and longitude conversions) and monitoring point elevations presented on this table are from the November 2017 survey by A&E Engineering.

amsl = Above mean sea level.

bmp = Below monitoring point.

FHML = Fort Hall Mine Landfill

ft = foot/feet.

MPE = Monitoring point elevation.

MW = Monitoring well.

DATA SOURCES:

SUMMER 2017 water level measurements Appendix B, Table B-4

TABLE 3-2

Field Parameter and TCE and PCE Concentration Summary

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

LOCID	Map Key	Date	Sampling Method	Purged Volume Before Sampling (gal)	Purged Volume (gal)	TCE Concentration [1] (µg/L)	PCE Concentration [1] (µg/L)	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)
RW-7505P	3	7/13/2017	S	200	4	< 1	< 1	12.299	6.93	701.0	0.62	6.48	170.9
RW-2172H	4	8/8/2017	S	200	4	37.7	6.69	12.486	6.96	1187.0	2.02	6.14	153.4
MW-116S	5	8/11/2017	LF	5	0.85	21.6	2.93	13.998	6.92	1096.5	4.19	6.76	187.0
MW-116D	5	8/11/2017	LF	5	1.19	< 1	< 1	17.305	6.97	371.2	1.31	0.79	-89.3
RW-2140H	6	8/11/2017	S	200	4	33.9	5.68	12.731	7.01	1240.2	0.26	6.20	156.4
RW-2203H	7	8/9/2017	LF	5	1.53	27.5	2.5	15.895	7.34	979.7	106.25	0.06	-224.1
RW-2151H	9	11/16/2017	S	500	5	34.4	4.66	10.573	6.97	1528.3	2.39	5.53	-9.8
RW-7588P	10	7/14/2017	S	200	3	< 1	< 1	13.804	7.23	704.1	1.32	6.56	207.7
RW-7244P	12	8/8/2017	S	200	4	< 1	< 1	12.018	7.22	708.3	1.88	6.38	173.9
RW-7288P	13	7/14/2017	S	200	4	< 1	< 1	13.202	7.26	691.0	1.39	6.37	171.9
RW-7310P	14	7/13/2017	S	200	5	< 1	< 1	13.739	7.15	665.1	1.30	6.21	144.0
RW-7350P	15	8/3/2017	S	300	4	< 1	< 1 UJ	17.554	7.35	710.8	2.48	6.31	195.9
RW-7492P	18	7/12/2017	S	200	4	< 1	< 1	13.782	7.36	640.1	2.60	6.41	187.6
RW-7498P	19	7/12/2017	S	115	3	< 1	< 1	14.184	7.11	643.4	4.04	6.33	175.8
MW-103S	20	8/9/2017	LF	5	0.95	1.72	0.471 J	14.873	7.06	768.5	3.96	6.27	155.9
MW-103D	20	8/9/2017	LF	1.48	1.48	< 1	< 1	23.683	7.86	738.9	4.27	4.92	142.8
RW-2076F	21	8/2/2017	S	300	4	0.588 J	< 1	15.525	7.26	721.0	2.02	5.34	201.0
RW-2213F	26	8/2/2017	S	200	4	< 1	< 1	12.234	7.39	692.0	0.70	6.46	153.8
RW-2172F	29	8/2/2017	S	200	4	< 1	< 1	16.656	7.27	717.0	2.59	6.53	182.3
RW-7077P	31	8/2/2017	S	200	4	< 1	< 1	12.765	7.35	703.1	1.97	6.19	164.1
RW-3259B	51	8/16/2017	S	100	4	< 1	< 1	15.927	7.21	433.5	2.73	7.23	186.0
RW-8035P	60	8/1/2017	S	200	4	< 1	< 1	15.780	7.38	680.5	2.15	4.49	178.2
PA-1	81	8/10/2017	LF	3	1.24	2.12	< 1	18.190	7.13	789.4	3.77	6.13	180.2
PA-3	81	8/10/2017	LF	2.5	0.69	1.66	< 1	16.750	7.13	824.0	4.12	7.13	200.1
PA-4	81	8/10/2017	LF	5	1.24	2.18	< 1	16.239	7.11	825.0	2.47	6.67	203.3
RW-7776P	95	8/8/2017	S	200	4	< 1	< 1	12.812	7.22	716.0	1.26	7.10	162.7
RW-7688P	97	8/8/2017	S	200	4	< 1	< 1	13.981	7.27	710.0	3.66	7.15	185.0
RW-7586P	98	7/13/2017	S	200	3	< 1	< 1	15.105	7.29	767.9	0.99	6.49	178.7
MW-115S	99	8/15/2017	LF	5	0.87	11.6	1.44	19.092	7.16	1106.9	2.97	9.01	171.2
MW-115D	99	8/15/2017	LF	5	1.03	2.17	< 1	19.712	7.13	929.9	3.72	7.62	167.5
RW-7677P	99	8/9/2017	S	200	4	33.8	5.45	12.412	7.16	1105.1	2.94	7.15	125.1
MW-106S	100	8/15/2017	LF	5	0.77	< 1	< 1	14.107	7.04	798.0	2.62	6.71	173.6
MW-106D	100	8/15/2017	LF	5	0.92	< 1	< 1	20.021	7.17	787.2	2.91	6.16	162.6
RW-7773P	100	8/15/2017	S	200	4	< 1	< 1	13.876	7.20	787.2	2.56	6.27	61.0
RW-2237H	101	8/3/2017	S	200	4	44.3	7.84	15.456	7.02	1245.7	4.82	5.75	161.3
RW-7549P	103	7/14/2017	S	100	3.2	5.5	0.822 J	15.677	7.01	777.9	74.70	7.20	213.9
RW-8000B	115	8/3/2017	S	300	5	4.65	0.786 J	12.408	7.29	839.5	2.13	7.20	180.6
RW-8209P	198	8/2/2017	S	200	4	< 1	< 1	14.085	7.14	3489.4	4.57	6.96	181.4
RW-8249P	199	8/16/2017	S		4	< 1	< 1	16.803	7.17	839.6	3.69	6.65	190.1
RW-2879M	202	8/11/2017	S	200	4	< 1	< 1	16.280	6.96	1580.2	1.62	5.30	29.9
RW-8030P	205	8/1/2017	S	300	4	16.4	2.67	13.978	7.09	949.1	3.91	4.89	168.8
RW-8012P	206	8/3/2017	S	200	5	2.08	0.381 J	12.663	7.27	819.0	2.38	7.25	185.5

TABLE 3-2

Field Parameter and TCE and PCE Concentration Summary

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

LOCID	Map Key	Date	Sampling Method	Purged Volume Before Sampling (gal)	Purged Volume (gal)	TCE Concentration [(1)] (µg/L)	PCE Concentration [(1)] (µg/L)	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)
CW-2-EXT	210	8/10/2017	LF	5	1.14	2.94	0.381 J	20.080	7.06	830.3	2.21	5.86	160.9
RW-7953P	214	8/16/2017	S	200	4	5.61	0.764 J	12.842	7.03	1020.9	1.75	8.97	191.4
RW-8105PS	225	8/11/2017	S	200	4	< 1	< 1	11.955	7.01	883.7	0.48	0.13	-95.8
RW-8105PN	225	8/11/2017	S	200	4	< 1	< 1	13.110	6.83	1538.1	2.72	2.73	94.7

NOTES:

[(1)] MCLs for PCE and TCE is 5 µg/L.

°C = Degree Celsius.

µg/L = Microgram(s) per liter.

µS/cm = Microsiemen(s) per centimeter.

DO = Dissolved oxygen.

gal = Gallons.

J = Estimated value between MDL and RDL.

LF = Low flow sampling method.

MCL = Maximum Contaminant Level.

MDL = Laboratory method detection limit.

mg/L = Milligram(s) per liter.

mV = Millivolt.

MW = Monitoring well.

NTU = Nephelometric turbidity unit.

ORP = Oxidation reduction potential.

PCE = Tetrachloroethene.

RDL = Laboratory reporting detection limit.

S = Spigot sample.

TCE = Trichloroethene.

UJ = Non-detected estimated.

DATA SOURCES:

PCE and TCE concentrations (Summer 2017) Appendix D, Table D-1.

TABLE 3-3

Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
CW-2-EXT	8/10/2017	2.94	0.381 J		Appendix D, Tables D-1.
MW-102S	3/24/1994	3.6	0.51		IDEQ excel spreadsheet, August 2016.
	12/13/1994	1.3	--		IDEQ excel spreadsheet, August 2016.
	7/18/1995	**7.6**	1.5		IDEQ excel spreadsheet, August 2016.
	3/19/1997	**184.1**	**17.2**		IDEQ excel spreadsheet, August 2016.
	10/27/1997	**140**	**11**		IDEQ excel spreadsheet, August 2016.
	5/27/1998	**190**	**16**		IDEQ excel spreadsheet, August 2016.
	10/30/1998	**124**	**16**		IDEQ excel spreadsheet, August 2016.
	4/7/1999	**5**	--		IDEQ excel spreadsheet, August 2016.
	6/7/1999	**53**	**6**		IDEQ excel spreadsheet, August 2016.
	7/14/1999	**65**	**7**		IDEQ excel spreadsheet, August 2016.
	10/8/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/7/2000	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/3/2001	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	4	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2001	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/7/2002	4	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2002	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2002	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/8/2002	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/30/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/15/2004	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2004	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/29/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/15/2007	--	--		CES Monitoring Reports (PDFs and Excel).
	3/25/2009	3.5	1.2		Electronic data - Pace Analytical Laboratory
	10/19/2009	1.4	--		Electronic data - Pace Analytical Laboratory
	1/9/2010	1.4	--		Electronic data - Pace Analytical Laboratory
	4/14/2010	0.62 J	--		Electronic data - Pace Analytical Laboratory
	6/28/2010	2	0.57 J		Electronic data - Pace Analytical Laboratory
	10/15/2010	1.1	0.40 J		Electronic data - Pace Analytical Laboratory
	1/5/2011	1.3	--		Electronic data - Pace Analytical Laboratory
	4/19/2011	0.54 J	0.34 J		Electronic data - Pace Analytical Laboratory
	7/11/2011	**64.1**	**9**		Electronic data - Pace Analytical Laboratory
	10/17/2011	**67**	**9.7**		Electronic data - Pace Analytical Laboratory

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-102S	1/10/2012	1.6	0.46 J		Electronic data - Pace Analytical Laboratory
	4/19/2012	0.41 J	--		Electronic data - Pace Analytical Laboratory
	7/25/2012	--	--		Electronic data - Pace Analytical Laboratory
	10/10/2012	2.3	--		Electronic data - Pace Analytical Laboratory
	1/16/2013	3.6	0.66 J		Electronic data - Pace Analytical Laboratory
	4/8/2013	**26.1**	2.5		Electronic data - Pace Analytical Laboratory
	7/22/2013	2	0.65 J		Electronic data - Pace Analytical Laboratory
	10/8/2013	4	1.1		Electronic data - Pace Analytical Laboratory
	1/21/2014	4.5	1.4		Electronic data - Pace Analytical Laboratory
	4/9/2014	2.5	0.98 J		Electronic data - Pace Analytical Laboratory
	7/16/2014	3	1.2		Electronic data - Pace Analytical Laboratory
	10/16/2014	3.3	1.3		Electronic data - Pace Analytical Laboratory
	1/21/2015	1.9	1		Electronic data - Pace Analytical Laboratory
	4/28/2015	1.8	1.3		Electronic data - Pace Analytical Laboratory
	7/8/2015	1.2	1		Electronic data - Pace Analytical Laboratory
	10/28/2015	1.3	0.79 J		Electronic data - Pace Analytical Laboratory
	1/6/2016	2.1	1.1		Electronic data - Pace Analytical Laboratory
	4/12/2016	0.99	0.68 J		Electronic data - Pace Analytical Laboratory
	7/20/2016	1.2	0.88 J		Electronic data - Pace Analytical Laboratory
	12/11/2016	**11**	1.82		AEEC. 2018. Fall 2016 and Winter 2017.
	2/17/2017	3.37	1.9		AEEC. 2018. Fall 2016 and Winter 2017.
	5/2/2017	**10.1**	1.91		AEEC. 2018. Spring 2017 and Summer 2017.
	7/19/2017	**8.02**	3.38		AEEC. 2018. Spring 2017 and Summer 2017.
MW-103D	3/23/1994	0.35	--		IDEQ excel spreadsheet, August 2016.
	4/4/1994	--	*unk*		IDEQ excel spreadsheet, August 2016.
	6/21/1994	1	--		IDEQ excel spreadsheet, August 2016.
	12/13/1994	1	--		IDEQ excel spreadsheet, August 2016.
	3/20/1997	**8.2**	0.6		IDEQ excel spreadsheet, August 2016.
	5/28/1998	2	--		IDEQ excel spreadsheet, August 2016.
	4/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	6/8/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/14/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/8/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/13/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/9/2017	--	--		Appendix D, Tables D-1.
MW-103S	3/23/1994	**110**	**10**		IDEQ excel spreadsheet, August 2016.
	6/1/1994	**67**	**5.4**		IDEQ excel spreadsheet, August 2016.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-103S	12/13/1994	**52**	3.5		IDEQ excel spreadsheet, August 2016.
	3/20/1997	0.7	**7**		IDEQ excel spreadsheet, August 2016.
	5/28/1998	2	**--**		IDEQ excel spreadsheet, August 2016.
	10/30/1998	**10**	1		IDEQ excel spreadsheet, August 2016.
	6/7/1999	4	**--**		IDEQ excel spreadsheet, August 2016.
	7/14/1999	2	**--**		IDEQ excel spreadsheet, August 2016.
	10/8/1999	**16**	2		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2000	**36**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/12/2000	**61**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2000	**54**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/5/2000	**57**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2001	**51**	**8**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	**58**	**10**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2001	**37**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	**33**	**5**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	**34**	**5**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2002	**66**	**12**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2002	**30**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/7/2002	**18**	3		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/13/2003	**22**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2003	**29**	**5**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	**27**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/29/2003	**33**	**6**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/15/2004	**28**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2004	**52**	**8**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/30/2004	**40**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	**26**	3		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	**23**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/25/2009	**77.6**	**11.9**		Electronic data - Pace Analytical Laboratory
	10/19/2009	**46.4**	**7.7**		Electronic data - Pace Analytical Laboratory
	1/9/2010	**33.6**	**5.2**		Electronic data - Pace Analytical Laboratory
	4/14/2010	**61.7**	**9.2**		Electronic data - Pace Analytical Laboratory
	6/28/2010	**55.8**	**8.6**		Electronic data - Pace Analytical Laboratory
	10/15/2010	**33.7**	**5.1**		Electronic data - Pace Analytical Laboratory
	1/5/2011	**50.9**	**7.8**		Electronic data - Pace Analytical Laboratory
	4/19/2011	**54**	**7.6**		Electronic data - Pace Analytical Laboratory
	7/11/2011	2.8	0.47 J		Electronic data - Pace Analytical Laboratory
	1/10/2012	4	0.68 J		Electronic data - Pace Analytical Laboratory
	4/19/2012	**14.8**	2.2		Electronic data - Pace Analytical Laboratory
	7/27/2012	**16.5**	1.7		Electronic data - Pace Analytical Laboratory
	10/10/2012	**30**	2.8		Electronic data - Pace Analytical Laboratory
	4/8/2013	**52.6**	**5.8**		Electronic data - Pace Analytical Laboratory
	10/8/2013	**7.5**	0.82 J		Electronic data - Pace Analytical Laboratory
	1/21/2014	**10.1**	1.3		Electronic data - Pace Analytical Laboratory
	4/9/2014	**13.2**	1.5		Electronic data - Pace Analytical Laboratory
	7/16/2014	**8.8**	1.4		Electronic data - Pace Analytical Laboratory
	10/16/2014	**11.2**	1		Electronic data - Pace Analytical Laboratory
	4/29/2015	**16.8**	2.7 J		Electronic data - Pace Analytical Laboratory
	7/8/2015	**15.5**	2.1		Electronic data - Pace Analytical Laboratory
	1/7/2016	**32.2**	**5.2**		Electronic data - Pace Analytical Laboratory
	4/12/2016	**55.7**	**8.3**		Electronic data - Pace Analytical Laboratory
	7/20/2016	**27.8**	4.7		Electronic data - Pace Analytical Laboratory

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-103S	12/14/2016	**28**	4.06		AEEC. 2018. Fall 2016 and Winter 2017.
	2/16/2017	**60.1**	**7.19**		AEEC. 2018. Fall 2016 and Winter 2017.
	5/2/2017	**12.6**	1.77		AEEC. 2018. Spring 2017 and Summer 2017.
	7/20/2017	**20.7**	2.72		AEEC. 2018. Spring 2017 and Summer 2017.
	8/9/2017	1.72	0.471 J		Appendix D, Tables D-1.
MW-106D	5/8/1999	--	--		IDEQ excel spreadsheet, August 2016.
	6/8/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/14/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/12/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	11/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/4/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/15/2017	--	--		Appendix D, Tables D-1.
MW-106S	6/21/1994	--	--		IDEQ excel spreadsheet, August 2016.
	6/22/1994	--	--		IDEQ excel spreadsheet, August 2016.
	12/13/1994	--	--		IDEQ excel spreadsheet, August 2016.
	7/18/1995	--	--		IDEQ excel spreadsheet, August 2016.
	3/19/1997	--	--		IDEQ excel spreadsheet, August 2016.
	5/26/1998	--	--		IDEQ excel spreadsheet, August 2016.
	10/26/1998	--	--		IDEQ excel spreadsheet, August 2016.
	4/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	6/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/14/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/12/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	11/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/4/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/15/2017	--	--		Appendix D, Tables D-1.
MW-107D	5/5/1999	--	--		IDEQ excel spreadsheet, August 2016.
	6/3/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/14/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/14/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-107D	11/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/3/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
MW-107S	5/12/1999	**18**	2		IDEQ excel spreadsheet, August 2016.
	6/2/1999	**55**	3		IDEQ excel spreadsheet, August 2016.
	7/7/1999	**42**	3		IDEQ excel spreadsheet, August 2016.
	10/14/1999	**16**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2000	**7**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/11/2000	**8**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2000	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/5/2000	4	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2001	**13**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/11/2001	**13**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	**8**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/3/2001	**5**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	**9**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	**17**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
MW-108D	5/8/1999	--	--		IDEQ excel spreadsheet, August 2016.
	6/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/14/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/14/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/3/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
MW-115D	10/20/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/17/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/15/2017	2.17	--		Appendix D, Tables D-1.
MW-115S	10/20/1999	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-115S	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/17/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/4/2002	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/15/2017	**11.6**	1.44		Appendix D, Tables D-1.
MW-116D	1/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	5/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/17/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/4/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/8/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/11/2017	--	--		Appendix D, Tables D-1.
MW-116S	1/7/2000	**57**	**6**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/12/2000	**65**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/17/2000	**18**	2		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/11/2000	**21**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2001	**13**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/11/2001	**12**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	**11**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/4/2002	**17**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/8/2002	**28**	3		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/8/2002	**22**	2		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2003	**19**	2		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2003	**15**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/8/2003	**12**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/30/2003	**10**	1		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2004	**6**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/1/2004	**6**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	**5**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2005	**5**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/11/2017	**21.6**	2.93		Appendix D, Tables D-1.
MW-117D	10/3/2000	**6**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/3/2001	**122**	**20**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	4	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/7/2002	**34**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/8/2002	4	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/8/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2003	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/30/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/14/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-117D	4/5/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/30/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/15/2007	**27**	2.8		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/25/2009	**101**	**14.2**		Electronic data - Pace Analytical Laboratory
	10/19/2009	**82**	**12.6**		Electronic data - Pace Analytical Laboratory
	1/9/2010	**96.6**	**13.4**		Electronic data - Pace Analytical Laboratory
	4/14/2010	**93.4**	**13.3**		Electronic data - Pace Analytical Laboratory
	6/28/2010	**10.5**	1		Electronic data - Pace Analytical Laboratory
	10/15/2010	**72.3**	**10.5**		Electronic data - Pace Analytical Laboratory
	1/5/2011	**53.7**	**8**		Electronic data - Pace Analytical Laboratory
	4/19/2011	**30.7**	3.3		Electronic data - Pace Analytical Laboratory
	7/11/2011	**80.1**	**11.4**		Electronic data - Pace Analytical Laboratory
	1/10/2012	**62.5**	**8.4**		Electronic data - Pace Analytical Laboratory
	4/19/2012	**65.1**	**9.6**		Electronic data - Pace Analytical Laboratory
	7/24/2012	**137**	**17.9**		Electronic data - Pace Analytical Laboratory
	7/25/2012	0.19 J	--	Well surface seal likely compromised, allowing fresh water into the deep screened interval. Sample results going forward reflect fresh water, and then mixtures of fresh and well water.	Electronic data - Pace Analytical Laboratory
	10/10/2012	0.16 J	--		Electronic data - Pace Analytical Laboratory
	4/8/2013	1.1	--		Electronic data - Pace Analytical Laboratory
	10/8/2013	0.62	--		Electronic data - Pace Analytical Laboratory
	1/21/2014	**51.2**	**7.1**		Electronic data - Pace Analytical Laboratory
	4/9/2014	**9.1**	1.1		Electronic data - Pace Analytical Laboratory
	7/16/2014	**28.3**	3.6		Electronic data - Pace Analytical Laboratory
	10/16/2014	**6.6**	1.1		Electronic data - Pace Analytical Laboratory
	1/21/2015	**11.3**	1.3		Electronic data - Pace Analytical Laboratory
	4/28/2015	**31.4**	4.8		Electronic data - Pace Analytical Laboratory
	7/8/2015	**20.3**	2.7		Electronic data - Pace Analytical Laboratory
	10/28/2015	**21**	2.4		Electronic data - Pace Analytical Laboratory
	1/7/2016	**9.1**	1.3		Electronic data - Pace Analytical Laboratory
	4/12/2016	**30.3**	3.4		Electronic data - Pace Analytical Laboratory
	7/20/2016	**10.3**	1.6		Electronic data - Pace Analytical Laboratory
	12/11/2016	**20.8**	2.65		AEEC. 2018. Fall 2016 and Winter 2017.
	2/17/2017	**6.41**	1.53		AEEC. 2018. Fall 2016 and Winter 2017.
	5/1/2017	**5.01**	0.914 J		AEEC. 2018. Spring 2017 and Summer 2017.
	7/19/2017	**4.1**	2.11		AEEC. 2018. Spring 2017 and Summer 2017.
MW-117S	10/3/2000	**130**	**15**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	**99**	**16**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2001	**107**	**18**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	**92**	**15**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/7/2002	**142**	**20**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2002	**97**	**14**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/8/2002	**80**	**12**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/8/2002	**68**	**13**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2003	**79**	**15**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2003	**86**	**17**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	**79**	**16**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/30/2003	**86**	**16**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/14/2004	**101**	**18**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-117S	4/5/2004	**120**	**16**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/30/2004	**103**	**18**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	**97**	**17**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	**88**	**15**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/20/2006	**110**	**17**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/15/2007	**100**	**14**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/25/2009	**117**	**15.7**		Electronic data - Pace Analytical Laboratory
	10/19/2009	**114**	**17.7**		Electronic data - Pace Analytical Laboratory
	1/9/2010	**160**	**23.1**		Electronic data - Pace Analytical Laboratory
	4/14/2010	**103**	**14.5**		Electronic data - Pace Analytical Laboratory
	6/28/2010	**116**	**17.3**		Electronic data - Pace Analytical Laboratory
	10/15/2010	**114**	**17.3**		Electronic data - Pace Analytical Laboratory
	1/5/2011	**62.4**	**8.9**		Electronic data - Pace Analytical Laboratory
	4/19/2011	**125**	**16.2**		Electronic data - Pace Analytical Laboratory
	7/11/2011	**55.5**	**7.7**		Electronic data - Pace Analytical Laboratory
	1/10/2012	**89.1**	**13**		Electronic data - Pace Analytical Laboratory
	4/19/2012	**84.5**	**13.3**		Electronic data - Pace Analytical Laboratory
	7/24/2012	**112**	**18.2**		Electronic data - Pace Analytical Laboratory
	7/25/2012	**87**	**11.3**		Electronic data - Pace Analytical Laboratory
	10/10/2012	**129**	**16**		Electronic data - Pace Analytical Laboratory
	4/8/2013	**135**	**16.1**		Electronic data - Pace Analytical Laboratory
	10/8/2013	**56.4**	**7.5**		Electronic data - Pace Analytical Laboratory
	1/21/2014	**40.6**	**6.9**		Electronic data - Pace Analytical Laboratory
	4/28/2014	**78.4**	**11.1**		Electronic data - Pace Analytical Laboratory
	7/16/2014	**75.4**	**11.8**		Electronic data - Pace Analytical Laboratory
	10/16/2014	**53.1**	**8.3**		Electronic data - Pace Analytical Laboratory
	1/21/2015	**36.7**	**12.7**		Electronic data - Pace Analytical Laboratory
	4/28/2015	**80.7**	**14.3**		Electronic data - Pace Analytical Laboratory
	7/8/2015	**102**	**15.6**		Electronic data - Pace Analytical Laboratory
	10/28/2015	**107**	**15.1**		Electronic data - Pace Analytical Laboratory
	1/7/2016	**113**	**15.8**		Electronic data - Pace Analytical Laboratory
	4/12/2016	**99.8**	**14.8**		Electronic data - Pace Analytical Laboratory
	7/20/2016	**83.2**	**14.6**		Electronic data - Pace Analytical Laboratory
	12/11/2016	**90.4**	**12**		AEEC. 2018. Fall 2016 and Winter 2017.
	2/17/2017	**44.1**	**7.62**		AEEC. 2018. Fall 2016 and Winter 2017.
	5/1/2017	**25.2**	3.76		AEEC. 2018. Spring 2017 and Summer 2017.
	7/19/2017	**43.5**	**8.53**		AEEC. 2018. Spring 2017 and Summer 2017.
MW-118D	10/4/2000	**49**	**10**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/3/2001	**41**	**11**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	**77**	**21**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2001	**68**	**17**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/3/2001	**79**	**21**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/7/2002	**77**	**20**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	**90**	**23**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	**76**	**18**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/8/2002	**75**	**19**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/13/2003	**124**	**26**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2003	**88**	**20**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	**149**	**30**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/30/2003	**101**	**19**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/15/2004	**70**	**15**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2004	**110**	**26**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
MW-118D	6/30/2004	**136**	**27**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	**115**	**25**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	**124**	**26**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/15/2007	**--**	**28**		CES Monitoring Reports (PDFs and Excel).
	3/26/2009	**142**	**35.6**		Electronic data - Pace Analytical Laboratory
	10/19/2009	**180**	**27.5**		Electronic data - Pace Analytical Laboratory
	1/9/2010	**218**	**32.6**		Electronic data - Pace Analytical Laboratory
	4/15/2010	**155**	**24.9**		Electronic data - Pace Analytical Laboratory
	6/28/2010	**192**	**29.9**		Electronic data - Pace Analytical Laboratory
	10/15/2010	**237**	**39.7**		Electronic data - Pace Analytical Laboratory
	1/5/2011	**185**	**20.6**		Electronic data - Pace Analytical Laboratory
	4/19/2011	**243**	**39.5**		Electronic data - Pace Analytical Laboratory
	7/14/2011	**171**	**27.6**		Electronic data - Pace Analytical Laboratory
	1/10/2012	**186**	**27**		Electronic data - Pace Analytical Laboratory
	4/19/2012	**237**	**34.5**		Electronic data - Pace Analytical Laboratory
	7/25/2012	**188**	**20.2**		Electronic data - Pace Analytical Laboratory
	10/10/2012	**268**	**43**		Electronic data - Pace Analytical Laboratory
	4/8/2013	**258**	**38.1**		Electronic data - Pace Analytical Laboratory
	10/8/2013	**193**	**23.2**		Electronic data - Pace Analytical Laboratory
	1/21/2014	**249**	**33**		Electronic data - Pace Analytical Laboratory
	4/9/2014	**222**	**26.6**		Electronic data - Pace Analytical Laboratory
	7/16/2014	**258**	**34.3**		Electronic data - Pace Analytical Laboratory
	10/16/2014	**249**	**35**		Electronic data - Pace Analytical Laboratory
	1/21/2015	**274**	**37.1**		Electronic data - Pace Analytical Laboratory
	4/29/2015	**185**	**38.3**		Electronic data - Pace Analytical Laboratory
	10/29/2015	**228**	**34**		Electronic data - Pace Analytical Laboratory
	4/12/2016	**263**	**36.1**		Electronic data - Pace Analytical Laboratory
	7/20/2016	**243**	**36.7**		Electronic data - Pace Analytical Laboratory
	12/14/2016	**246**	**29.7**		AEEC. 2018. Fall 2016 and Winter 2017.
	2/17/2017	**179**	**24.5**		AEEC. 2018. Fall 2016 and Winter 2017.
	4/29/2017	**200**	**22.4**		AEEC. 2018. Spring 2017 and Summer 2017.
	7/19/2017	**171**	**28.3 J**		AEEC. 2018. Spring 2017 and Summer 2017.
PA-1	3/6/1995	**7.1**	*unk*		Data provided by IDEQ.
	3/13/1995	**6.9**	*unk*		Data provided by IDEQ.
	3/23/1995	**6.1**	*unk*		Data provided by IDEQ.
	4/4/1995	**5.9**	*unk*		Data provided by IDEQ.
	4/11/1995	**6.3**	0.8		Data provided by IDEQ.
	4/18/1995	**6.3**	*unk*		Data provided by IDEQ.
	5/2/1995	**6**	*unk*		Data provided by IDEQ.
	5/8/1995	**5.8**	*unk*		Data provided by IDEQ.
	5/9/1995	**6.5**	*unk*		Data provided by IDEQ.
	5/31/1995	**6.3**	*unk*		Data provided by IDEQ.
	6/5/1995	4.6	*unk*		Data provided by IDEQ.
	6/20/1995	4.9	*unk*		Data provided by IDEQ.
	7/6/1995	**5.1**	*unk*		Data provided by IDEQ.
	7/19/1995	**6.5**	*unk*		Data provided by IDEQ.
	8/8/1995	4.4	*unk*		Data provided by IDEQ.
	8/23/1995	3.2	*unk*		Data provided by IDEQ.
	8/29/1995	3.8	*unk*		Data provided by IDEQ.
	9/12/1995	4.4	*unk*		Data provided by IDEQ.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
PA-1	9/27/1995	3.8	*unk*		Data provided by IDEQ.
	10/23/1995	3.9	*unk*		Data provided by IDEQ.
	11/14/1995	3.3	*unk*		Data provided by IDEQ.
	12/6/1995	3.6	*unk*		Data provided by IDEQ.
	1/18/1996	3.4	*unk*		Data provided by IDEQ.
	1/23/1996	3.8	*unk*		Data provided by IDEQ.
	2/20/1996	2.9	*unk*		Data provided by IDEQ.
	2/26/1996	4.7	0.3		Data provided by IDEQ.
	3/15/1996	2.7	1.5		Data provided by IDEQ.
	3/25/1996	4.1	1		Data provided by IDEQ.
	6/7/1996	2.7	0.4		Data provided by IDEQ.
	8/19/1996	1.8	0.1		Data provided by IDEQ.
	9/28/1996	2	0		Data provided by IDEQ.
	10/4/1996	2.1	0		Data provided by IDEQ.
	10/30/1996	*unk*	0.3		Data provided by IDEQ.
	11/5/1996	4.5	*unk*		Data provided by IDEQ.
	11/13/1996	1.7	0.1		Data provided by IDEQ.
	11/25/1996	1.4	0		Data provided by IDEQ.
	1/3/1997	3.9	0.3		Data provided by IDEQ.
	1/31/1997	**6.2**	0.5		Data provided by IDEQ.
	2/17/1997	2.2	0.2		Data provided by IDEQ.
	3/28/1997	2.5	0.2		Data provided by IDEQ.
	4/9/1997	2.2	0.2		Data provided by IDEQ.
	4/23/1997	2.6	0.2		Data provided by IDEQ.
	5/5/1997	1.5	0.1		Data provided by IDEQ.
	5/15/1997	2.5	0.2		Data provided by IDEQ.
	5/28/1997	**6**	0.5		Data provided by IDEQ.
	6/10/1997	**5.3**	0.4		Data provided by IDEQ.
	7/18/1997	4.5	0.4		Data provided by IDEQ.
	8/21/1997	*unk*	0.4		Data provided by IDEQ.
	8/25/1997	**5.4**	*unk*		Data provided by IDEQ.
	9/10/1997	**5**	0.4		Data provided by IDEQ.
	10/2/1997	*unk*	0.4		Data provided by IDEQ.
	10/5/1997	4.9	*unk*		Data provided by IDEQ.
	10/22/1997	**5.1**	0.4		Data provided by IDEQ.
	11/4/1997	**5.2**	0.4		Data provided by IDEQ.
	11/20/1997	**6.5**	0.5		Data provided by IDEQ.
	6/26/2000	**6.8**	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	**7.4**	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	4.7	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	8/10/2017	2.12	--		Appendix D, Tables D-1.
PA-1/135[a]	11/12/1997	**6.3**	0.5		Enviro H2O Lab, Memo November 1997.
PA-1/145[a]	4/25/1994	**19.9**	1.5		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**14.2**	1.1		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-2	3/20/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	9/26/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	--	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-2/125[a]	4/25/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	11/12/1997	0.7	*unk*		Enviro H2O Lab, Memo November 1997.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
PA-3	3/20/2000	3.8	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	3.8	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	9/26/2000	4.1	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	**8.3**	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	4.2	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	8/10/2017	1.66	--		Appendix D, Tables D-1.
PA-3/55[a]	4/25/1994	**11.6**	0.9		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**10.5**	0.8		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-3/60[a]	11/12/1997	**9.9**	0.7		Enviro H2O Lab, Memo November 1997.
PA-4	6/26/2000	**9.1**	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	**5.7**	0.6		Analytical Laboratories analysis report, March 2001.
	1/31/2002	**6.1**	0.6		City of Pocatello Water Department, Excel file received on March 9, 2018.
	9/16/2003	**5.4**	0.6		City of Pocatello Water Department, Excel file received on March 9, 2018.
	8/10/2017	2.18	--		Appendix D, Tables D-1.
PA-4/65[a]	11/12/1997	**13.4**	1.0		Enviro H2O Lab, Memo November 1997.
PA-4/70[a]	4/25/1994	**26.4**	2.1		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**21.3**	1.7		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-4/105[a]	4/25/1994	**26.5**	2.0		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**21.1**	1.8		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	11/12/1997	**15.2**	1.2		Enviro H2O Lab, Memo November 1997.
PA-4/120[a]	11/12/1997	**15.5**	1.1		Enviro H2O Lab, Memo November 1997.
PA-4/145[a]	4/25/1994	**26.0**	2.0		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**22.5**	1.8		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-5	3/21/2000	0.5	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	1.8	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	1.9	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-5/43[a]	4/25/1994	**7.6**	2.1		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	4.8	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-5/70[a]	11/12/1997	4.8	0.4		Enviro H2O Lab, Memo November 1997.
PA-5/85[a]	4/25/1994	**8.2**	0.9		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	4.3	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-6	3/20/2000	1.3	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	1.5	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	9/26/2000	1.0	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	1.5	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	1.6	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-6/35[a]	4/25/1994	**7.6**	0.6		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	3.6	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	11/17/1997	3.1	0.2		Enviro H2O Lab, Memo November 1997.
PA-6/75[a]	4/25/1994	**6.9**	0.6		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	3.4	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	11/17/1997	3.1	0.2		Enviro H2O Lab, Memo November 1997.
PA-7	3/20/2000	2.1	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	2.9	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	9/26/2000	2.0	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	1.9	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	2.5	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-7/170[a]	4/25/1994	**7.9**	0.8		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**7.3**	0.6		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
PA-7/175[a]	11/12/1997	3.6	0.3		Enviro H2O Lab, Memo November 1997.
PA-8	3/20/2000	1.2	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	2.3	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	2.3	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	1.9	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-8/40[a]	4/25/1994	**8.5**	0.8		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	4.7	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-8/45[a]	11/12/1997	3.2	0.3		Enviro H2O Lab, Memo November 1997.
PA-8/80[a]	11/12/1997	3.4	0.3		Enviro H2O Lab, Memo November 1997.
PA-8/85[a]	4/25/1994	**8.7**	0.9		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	**6.5**	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-8/120[a]	11/12/1997	3.4	0.3		Enviro H2O Lab, Memo November 1997.
PA-8/125[a]	4/25/1994	**7.8**	0.7		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	4.4	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-9	3/20/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	--	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-9/65[a]	4/25/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	11/12/1997	--	--		Enviro H2O Lab, Memo November 1997.
PA-9/95[a]	4/25/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	11/12/1997	--	--		Enviro H2O Lab, Memo November 1997.
PA-10	3/20/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	6/26/2000	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
	2/27/2001	--	--		Analytical Laboratories analysis report, March 2001.
	1/31/2002	--	--		City of Pocatello Water Department, Excel file received on March 9, 2018.
PA-10/30[a]	4/25/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
PA-10/50[a]	11/12/1997	0.4	--		Enviro H2O Lab, Memo November 1997.
PA-10/60[a]	4/25/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
	8/8/1994	--	--		CH2M Hill 1994, Phase I Aquifer Management Plan Final Report.
RW-2076F	8/26/1992	**210**	**15**		Brown and Caldwell, 1993.
	9/28/1992	**150**	**12**		Brown and Caldwell, 1993.
	12/1/1992	**90**	**6.4**		IDEQ excel spreadsheet, August 2016.
	1/20/1993	**130**	**15**		IDEQ excel spreadsheet, August 2016.
	3/30/1993	**260**	**23**		IDEQ excel spreadsheet, August 2016.
	5/5/1993	**290**	**24**		IDEQ excel spreadsheet, August 2016.
	6/16/1993	**6.9**	0.88		IDEQ excel spreadsheet, August 2016.
	9/23/1993	2.31	0.24		IDEQ excel spreadsheet, August 2016.
	12/15/1993	1.3	--		IDEQ excel spreadsheet, August 2016.
	3/24/1994	**230**	**24**		IDEQ excel spreadsheet, August 2016.
	6/20/1994	**160**	**14**		IDEQ excel spreadsheet, August 2016.
	12/14/1994	**160**	**12**		IDEQ excel spreadsheet, August 2016.
	7/18/1995	**160**	**13**		IDEQ excel spreadsheet, August 2016.
	12/20/1996	0.67	--		IDEQ excel spreadsheet, August 2016.
	5/29/1998	--	--		IDEQ excel spreadsheet, August 2016.
	6/1/1998	*unk*	**13**		IDEQ excel spreadsheet, August 2016.
	11/9/1998	**7**	--		IDEQ excel spreadsheet, August 2016.
	6/2/1999	**8**	--		IDEQ excel spreadsheet, August 2016.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-2076F	7/6/1999	**6**	**--**		IDEQ excel spreadsheet, August 2016.
	10/14/1999	**48**	**5**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/7/2000	**59**	**8**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/12/2000	**77**	**10**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2000	**68**	**10**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2000	**68**	**9**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2001	**63**	**11**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	**70**	**12**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2001	**49**	**9**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	**34**	**6**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2002	**54 J**	**9**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2002	**80**	**14**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2002	**48**	**8**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/7/2002	**32 J**	**6**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/13/2003	**37**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2003	**46**	**9**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	**37**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/29/2003	**31**	**6**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/15/2004	**37**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2004	**60**	**11**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/30/2004	**45**	**8**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	**32**	**6**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	**38**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/2/2017	0.588 J	**--**		Appendix D, Tables D-1.
RW-2140H	9/28/1992	**55**	4.2	Property not connected to city water.	Brown and Caldwell, 1993.
	3/23/1994	**78**	**7.9**		IDEQ excel spreadsheet, August 2016.
	6/3/1999	**47**	4		IDEQ excel spreadsheet, August 2016.
	7/7/1999	**71**	**7**		IDEQ excel spreadsheet, August 2016.
	10/15/1999	**46**	**5**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/13/2000	**50**	**5**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2000	**6**	**--**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	**5**	**--**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	**--**	**--**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/11/2017	**33.9**	**5.68**		Appendix D, Tables D-1.
RW-2151H	9/28/1992	**110**	**8.4**		Brown and Caldwell, 1993.
	3/23/1994	**250**	**23**		IDEQ excel spreadsheet, August 2016.
	3/20/1997	**86.7**	**7.7**		IDEQ excel spreadsheet, August 2016.
	11/13/1998	**137**	**12**		IDEQ excel spreadsheet, August 2016.
	6/3/1999	**23**	2		IDEQ excel spreadsheet, August 2016.
	10/15/1999	**--**	**--**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2000	**40**	4		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	11/16/2017	**34.4**	4.66		Appendix D, Tables D-1.
RW-2172F	8/26/1992	**--**	**--**	Property not connected to city water.	Brown and Caldwell, 1993.
	9/28/1992	**--**	**--**		Brown and Caldwell, 1993.
	10/23/1992	**--**	**--**		Brown and Caldwell, 1993.
	12/3/1992	**--**	**--**		IDEQ excel spreadsheet, August 2016.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-2172F	1/20/1993	--	--		IDEQ excel spreadsheet, August 2016.
	2/25/1993	--	--		IDEQ excel spreadsheet, August 2016.
	3/30/1993	--	--		IDEQ excel spreadsheet, August 2016.
	5/5/1993	--	--		IDEQ excel spreadsheet, August 2016.
	6/16/1993	--	--		IDEQ excel spreadsheet, August 2016.
	9/23/1993	--	--		IDEQ excel spreadsheet, August 2016.
	12/15/1993	--	0.34		IDEQ excel spreadsheet, August 2016.
	3/21/1994	--	--		IDEQ excel spreadsheet, August 2016.
	6/20/1994	--	--		IDEQ excel spreadsheet, August 2016.
	12/14/1994	--	--		IDEQ excel spreadsheet, August 2016.
	7/18/1995	--	--		IDEQ excel spreadsheet, August 2016.
	12/20/1996	--	--		IDEQ excel spreadsheet, August 2016.
	5/29/1998	--	--		IDEQ excel spreadsheet, August 2016.
	11/9/1998	--	--		IDEQ excel spreadsheet, August 2016.
	6/2/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/6/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/15/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	3/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	11/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	12/4/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/4/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/9/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/2/2017	--	--		Appendix D, Tables D-1.
RW-2172H	9/28/1992	**140**	**12**	Property not connected to city water.	Brown and Caldwell, 1993.
	3/24/1994	**140**	**15**		IDEQ excel spreadsheet, August 2016.
	3/19/1997	**207.1**	**21.5**		IDEQ excel spreadsheet, August 2016.
	6/4/1999	**72**	**7**		IDEQ excel spreadsheet, August 2016.
	8/8/2017	**37.7**	**6.69**		Appendix D, Tables D-1.
RW-2203H	9/28/1992	**140**	**18**		Brown and Caldwell, 1993.
	3/23/1994	**250**	**28**		IDEQ excel spreadsheet, August 2016.
	6/4/1999	**49**	4		IDEQ excel spreadsheet, August 2016.
	7/13/1999	**72**	**7**		IDEQ excel spreadsheet, August 2016.
	10/14/1999	**68**	**7**		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/9/2017	**27.5**	2.5		Appendix D, Tables D-1.
RW-2213F	8/2/2017	--	--		Appendix D, Tables D-1.

TABLE 3-3

Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-2237H	9/28/1992	**33**	**6.2**		Brown and Caldwell, 1993.
	6/24/1994	**14**	1.5		IDEQ excel spreadsheet, August 2016.
	8/3/2017	**44.3**	**7.84**		Appendix D, Tables D-1.
RW-2334F	8/26/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	11/13/1998	--	--		IDEQ excel spreadsheet, August 2016.
	6/2/1999	--	--		IDEQ excel spreadsheet, August 2016.
RW-2613M	11/13/1998	--	--	Property not connected to city water.	IDEQ excel spreadsheet, August 2016.
RW-2879M	8/11/2017	--	--		Appendix D, Tables D-1.
RW-3259B	8/16/2017	--	--		Appendix D, Tables D-1.
RW-5787P (EDMS 445)	7/15/1994	--	--	IDWR Water Quality Well located at 5787 W Portneuf Rd, upgradient (east) of the Fort Hall Mine Canyon	IDWR Online Water Quality Database (maps.idwr.idaho.gov)
	7/29/1998	--	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	5/27/2015	--	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
RW-5898B1 (EDMS 461)	7/30/1993	4.5	--	IDWR Water Quality Well located at 5898 Bannock Hwy	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/18/1996	**5.03**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/17/1997	**5.65**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	7/29/1998	**5.87**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/23/1999	**6.69**	0.54		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/18/2000	4.04	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/24/2001	2.98	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/31/2004	2.04	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
RW-5898B1 (EDMS 461)	9/3/2008	2.04	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	5/27/2015	--	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
RW-5898B2 (EDMS 462)	7/28/2015	--	--	IDWR Water Quality Well located at 5898 Bannock Hwy	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
RW-6998P	10/23/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	1/5/2011	--	--		Electronic data - Pace Analytical Laboratory
	4/19/2011	--	--		Electronic data - Pace Analytical Laboratory
	7/11/2011	--	--		Electronic data - Pace Analytical Laboratory
RW-7077P	8/26/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	12/2/1992	--	--		IDEQ excel spreadsheet, August 2016.
	11/9/1998	--	--		IDEQ excel spreadsheet, August 2016.
	6/2/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/13/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	11/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/9/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/2/2017	--	--		Appendix D, Tables D-1.
RW-7244P	9/28/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	10/7/1998	--	--		IDEQ excel spreadsheet, August 2016.
	11/13/1998	--	--		IDEQ excel spreadsheet, August 2016.
	6/2/1999	--	--		IDEQ excel spreadsheet, August 2016.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/1/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-7244P	8/8/2017	--	--		Appendix D, Tables D-1.
RW-7288P	7/14/2017	--	--		Appendix D, Tables D-1.
RW-7310P	9/28/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	6/4/1999	--	--		IDEQ excel spreadsheet, August 2016.
	1/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/4/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/13/2017	--	--		Appendix D, Tables D-1.
RW-7350P	8/26/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	6/4/1999	--	--		IDEQ excel spreadsheet, August 2016.
	8/3/2017	--	--		Appendix D, Tables D-1.
RW-7412P	3/21/1994	--	--	Property not connected to city water.	IDEQ excel spreadsheet, August 2016.
	6/21/1994	--	--		IDEQ excel spreadsheet, August 2016.
	6/2/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/8/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/15/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/7/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/2/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
RW-7455P	3/25/1994	--	--	Property not connected to city water.	TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/4/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/14/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
RW-7492P	8/26/1992	--	--	Property not connected to city water.	IDEQ excel spreadsheet, August 2016.
	6/2/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/8/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/15/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2017	--	--		Appendix D, Tables D-1.
RW-7498P	7/12/2017	--	--		Appendix D, Tables D-1.
RW-7505P	9/28/1992	0.6	--	Property not connected to city water.	Brown and Caldwell, 1993.
	2/25/1993	--	--		IDEQ excel spreadsheet, August 2016.
	3/30/1993	--	--		IDEQ excel spreadsheet, August 2016.
	5/5/1993	--	--		IDEQ excel spreadsheet, August 2016.
	6/16/1993	--	--		IDEQ excel spreadsheet, August 2016.
	9/23/1993	--	--		IDEQ excel spreadsheet, August 2016.
	12/15/1993	2.5	0.37		IDEQ excel spreadsheet, August 2016.
	3/22/1994	--	--		IDEQ excel spreadsheet, August 2016.
	6/21/1994	0.28	--		IDEQ excel spreadsheet, August 2016.
	7/18/1995	0.38	--		IDEQ excel spreadsheet, August 2016.
	6/3/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/13/2017	--	--		Appendix D, Tables D-1.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-7549P	9/28/1992	1.1	--	Property not connected to city water.	Brown and Caldwell, 1993.
	2/25/1993	1.1	--		IDEQ excel spreadsheet, August 2016.
	3/30/1993	0.71	--		IDEQ excel spreadsheet, August 2016.
	5/5/1993	0.7	--		IDEQ excel spreadsheet, August 2016.
	6/16/1993	0.89	--		IDEQ excel spreadsheet, August 2016.
	9/23/1993	2.83	0.24		IDEQ excel spreadsheet, August 2016.
	3/22/1994	0.7	--		IDEQ excel spreadsheet, August 2016.
	6/20/1994	0.31	--		IDEQ excel spreadsheet, August 2016.
	12/14/1994	0.7	--		IDEQ excel spreadsheet, August 2016.
	7/18/1995	--	--		IDEQ excel spreadsheet, August 2016.
	6/3/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	10/15/1999	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/6/2000	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2002	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/8/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/14/2017	**5.5**	0.822 J		Appendix D, Tables D-1.
RW-7586P	9/28/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	6/8/1995	--	--		IDEQ excel spreadsheet, August 2016.
	6/3/1999	--	--		IDEQ excel spreadsheet, August 2016.
	7/13/2017	--	--		Appendix D, Tables D-1.
RW-7588P	11/13/1998	--	--	Property not connected to city water.	IDEQ excel spreadsheet, August 2016.
	7/14/2017	--	--		Appendix D, Tables D-1.
RW-7677P	10/23/1992	**32**	--		Brown and Caldwell, 1993.
	3/22/1994	**32**	3.1		IDEQ excel spreadsheet, August 2016.
	6/21/1994	**11**	1		IDEQ excel spreadsheet, August 2016.
	10/1/1995	**32**	*unk*		IDEQ excel spreadsheet, August 2016.
	6/8/1999	**10**	--		IDEQ excel spreadsheet, August 2016.
	7/10/2000	**6**	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/9/2017	**33.8**	**5.45**		Appendix D, Tables D-1.
RW-7688P	9/28/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	1/20/1993	--	--		IDEQ excel spreadsheet, August 2016.
	8/8/2017	--	--		Appendix D, Tables D-1.
RW-7773P	10/23/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	2/25/1993	--	--		IDEQ excel spreadsheet, August 2016.
	3/30/1993	--	--		IDEQ excel spreadsheet, August 2016.
	5/5/1993	--	--		IDEQ excel spreadsheet, August 2016.
	6/16/1993	--	--		IDEQ excel spreadsheet, August 2016.
	9/23/1993	--	--		IDEQ excel spreadsheet, August 2016.
	12/15/1993	--	--		IDEQ excel spreadsheet, August 2016.
	3/21/1994	--	--		IDEQ excel spreadsheet, August 2016.
	12/14/1994	--	--		IDEQ excel spreadsheet, August 2016.
	6/8/1995	--	--		IDEQ excel spreadsheet, August 2016.

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-7773P	7/7/1999	--	--		IDEQ excel spreadsheet, August 2016.
	4/10/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/11/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/4/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	8/15/2017	--	--		Appendix D, Tables D-1.
RW-7776P	9/28/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	6/13/1995	--	--		IDEQ excel spreadsheet, August 2016.
	8/8/2017	--	--		Appendix D, Tables D-1.
RW-7953P	10/23/1992	--	--	Property not connected to city water.	Brown and Caldwell, 1993.
	6/8/1995	--	--		IDEQ excel spreadsheet, August 2016.
	1/6/2000	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/14/2001	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/10/2001	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/12/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/1/2001	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/9/2002	3	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/3/2002	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/10/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/7/2002	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/8/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/2/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	7/7/2003	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	9/29/2003	1	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/15/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	4/5/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	6/30/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/4/2004	--	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	1/5/2005	2	--		TetraTech (Maxim) laboratory reports delivered to AEEC March 2017.
	10/15/2007	1.9	--		CES Monitoring Reports (PDFs and Excel).
	3/26/2009	1.1	--		Electronic data - Pace Analytical Laboratory
	10/19/2009	0.53 J	--		Electronic data - Pace Analytical Laboratory
	1/9/2010	--	--		Electronic data - Pace Analytical Laboratory
	4/14/2010	--	--		Electronic data - Pace Analytical Laboratory
	6/28/2010	--	--		Electronic data - Pace Analytical Laboratory
	9/29/2010	0.97 J	0.38 J		Electronic data - Pace Analytical Laboratory
	1/5/2011	0.57 J	--		Electronic data - Pace Analytical Laboratory
	4/19/2011	1	--		Electronic data - Pace Analytical Laboratory
	7/13/2011	1.3	--		Electronic data - Pace Analytical Laboratory
	10/18/2011	1.7	--		Electronic data - Pace Analytical Laboratory
	1/10/2012	**6.4**	0.91 J		Electronic data - Pace Analytical Laboratory
	4/19/2012	4.2	0.67 J		Electronic data - Pace Analytical Laboratory

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-7953P	8/16/2017	**5.61**	0.764 J		Appendix D, Tables D-1.
RW-8000B (EDMS 459)	8/21/1991	**15.5**	1.33	IDWR Water Quality Well located at 8000 Bannock Hwy	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	7/8/1995	**17.7**	1.57		
	8/23/1999	**15.3**	1.38		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/31/2004	3.66	0.67		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	5/28/2015	3.7	0.54		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/3/2017	4.65	0.786 J		Appendix D, Tables D-1.
RW-8012P (EDMS 453)	8/12/1993	--	--	IDWR Water Quality Well	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/13/1995	1.8	--	Property not connected to city water.	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/17/1997	**18.6**	1.43		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/24/2001	0.62	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/30/2006	1.65	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	5/27/2015	2.3	0.33		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/3/2017	2.08	0.381 J		Appendix D, Tables D-1.
RW-8030P (EDMS 454)	8/20/1992	**30**	2.3	IDWR Water Quality Well	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/13/1995	**12.3**	1.5	Property not connected to city water.	IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/18/1996	**24.6**	2.21		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/8/1999	**16**	1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/19/2000	**8.3**	0.97		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	7/10/2000	--	3		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	1/4/2001	3	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	4/11/2001	**8**	1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	7/11/2001	**7**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	10/1/2001	4	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	1/9/2002	**8**	1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	4/3/2002	**7**	1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	7/10/2002	**5**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	10/7/2002	**5**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	7/7/2003	**5**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	9/29/2003	**7**	1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	4/5/2004	**7**	1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/30/2004	**6**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	10/4/2004	**7**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	1/5/2005	**5**	--		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	10/15/2007	**10**	1.4		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	3/26/2009	**11.4**	1.9		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	10/19/2009	**8.8**	1.5		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	1/9/2010	**7.8**	1.3		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	4/14/2010	**8.1**	1.3		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	6/28/2010	**10.8**	1.6		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	9/29/2010	**12**	2.1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	1/5/2011	**12**	2.1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	4/19/2011	**10.8**	1.7		IDWR Online Water Quality Database (maps.idwr.idaho.gov).

TABLE 3-3
Historical TCE and PCE Analytical Data for Offsite Domestic Wells, Offsite and Landfill Property Boundary Monitoring Wells, and IDWR Water Quality Wells
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Well ID	Sample Date	TCE Concentration* (µg/L)	PCE Concentration* (µg/L)	Notes	Data Source
RW-8030P (EDMS 454)	7/13/2011	**8.9**	1.4		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	1/10/2012	**15**	2.1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	4/19/2012	**14**	2.1		IDWR Online Water Quality Database (maps.idwr.idaho.gov).
	8/1/2017	**16.4**	2.67		Appendix D, Tables D-1.
RW-8035P	8/1/2017	--	--		Appendix D, Tables D-1.
RW-8048P	6/8/1995	--	--		IDEQ excel spreadsheet, August 2016.
RW-8105PN	8/11/2017	--	--		Appendix D, Tables D-1.
RW-8105PS	8/11/2017	--	--		Appendix D, Tables D-1.
RW-8167P	6/8/1995	--	--	Property not connected to city water.	IDEQ excel spreadsheet, August 2016.
RW-8209P	8/2/2017	--	--		Appendix D, Tables D-1.
RW-8249P	6/13/1995	--	--	Property not connected to city water.	IDEQ excel spreadsheet, August 2016.
	8/16/2017	--	--		Appendix D, Tables D-1.
RW-8284P	6/8/1995	--	--		IDEQ excel spreadsheet, August 2016.
RW-CornF	1/28/1993	**15**	1.8		IDEQ excel spreadsheet, August 2016.

NOTES:

Bold Text - Reported analyte concentration exceeds the TCE and/or PCE MCL (5 µg/L)

[a]Number after "/" in Well ID column is the sample depth in units of feet below measuring point at top of casing.

*No data verification or data validation has been performed on the laboratory data from August 1991 to July 2016.

--	Analyte not detected above laboratory MDL
µg/L	Microgram(s) per liter
CES	Cascade Earth Sciences
EDMS	IDWR Water Quality Environmental Data Management System
IDWR	Idaho Department of Water Resources
J	Estimated analyte concentration between laboratory MDL and RDL
MCL	Maximum Contaminant Level
PCE	Tetrachloroethene
MDL	Laboratory Method Detection Limit
RDL	Laboratory Reporting Detection Limit
TCE	Trichloroethene
unk	Unknown laboratory data

Data Sources/ Notes:

August, September, October 1992: Brown and Caldwell, 1993
January 1993 - June 1995: Laboratory reports found in historical IDEQ and/or Bannock County archived files
1990 - 1999: Excel spreadsheet provided by IDEQ August 2016
1999 - 2005: TetraTech (formerly Maxim) PDFs of laboratory reports delivered to AEEC March 2017
2006 - 2008: Laboratory reports or spreadsheets found in CES Monitoring Reports
2009 - July 2016: Electronic data reports from Pace Analytical Laboratory
AEEC. 2018. Fall 2016 and Winter 2017 Remediation System Monitoring Report, Appendix D, Table D-1, Fort Hall Mine Landfill, Bannock County, Idaho. January.
AEEC. 2018. Spring 2017 and Summer 2017 Remediation System Monitoring Report, Appendix D, Table D-1, Fort Hall Mine Landfill, Bannock County, Idaho. January.
EDMS Wells: IDWR Online Water Quality Database (maps.idwr.idaho.gov)

0 600 1,200 Feet

1 inch = 1,200 feet

LEGEND

- Monitoring Well
- Subtitle D Monitoring Well
- (4604.85) Groundwater Elevation
- —4470— Summer 2017 Potentiometric Surface Contours (ft amsl)
- Domestic Water Source Inventory Area
- Landfill Cell
- Landfill Boundary

Notes:
ft amsl = Feet above mean sea level

Onsite contour interval = 20 feet
Offsite contour interval = 1 foot

Geographic data for the study area was projected using Idaho East State Plane coordinates, North American Datum of 1983.

Subtitle D monitoring wells are surveyed in Spring and Fall only. No water levels available for Summer 2017.

PA-3 (4462.73)
CW-2-EXT (4463.27)
MW-106S (4466.80)
MW-115S (4466.89)
MW-116S (4468.86)
MW-103S (4469.79)
MW-102S (4471.60)
MW-117S (4471.48)
MW-118D (4555.76)
MW-120D (4567.95)
MW-119D (4573.00)
MW-113S (4686.40)
MW-112D (4586.76)
MW-111D (4635.37)
MW-1 (4604.85)
MW-105D (4604.84)
MW-9
MW-8
MW-13
MW-12
MW-5A
MW-6A
MW-4
MW-4A
MW-3A

4463 4464 4465 4466 4467 4468 4469 4470 4480 4500 4520 4540 4560 4580 4600 4620 4640 4660

Fort Hall Mine Rd
W Portneuf Rd

CELL #3
OLD LANDFILL CELL #1
ACTIVE LANDFILL CELL #2
ACTIVE LANDILL CELL #4
POTENTIAL FUTURE CELL #6

Aerial Source(s): USGS 2015
All Other Data Source(s): Fort Hall Mine Landfill

FIGURE 3-1
SUMMER 2017 OFFSITE AND ONSITE POTENTIOMETRIC SURFACE MAP
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

4.0 Offsite Conceptual Site Model

4.1 Regional Geology

4.1.1 Geologic Timeline

The Lower Portneuf River Valley (LPRV) lies at the southeastern edge of the Snake River Plain, between the Pocatello Range to the north and the Bannock Range to the south (Figure 4-1). During the Cenozoic, southeast Idaho extended along north trending normal faults that are characteristic of the Basin and Range Province. In the case of the LPRV, this process resulted in a sediment filled half-graben structure (Figure 4-2). Pediment gravel terraces flanking the valley imply several valley sedimentary filling and downcutting episodes that are thought to be late Tertiary to Pleistocene in age (Welhan, 1994). Following a long period of non-deposition, proximal volcanism related to the formation of the eastern Snake River Plain occurred in the middle Miocene (Rodgers, 1999). Huge volumes of silicic air fall tuffs and ash flow tuffs erupted on the Plain, disrupting drainages and accumulating in low-lying regions. 8.2-7.4 million-year-old (MA) distal tuffs associated with this event are interbedded with conglomerates to form the Starlight Fm, which accumulated regionally, including in the LPRV. After several millions of years of uplift and erosion, during which the modern drainage system of the LPRV was established, the 0.43 MA valley-confined Portneuf Basalt flowed into the valley through the Portneuf Gap (located approximately one-half mile northeast of the Fort Hall Mine Landfill) (Figure 4-3). Approximately 15,000 years ago a natural dam at Red Rock Pass, Idaho was breached, and an estimated 1,200 cubic miles of water from the ancient Lake Bonneville was released towards the Snake River Plain through the Portneuf Gap. This event was responsible for scouring the surface of the basalt and the pre-existing valley fill along the western margin of the basalt and depositing extensive well sorted (poorly graded) coarse gravels and sands along the LPRV. Since that time the poorly graded gravels have been covered by a "mantle" of post-flood river silt and loess (Welhan, 1994).

4.1.2 Description of the Southern Lower Portneuf River Valley

Six lithologic groups have been defined in the southern portion of the LPRV (Welhan, 1996):

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

- Middle to Late Tertiary basin-filling sediments and volcaniclastics of the Starlight Formation. In the vicinity of the LPRV, the unit occurs primarily as a tuffaceous conglomerate with minor rhyolitic tuff interbeds. The conglomeratic portion of the formation contains subangular to subround clasts of red and green metaquartzie, argillite, and volcanic materials in a fine-grained pumaceous matrix. The interbedded rhyolitic tuff units discontinuous, and are generally light gray to white, fine-grained, and sparsely crystal bearing, ranging from approximately 3 to 20 feet thick;

- Quaternary valley fill and alluvial deposits composed of unindurated silty gravels and cobbles with lenses of sand, silt, and intercalated clays;

- The 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, and which compromises the most productive portion of the underlying Lower Portneuf Valley Aquifer (LPVA); and

- A silt "mantle" of variable thickness (0 to 43 ft) overlies the Upper Gravels, originating from overbank flood material from periodic Portneuf River flooding.

The eastern margin of the LPRV is defined by what appears to be a planar (possibly fault-derived) bedrock scarp of dense, massive Proterozoic quartzite (Caddy Canyon Fm). The bedrock limits that define the western margin of the LPRV are unknown. There is a "bedrock high" which separates the Lower Portneuf Valley Aquifer (LPVA) into southern and northern portions, located in the vicinity of Red Hill (Figure 4-3). This bedrock high may be a manifestation of the splaying of the basin-bounding fault about mid-way down the lower Portneuf valley which distributed the total fault offset over numerous subsidiary faults. (Welhan, 1994)

In the vicinity of the Fort Hall Mine Landfill, Quaternary valley-fill deposits of loess and silty gravels are found at the bottom of Fort Hall Canyon, which grade into alluvial fan deposits extending northward from the mouth of Fort Hall Canyon. The alluvial deposits consist of stream channel and alluvial fan deposits which are interbedded, discontinuous units of sand, gravel, silt and clay. Coarse materials are generally subangular to subround fragments of red to green metaquartzite and argillite. Interstitial materials are slightly too moderately plastic, light to medium brown, silt and clay. The alluvial fan deposits then grade into the LPRV valley-fill deposits that predate Upper Gravels from the Bonneville Flood event and form the benches along the southwestern edge of the valley (Figure 4-4). The nature of the lateral and vertical grading between the three sedimentary deposits is unclear at this time. These sedimentary deposits all overlie, and are derived from, the Tertiary Starlight Fm.

Seismic refraction geophysical surveys were conducted by Brown and Caldwell as part of the initial site investigations at the mouth of the Fort Hall Mine Canyon in 1992 and 1993 (Brown and Caldwell, 1992), (Brown and Caldwell, 1994). The purpose of the surveys was to identify the depth to "bedrock," which would have provided a low permeability base boundary for groundwater flow (and contaminant flow) northward out of the canyon. It was further postulated that this low permeability bedrock may have contained "paleochannels" (topographic lows in the top of the bedrock) that may have served as conduits for preferential contaminant pathways out of the canyon. In 2000, Maxim Technologies, Inc. (Maxim) further postulated that the "low permeability bedrock" was the Starlight Formation, with reported fractured conditions prevalent near the top of the formation at the mouth of the canyon. According to Maxim, the aquifer overlying this bedrock basement consisted of weathered Starlight Formation materials at the top of the bedrock, covered by alluvial sediments of varying thickness. These materials appeared to be hydrologically connected and were considered to be a single aquifer that extended from the mouth of

the canyon to the LPRV aquifer. Maxim also assumed that groundwater flow through the Starlight Formation bedrock (and any associated contamination) would be negligible. In 2001 Maxim created a two-dimensional numerical groundwater flow model based on this conceptual site model (CSM) and designed the pump and treat remediation system at the mouth of Fort Hall Mine Canyon based on this CSM. The remediation system extraction wells were designed to key into the "unweathered" top of the Starlight formation and capture all groundwater moving through the mouth of the canyon, to be treated via air stripper, and returned to the aquifer in a downgradient injection well.

Of note, the 1992 and 1993 geophysical studies also confirmed the presence of a Basin and Range-type normal fault that strikes slightly west of north through the Fort Hall Mine Canyon. This fault was originally identified as a thrust fault by Trimble (1976), and later revised to a normal fault by Rodgers, et. Al. (2006) (Figure 4-5). 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. The fault was estimated to be located 100 to 200 feet below ground surface (bgs) at the mouth of the canyon and approximately 180 feet wide, with formation offset downward to the west approximately 6 kilometers (Trimble, 1976).

Of note, Brown and Caldwell postulated in the Phase II Hydrogeologic Assessment Report (1994) that monitoring well MW-103D intercepted the Fort Hall Canyon Fault when it was installed in 1994. MW-103D was drilled to a total depth of 236 feet bgs; at 176 feet bgs clay was encountered, and drilling from 185 to 190 feet bgs was very soft, returning mostly mud. This interval correlated well with the estimated depth of the fault based on geophysical information. Drilling became hard again at 190 feet bgs, returning vari-colored angular fragments as above. The borehole was terminated at 236 feet bgs and was dry from 205 feet bgs to the bottom. The screened interval for MW-103D was placed across the fault zone. Groundwater elevations in MW-103D reportedly vary with respect to elevations in MW-103S, sometimes higher, sometimes lower, and at other times MW-103D is dry. The groundwater in MW-103D reportedly also has a unique geochemical signature apart from other FHML monitoring wells (Brown and Caldwell, 1994).

4.2 Hydrogeology of the Lower Portneuf Valley Aquifer

The aquifer system beneath the LPRV is comprised of northern, eastern, and southern sub-aquifers (Figure 4-3), and is the sole source for drinking water for the communities of Pocatello and Chubbuck, Idaho. The lateral boundaries of the aquifer are delineated by the geologic contact between the Quaternary alluvium with less permeable rocks along the basin margins (i.e. Portneuf basalt on the northeast boundary, brecciated sediments of the Lower Member of the Starlight Fm form a more arbitrary boundary along the southwest). In cross-sectional view (Figure 4-6), the aquifer resembles an asymmetrical basin with the deepest portion occurring adjacent to the southwest side of the valley. The contact between the Upper Gravels and the underlying Tertiary age Starlight Fm represents an unconformity from scouring by the Bonneville Flood. The unconformity is quite steep on the southwest side, probably becoming more of an undulating surface toward the center of the valley (CH2M HILL, 1994).

The principal sources of recharge to the LPVA are depicted on Figure 4-7, and include:

- Underflow from Marsh Valley through the Portneuf Gap;
- Portneuf River seepage losses (although very minimal) (Welhan, 1994);
- Mink Creek underflow;
- Pocatello Creek underflow; and
- Lateral ground water inflow to the valley through the bench pediment gravels along the southwest margin of the valley (including the area downgradient of Fort Hall Canyon) and from small tributary streams (unknown amount of recharge).

The southern portion of the LPVA has excellent water yields derived from coarse, clean Upper Gravels at depths less than 100-150 feet bgs. There is an abrupt transition to the Starlight Fm consisting of a series of partially indurated sand, silty sand and intercalated clays, a hard, grey volcanic ash or tuff, and a sticky clay unit which overlies cemented gravel. The clay-rich section underlying the Upper Gravels, and the underlying cemented gravel (the Starlight Fm) has significantly lower permeability – with bulk hydraulic conductivity several orders of magnitude lower than that of the Upper Gravels (CH2M HILL, 1993).

"Static" water level in early 1990s of the Portneuf valley aquifer showed a fairly regular hydraulic gradient along the length of the aquifer, with an overall gradient along the valley axis on the order of 0.0015 ft/ft but varying significantly from southeast to northwest. The hydraulic gradient increases abruptly in the vicinity of the bedrock high, and then returns to close to average values on either side of the bedrock high.

The Upper Gravels portion of the aquifer is strongly influenced by long-term (5-6 year) variations in precipitation and basin recharge (superimposed on seasonal water level fluctuations on the order of 2 ft to 6 ft due to seasonal imbalance between recharge and pumping). Pronounced secular variations of 10 ft or more are observed between periods of normal and below-normal precipitation (Welhan, 1996).

Some important characteristics of the southern Portneuf aquifer (Welhan, 1996) include:

- Aquifer storage that is sensitive to upgradient recharge sources;
- Water levels in some City of Pocatello municipal water supply wells display a pronounced diurnal oscillation, suggestive of a barometric response under confined aquifer conditions (wells #36, #13, and #28) (Figure 4-8);
- River losses are minimal and not a significant source of recharge; and
- The southern sub-aquifer is effectively confined, at least in the vicinity just south of City Creek.

The transmissivity (T) of the Upper Gravels in the southern portion of the LPVA was estimated at approximately 10 ft^2/sec, with aquifer storage (S) estimated at 0.005 based constant discharge pumping tests of municipal wells by CH2M HILL in 1994. The aquifer testing also indicated an impermeable flow boundary at a distance (inferred western bedrock margin), no direct influence of river recharge in the immediate vicinity of the pumping well, and confined or semi-confined conditions (especially in pumping test from municipal well #36). The confined or semi-confined condition is in contrast to the lithologic data that strongly suggest unconfined conditions but is consistent with the apparent barometric responses observed in municipal water supply wells #36, #13, and to a lesser degree in well #28. This effective confining condition may be a reflection of the tendency of the basin to have accumulated river silt periodically over widespread areas in the area between City Creek and the Portneuf Gap, which may be due to periodic flooding enhanced by the narrow neck of the valley just south of City Creek, and the flood plain's relatively narrow width over the entire southern portion of the valley.

Of note, this effective confining condition observed in the southern aquifer is not necessarily consistent with the Bonneville flood deposition history. Relatively thin lenses or layers of silt in the gravel section required for effective confining condition may suggest that the upper gravel section in the southern valley may be due to braided fluvial deposition rather than a Michaud equivalent deposition.

Welhan (1996) estimated a linear flow velocity of 6 – 60 ft/day for the Upper Gravels of the southern LPVA, at the narrows just below City Creek, based on estimated range of transmissivity of 1 to 10 ft^2/sec, hydraulic gradient of 0.0015, mean total saturated thickness of 100 ft, total cross-sectional area for underflow through City Creek narrows of 3.5×10^5 ft^2, estimated groundwater underflow past City Creek narrows of 5 to 50 ft^3/sec, and effective porosity of 0.2.

4.3 Contamination in the Lower Portneuf Valley Aquifer

4.3.1 Historical TCE Plume

The historical downgradient extent of the TCE plume has been defined in the past based upon TCE impacts to City of Pocatello municipal water wells in the southern portion of Pocatello. The locations of these wells are depicted on Figure 4-8. The impacts to groundwater south of the municipal water wells has been historically monitored by the Idaho Department of Water Resources using select domestic wells identified as EDMS (Environmental Data Management System) wells, which are also depicted on Figure 4-8.

Historical TCE concentrations in City of Pocatello municipal water wells are depicted on Figure 4-9 as time series plots for each well from 1993 through 2015. Examination of these time series plots reveals the progression and eventual dispersion of the TCE plume into the southern portion of Pocatello from 1993 through 2014. Elevated TCE concentrations in the two southernmost municipal wells, #33 and #14, were detected in 1993 and 1994, and both of these municipal wells were shut down in July 1994 because TCE concentrations exceeded the TCE MCL of 5 µg/L. Subsequent TCE impacts to municipal wells were seen in the next several years, but at concentrations below the MCL. The peak of these TCE impacts reached well #13 in 1995, well #36 in 1998, and well #12 in 2000; TCE concentrations subsequently dropped off in these municipal wells in the following years and were nondetect when last

sampled in 2015. Low-level, continuous TCE impacts were seen in the next few municipal wells to the north, including #30, #16, and #10, from 1993 through 2010, but no TCE impacts have been detected since. Of note, municipal wells #2, #3/3R, and #28, located on the east side of the Portneuf River in southern Pocatello, have had no TCE impacts in the past. The maximum extent of the TCE plume, as visualized through the City of Pocatello municipal water wells, was as far as well #29, with a TCE concentration of 0.6 µg/L in 2002. Well #29 is located in the vicinity of East Walnut Street and Willard Avenue in Pocatello.

Maxim described the extent of the TCE plume into southern Pocatello as having a substantial dispersion zone in front of the 5 µg/L isocontour line on the downgradient end of the plume (Maxim, 2000). The dispersion front extended downgradient to City wells #10 and #29, where trace level (0.6 µg/L to 23 µg/L) TCE concentrations were identified, suggesting that the total length of the plume was at least 8 miles long in the early 2000s.

In the Phase 1 Aquifer Management Plan Report to the City of Pocatello by CH2M HILL in 1994, the TCE plume was described as extending contiguously upgradient to the south to the Fort Hall Mine Landfill, and adhering to the southwestern margin of the valley, but appeared to be influenced by tributary underflow. The report stated that this inference was supported by the observation that TCE concentrations in the past decreased by about 50% downgradient from the mouth of Gibson Jack Creek (CH2M HILL, 1994).

Based on depth-integrated sample results from 1993 and 1994 from City of Pocatello monitoring wells installed across the northern portion of the LDS agricultural property (Figure 4-6), CH2M HILL postulated several hypotheses regarding the lateral and vertical distribution of the TCE plume:

- The TCE plume from the FHML is present in the southern portion of the LPVA and existed in the dissolved aqueous phase (no DNAPLs were present);
- The plume was vertically dispersed throughout the saturated thickness of the aquifer;
- This type of plume configuration implies that transverse dispersivity is nominal and that advection was the predominant process controlling TCE mass transport;
- CH2M HILL therefore concluded that rapid groundwater flow resulted in a highly dispersed TCE plume in vertical profile but minimized lateral (i.e. transverse) dispersion. Thus, lateral spreading of the plume did not appear to be controlled by hydrogeological constraints;
- In addition, CH2M HILL postulated that TCE movement in the aquifer would not be significantly attenuated because of the lack of fine-grained sediments and organic carbon within the aquifer to retard contaminant migration.

4.3.2 Current TCE Plume

An interpretation of the extent of the current TCE plume (defined by TCE concentrations in groundwater greater than 1 µg/L) in the southern LPVA, based on groundwater sample results from the Summer 2017 offsite sampling event, is depicted in Figure 4-10. The interpreted distribution of the portions of the TCE plume depicted at the mouth of Fort Hall Canyon, within the FHML property boundary, is based on the FHML Summer 2017 quarterly remediation system sampling event.

TCE plume contours were estimated by hand by an experienced hydrogeologist and digitized into FHML ArcGIS base maps. Attempts were made to utilize the kriging algorithm in Surfer to create a contour map of the Summer 2017 offsite TCE concentration results. However, simple data kriging (including log- and gamma-transformation of raw data) does not take into account the highly contrasting properties of the hydrogeologic materials through which contaminated groundwater flows from the mouth of the Fort Hall Mine Canyon into the southern portion of the LPVA (as discussed in detail in Section 4.1.2 below). The nature of the complex sedimentary deposits within the alluvium and Quaternary pre-Bonneville pediment deposits, although poorly understood at this time, may be simply described as a heterogeneous formation with questionable isotropy. In contrast, the post-Bonneville Upper Gravels of the LPVA may be simply described as a relatively homogeneous formation, but with strongly anisotropic hydraulic conductivity caused by the linear nature of the LPVA. Complex statistical variogram modeling would be required when gridding with the kriging algorithm to approximate the lateral and vertical distribution of TCE concentrations, which is beyond the scope of the project at this point and may be more precisely approximated in the future with numerical groundwater flow and transport modeling.

Multiple nested off-site monitoring wells were sampled during the Summer 2017 monitoring event. The analytical results from the nested wells were analyzed with respect to the depth of the screened intervals, the type of aquifer material that those depths, depths of nearby domestic wells, vertical hydraulic gradients in the nested wells, and contaminant concentrations in each screened interval. Based on these analyses, specific screened intervals within the nested wells were chosen to represent the contaminant concentration in the vicinity of the well for purposes of contaminant plume contouring:

- Monitoring wells MW-116S and MW-116D are located on residential property at the southeast end of Hillside Lane, along with domestic well RW-2140H. Domestic wells in the vicinity of Hillside Lane have historically been impacted with some of the highest TCE and PCE concentrations observed in offsite domestic and monitoring wells (as high as 250 µg/L TCE in domestic well RW-2151H in 1994). Figure 4-11 depicts a cross-section A-A' that runs along the axis of Hillside Lane, from the top of the road to the south, northward across Portneuf Road, ending at the Portneuf River in the middle of the LPVA. The domestic and monitoring wells located along Hillside Lane have been projected onto this cross-section, thus depicting the estimated vertical elevations of the wells with respect to the topographic profile of the road and other nearby wells. The shallow and deep screened intervals of monitoring well MW-116 are depicted with respect to the elevations of the screened intervals of nearby domestic wells RW-2140H, RW-2172H, and RW-2203H. The MW-116S screened interval is similar in elevation of those of nearby domestic wells and has had similar TCE concentrations. The MW-116D screened interval is located approximately 20 feet deeper than nearby domestic wells

and has historically had nondetect contaminant concentrations. Therefore, MW-116S was chosen to represent the TCE concentration for the nested monitoring wells on the plume contour map. Of note, nearby domestic well RW-2151H, which was drilled in 1972, consists of a 6-inch metal casing installed down to 195 feet bgs, with no well screen. TCE concentrations in this domestic well have historically been similar to nearby domestic wells and MW-116S, even though groundwater from this domestic well should theoretically originate from the bottom of the metal casing, 60 to 70 feet deeper than nearby domestic well screened intervals. This may indicate that either the vertical distribution of the contaminant plume has not been fully characterized by the two screened intervals of monitoring well MW-116S/D, or that the metal casing of domestic well RW-2151H may have been compromised somewhere in the upper portion of the aquifer. A downward vertical hydraulic gradient of approximately 0.18 ft/ft was noted in MW-116S/D during the Summer 2017 monitoring event.

- Monitoring wells MW-115S and MW-115D are located on private property off of Portneuf Road, approximately 1000 feet northwest of Hillside Lane (Map Parcel ID #46). Groundwater elevations in these monitoring wells indicate a very slight upward vertical hydraulic gradient of 0.003 ft/ft. The TCE concentration in MW-115S is higher than MW-115D (which historically has had nondetect concentrations). Therefore, MW-115S was used for the plume contour map.

- Groundwater elevations in MW-106S and MW-106D, located 200 feet northwest of nested monitoring wells MW-115S/D, have nearly identical groundwater elevations (within 0.03 ft), and nondetect contaminants in both screened intervals. However, the MW-106S screened interval is close in elevation to nearby domestic well RW-7773P, and nearby monitoring well MW-115S. Therefore MW-106S was used for the plume contour map.

- MW-103S and MW-103D were previously discussed in Section 4.1.2. MW-103S was used for the plume contour map.

- Three monitoring wells located along the northern edge of the LDS agricultural field, northeast of the ballpark located at 8000 Bannock Highway, were sampled in the Summer 2017 monitoring event. These monitoring wells belong to the City of Pocatello and were installed in the early 1990s to investigate the lateral and vertical extent of TCE impacts to the LPVA. Three monitoring wells located on the western edge of the agricultural field were sampled, including PA-1, PA-3 and PA-4. Monitoring wells PA-1 is screened around 141 ft bgs, and PA-3 is screened around 61 ft bgs. Monitoring well PA-4 has three screened intervals, and the deepest interval around 142 ft bgs was sampled in Summer 2017. Groundwater elevations were within 0.09 feet among these monitoring wells, and TCE concentrations were similar in the wells, ranging from 1.66 µg/L to 2.12 µg/L. All three monitoring wells were used for the plume contour map, along with a nearby extraction well (CW-2-EXT) that was also sampled in the Summer 2017.

Based on the current interpretation of the TCE concentrations in monitoring and domestic wells downgradient of the FHML, the TCE plume appears to extend northward out of the mouth of Fort Hall Canyon, and then abruptly turns to the northwest, along the longitudinal axis of the LPRV, possibly due

to the strong and fast northwesterly groundwater flow of the LPVA. The exact distance that the plume travels northward out of the Fort Hall Canyon, within the canyon alluvial deposit, is unclear at this time due to a scarcity of available wells to sample immediately northwest of the mouth of Fort Hall Canyon. The nature of the complex sedimentary deposits within the alluvium and Quaternary pre-Bonneville pediment deposits, and the degree of interconnectivity of possible impacted perched water zones is also poorly understood at this time. An interpretation of the relationship between the current TCE plume and the extent of the sedimentary deposits north of the Fort Hall Canyon is presented in Figure 4-12.

It appears that the current TCE plume continues to be long and narrow, extending at least 1.5 miles downgradient into the Juniper Hills golf course. TCE concentrations in the City of Pocatello monitoring wells PA-1, PA-3 and PA-4, and extraction well CW-2-EXT, located near the LDS ballpark, range from 1.66 µg/L to 2.94 µg/L. Although these TCE concentrations are below the MCL, a downgradient boundary well that defines the downgradient extent of the TCE plume (as defined by less than 1 µg/L) was not found during the Summer 2017 monitoring activities. A domestic well located in the southern portion of the Juniper Hills golf course, RW-7091R, will be sampled during the Summer 2018 offsite monitoring activities in an attempt to identify the current downgradient extent of the TCE plume (as defined by the 1 µg/L contour).

It also appears that the TCE plume hugs the southwestern margin of the LPRV, in the Quaternary pediment deposits, until it reaches Portneuf Drive just south of the LDS Church. The TCE plume appears to be vertically restricted in the Quaternary pediment deposits, based on TCE concentrations of nested monitoring wells MW-115S/D and MW-116S/D, as discussed above. Beyond Portneuf Drive, it appears that the TCE plume enters the Upper Gravels portion of the LPVA near the southwest corner of the LDS agricultural field based on TCE concentrations in domestic wells RW-8012P and RW-8030P. The lateral extent of the plume along Portneuf Rd will be further evaluated by sampling an additional domestic well, RW-8048P, located west of RW-8030P in Summer 2018.

The current interpretation of the TCE plume along the western margin of the Upper Gravels portion of the LPVA beneath the LDS agricultural field is based upon the hydrogeological conditions described in previous site investigations (strongly anisotropic hydraulic conductivity along the axis of the LPVA, and a substantial dispersion zone along the leading edge of the plume (CH2M HILL, 1994) and based on the apparent plume distribution in the upgradient Quaternary pediment deposits. However, the true lateral extent of the TCE plume in the Upper Gravels is poorly understood at this point due to a lack of data beneath the LDS agricultural field and will require further investigation in 2018 by collecting samples from additional City of Pocatello monitoring wells across the northern edge of the LDS agricultural field. Of note, when CH2M HILL conducted the assessment of TCE contamination in the southern LPVA in 1994, municipal water supply wells #33 and #14 were still operating, drawing the TCE plume longitudinally downgradient along the western edge of the LPVA. These municipal wells were shut down in July 1994, and a new municipal supply well, #44, was installed on the other side of the LPVA in 2000 (Figure 4-8). The effects of the new municipal well on the lateral extent of the TCE plume have been periodically monitored by the City of Pocatello using the PA-series monitoring wells installed along the northern boundary of the field. Bannock County has requested this data from the City of Pocatello, and a representative is attempting to assemble this data as of the date of this Draft Final report.

4.3.3 Current PCE Plume

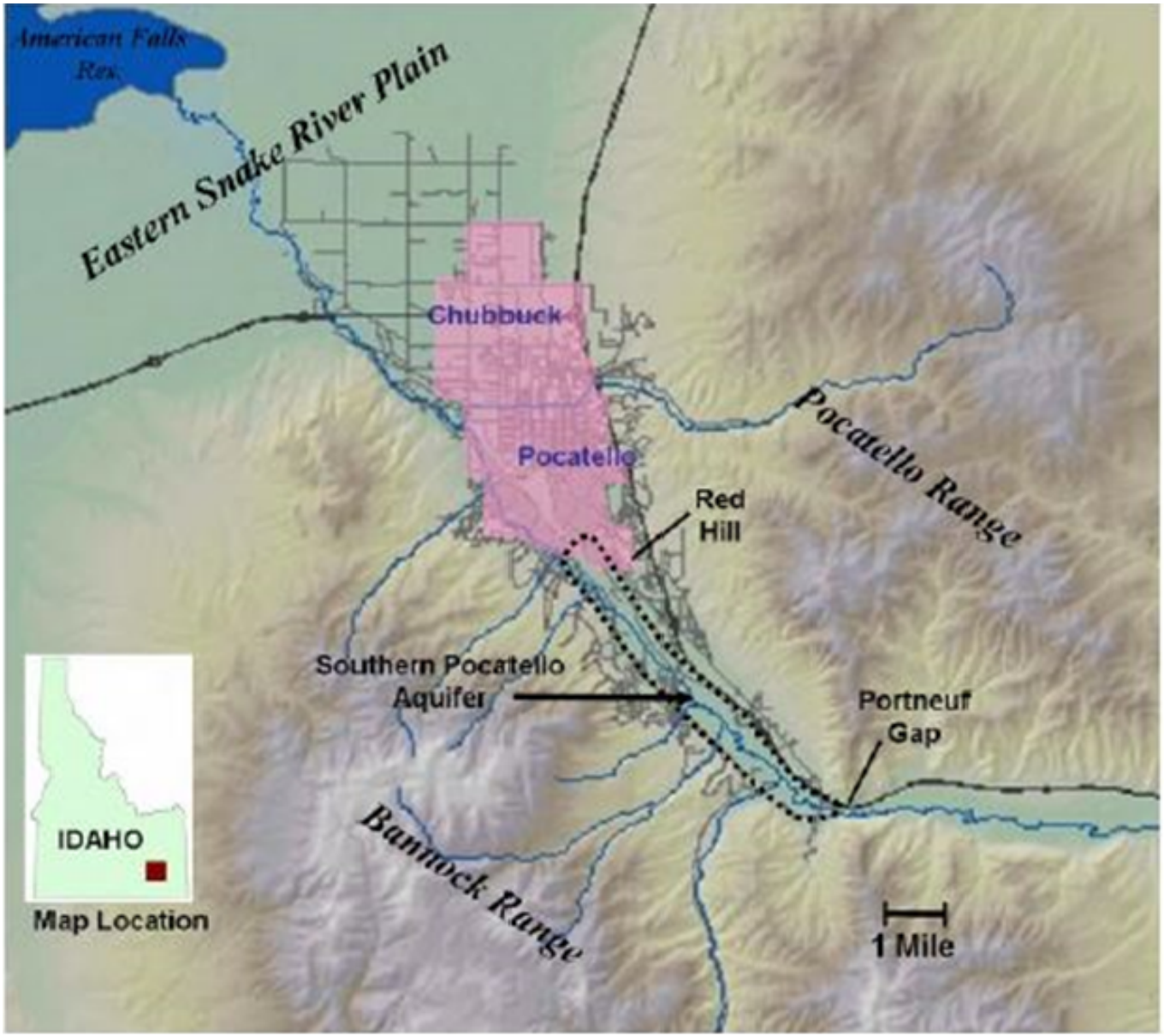
The interpreted extent of the current PCE plume (defined by PCE concentrations in groundwater greater than 1 µg/L) in the southern LPVA, based on groundwater sample results from the Summer 2017 offsite monitoring event, is depicted in Figure 4-13. The interpreted distribution of the portions of the PCE plume depicted at the mouth of Fort Hall Canyon, within the FHML property boundary, is based on the FHML Summer 2017 quarterly remediation system sampling event.

As with the TCE plume, PCE plume contours were estimated by hand by an experienced hydrogeologist and digitized into FHML ArcGIS base maps. The same nested monitoring wells used to define the TCE plume were also used for the PCE plume, as discussed in Section 4.3.2.

Based on the current interpretation of the PCE concentrations in monitoring wells and domestic wells downgradient of the FHML, the PCE plume appears to extend northward out of the mouth of Fort Hall Canyon, and then abruptly turns to the northwest, along the longitudinal axis of the LPRV. The exact distance that the PCE plume travels northward out of the Fort Hall Canyon is unclear at this time due to a scarcity of available wells to sample immediately northwest of the mouth of Fort Hall Canyon, and the complexity of these sedimentary deposits.

The nature of the current interpretation of the PCE plume is similar to the TCE plume in that it appears to be long and narrow and hugs the southwestern margin of the LPVR. The PCE plume also appears to exhibit a substantial dispersion zone in front of the 5 µg/L PCE isocontour, and the plume appears to be vertically restricted in the Quaternary pediment deposits like the TCE plume, based on PCE concentrations in offsite nested monitoring wells. The front edge of the PCE plume, as defined by the 1 µg/L PCE contour, is likely located somewhere beneath the LDS agricultural field, but cannot be further defined due to lack of data around the field. The lateral extent of the PCE plume beneath the field is also unknown at this time.

Of note, the nature of the connectedness of the 5 µg/L PCE isocontour regions in the northern and southern portions of the offsite PCE plume is highly questionable due to the scarcity of data in between.



Source: C.W. Meehan. 2005. Geochemistry of the Southern Pocatello Aquifer and its Implications for Aquifer Recharge and Contamination Potential. Master of Science Thesis, Idaho State University.

FIGURE 4-1
LOWER PORTNEUF RIVER VALLEY LOCATION MAP
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FORT HALL MINE LANDFILL - BANNOCK COUNTY, IDAHO

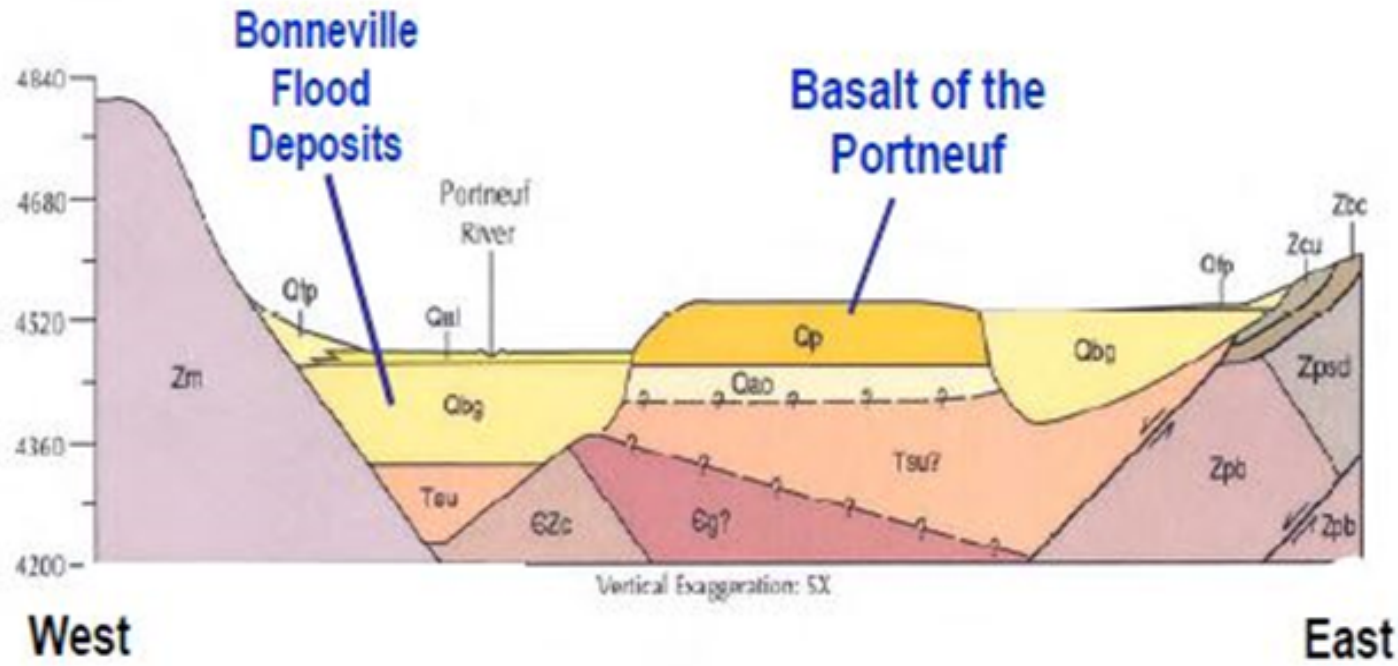
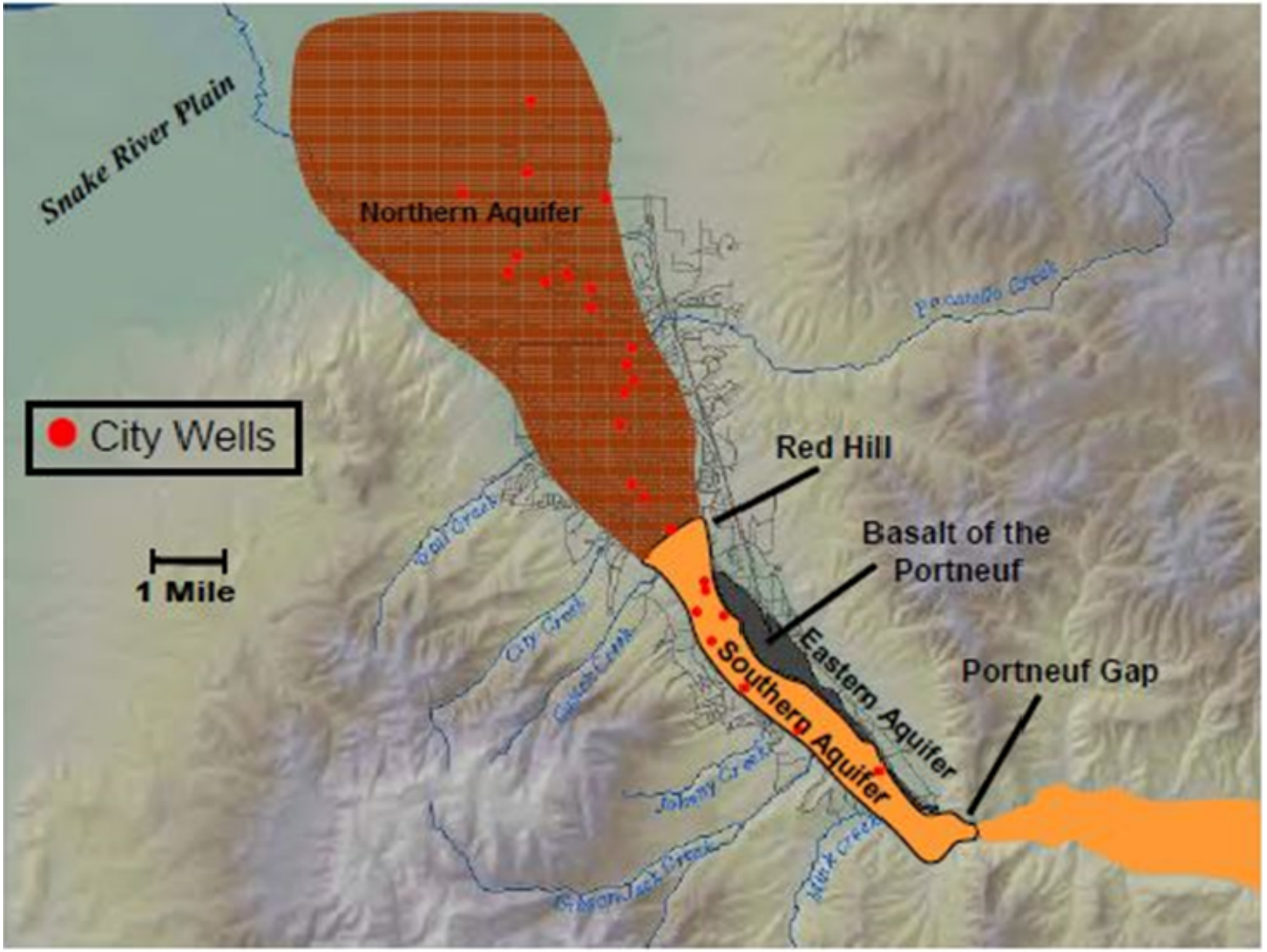


Figure 1-2: East-west cross section through the southern portion of the Pocatello valley (Rodgers and Othberg., 1999). Geologic units represented are: Zpb, Pocatello Formation-Bannock Volcanic Member; Zpsd, Pocatello Formation-Scout Mountain Member; Zbc, Blackrock Canyon Limestone; Zcu, Caddy Canyon Quartzite; Zm, Mutual Formation; CZc Camelback Mountain Quartzite; Cg, Gibson Jack Formation; Tsu, Starlight and Salt Lake Formations; Qao, older Pleistocene alluvium of the Portneuf River; Qp, Basalt of the Portneuf; Qfp, Alluvial fan gravel; Qbg, Bonneville flood deposits; Qal, Alluvium.

Source: C.W. Meehan. 2005. Geochemistry of the Southern Pocatello Aquifer and its Implications for Aquifer Recharge and Contamination Potential. Master of Science Thesis, Idaho State University.



Source: C.W. Meehan. 2005. Geochemistry of the Southern Pocatello Aquifer and its Implications for Aquifer Recharge and Contamination Potential. Master of Science Thesis, Idaho State University.

FIGURE 4-3
GEOGRAPHIC BOUNDARIES OF THE LOWER PORTNEUF RIVER VALLEY AND AQUIFER
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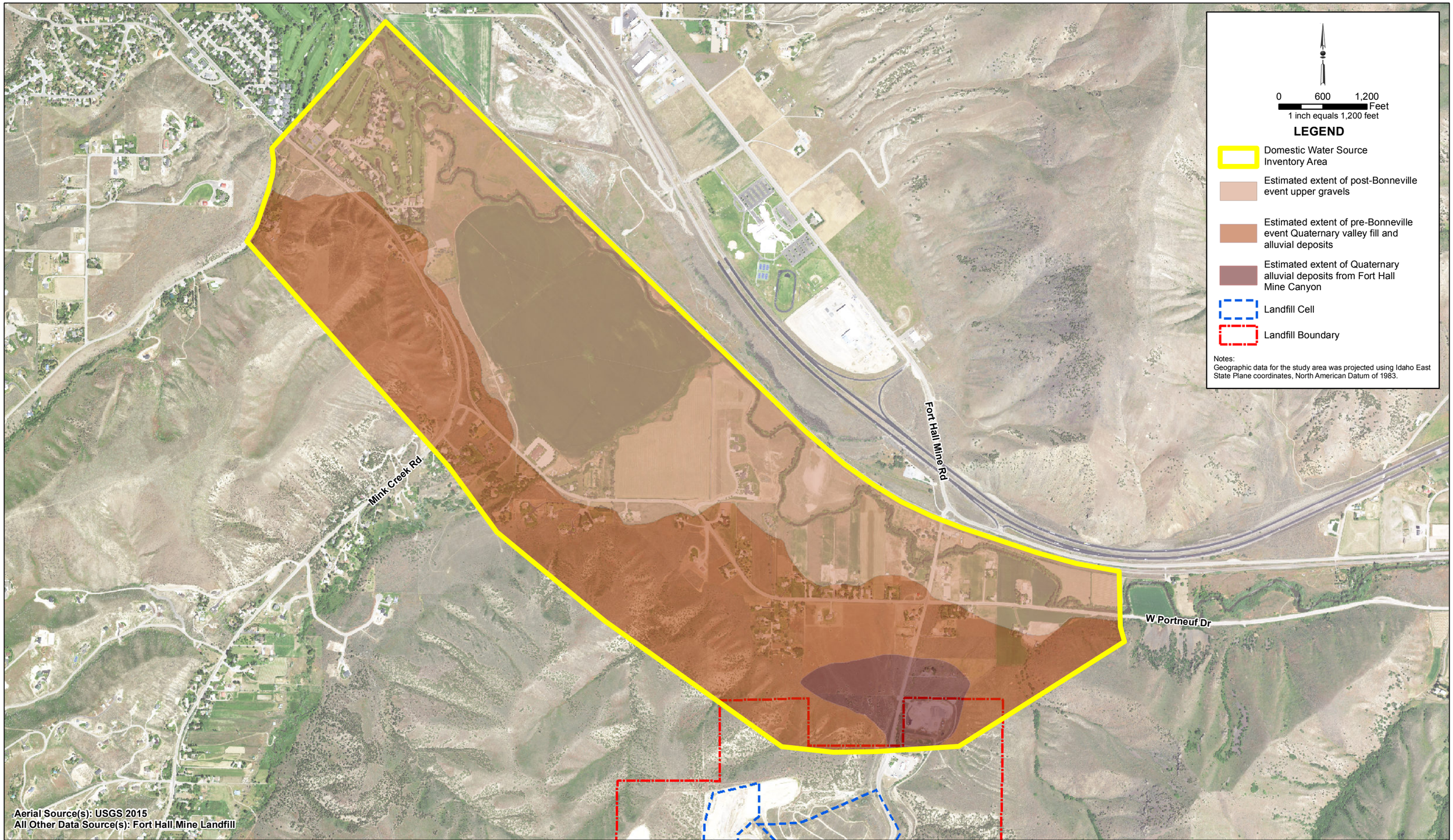
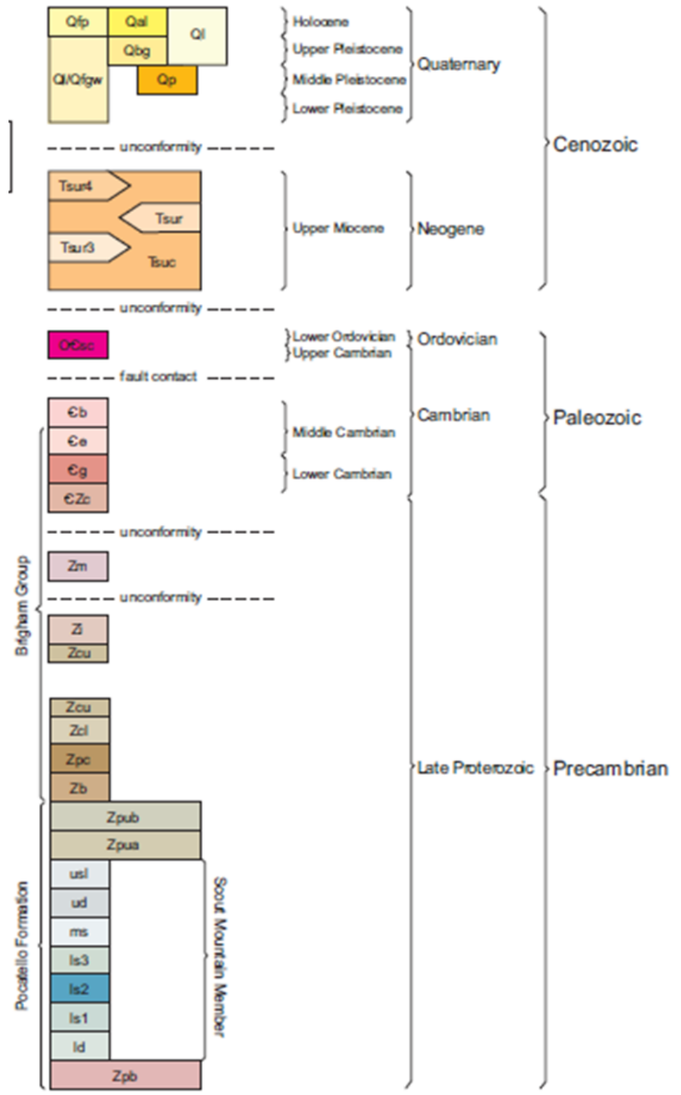
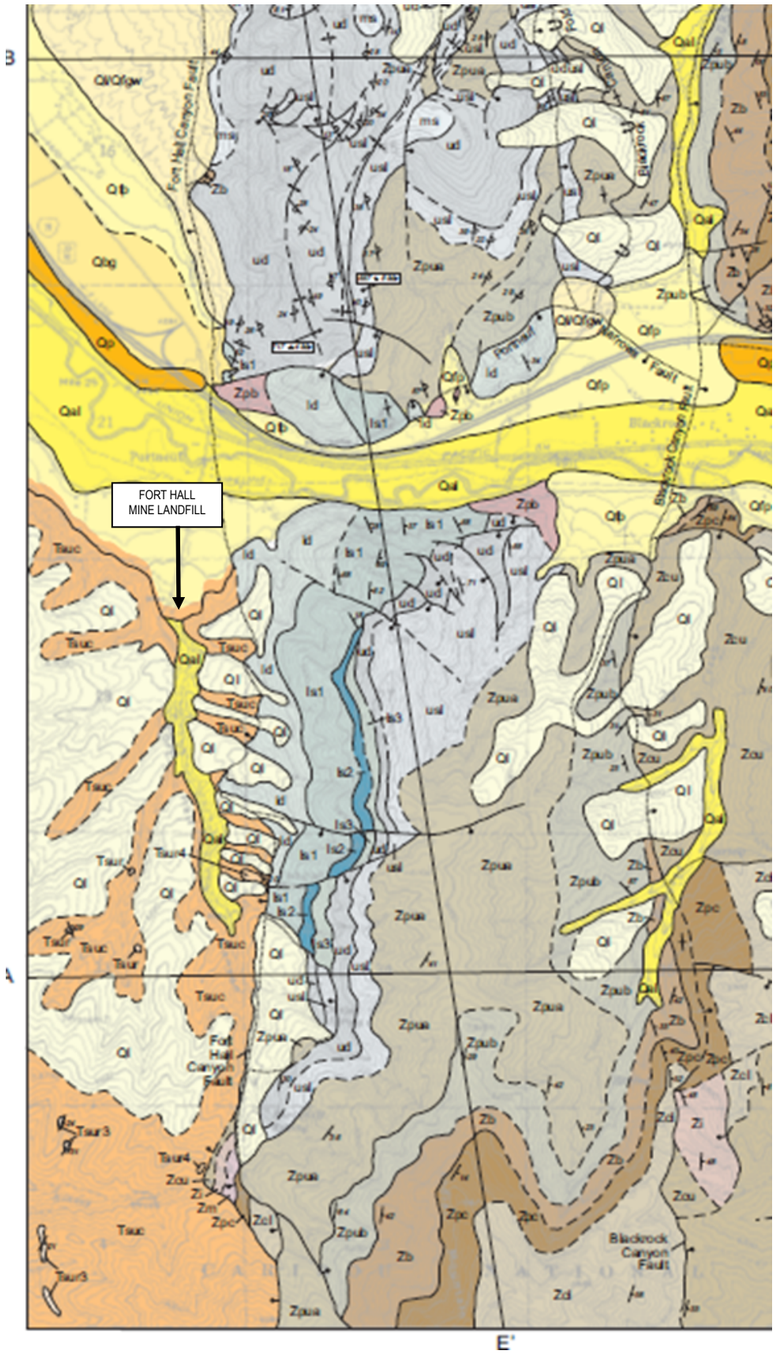


FIGURE 4-4
LOWER PORTNEUF RIVER VALLEY SEDIMENTARY DEPOSITS
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Correlation Of Map Units



Source: D.W. Rodgers, et al. 2006. Geologic Map of the Inkom Quadrangle, Bannock County, Idaho, Idaho Geological Survey.



Qal **ALLUVIUM (Holocene)**--Unconsolidated mud, silt, sand, and gravel deposited in the floodplain of the Portneuf River and its major tributaries. Thickness 0-30(?)m (0-100 ft)

Qfp **ALLUVIAL FAN DEPOSITS OF THE LOWER PORTNEUF VALLEY (Holocene)**--Poorly consolidated mud, silt, sand, and gravel. Thickness 0-20(?)m (0-70 ft)

STARLIGHT FORMATION, UPPER MEMBER (Upper Miocene)- Conglomerate, rhyolite air-fall tuff, and rare sandstone and marl. Conglomerate and intercalated rocks were assigned by Trimble (1976) to the Lower member of the Starlight Formation but geologic mapping, radiometric dating, and geochemical analyses indicate these rocks overlie, and are younger than, the 10.3 Ma Tuff of Arbon Valley (Kellogg and others, 1994) which composes the Middle member of the Starlight Formation (Trimble, 1976). Divided into informal units including conglomerate and intercalated tuff units including four tuffs which are regionally persistant in the Pocatello South quadrangle (Tsur1 and Tsur2; Rodgers and Othberg, 1999) and Inkom quadrangle (Tsur3, Tsur4). Formation age is constrained by an $^{40}Ar/^{39}Ar$ age of 7.39 Ma for Tsur4 and a correlation age of 8.2±0.5 for Tsur1 (Rodgers and Othberg, 1999).

Tsuc **CONGLOMERATE UNIT--**Clast-supported, moderately indurated cobble conglomerate with clasts derived from pre-Tertiary rocks in the region. Reddish-orange to reddish-brown matrix which is typically sandy but locally tuffaceous. Very rare sandstone and marl interbeds. Contains two persistent but discontinuous air-fall tuff beds (described below) and other lenses of air fall tuff. Abrupt lower contact, located west of map area, is placed at the base of cobble conglomerate which coincides with the top of Cambrian/Late Proterozoic bedrock or more rarely with the top of air-fall tuff (Tsur1). Forms gravel-covered slopes with very rare outcrops. Maximum thickness (including intercalated air-fall tuff units) measured from fault-bounded top to unconformity at base is about 800m (2900 ft).

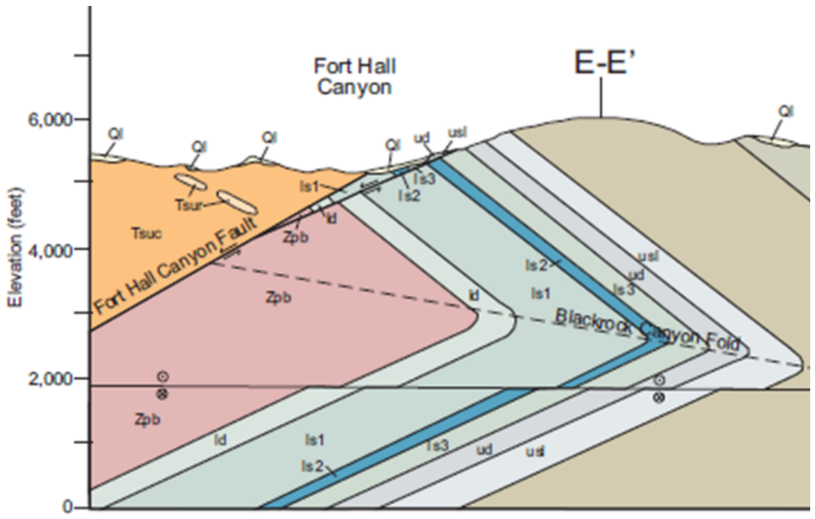
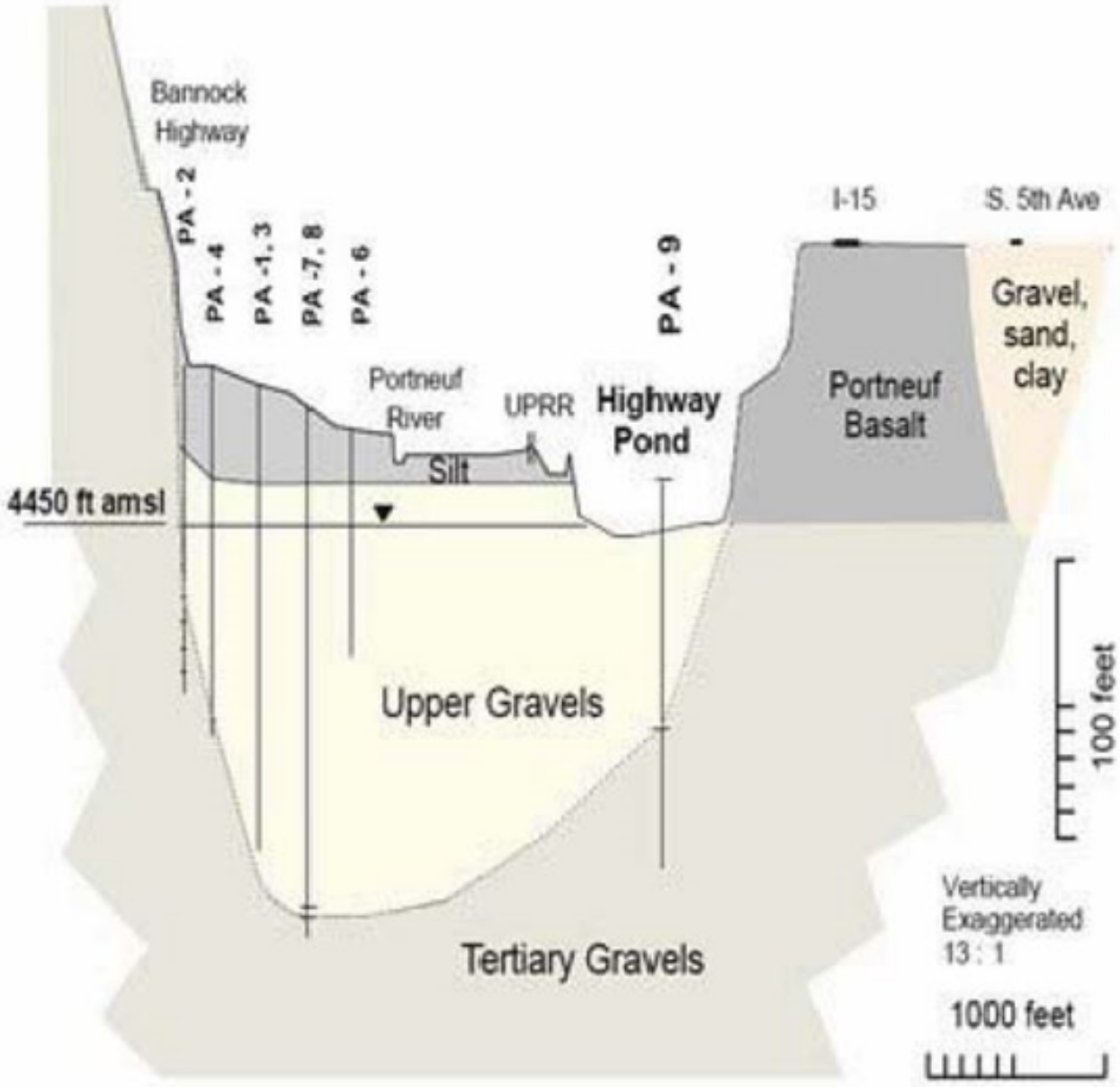


FIGURE 4-5
GEOLOGIC MAP OF THE FORT HALL MINE CANYON
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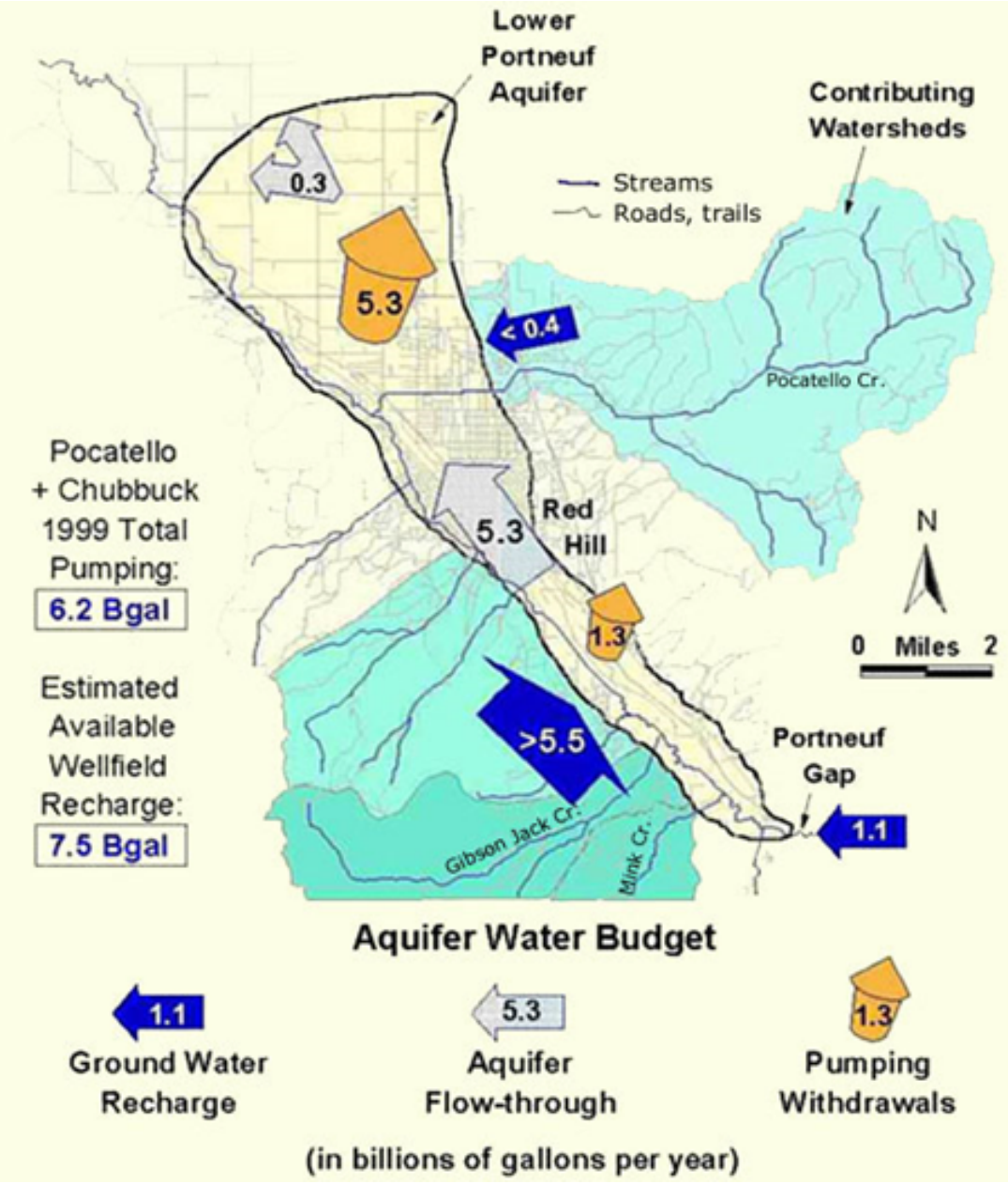
Source: CH2M HILL. 1994. Hydrogeology and Assessment of TCE Contamination in the Southern Portion of the Pocatello Aquifer – Phase I Aquifer Management Plan Final Report. December.

FIGURE 4-6

EAST-WEST CROSS-SECTION THROUGH THE LOWER PORTNEUF RIVER VALLEY NORTH OF LDS AGRICULTURAL FIELD

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Source: C.W. Meehan. 2005. Geochemistry of the Southern Pocatello Aquifer and its Implications for Aquifer Recharge and Contamination Potential. Master of Science Thesis, Idaho State University.

FIGURE 4-7
LOWER PORTNEUF VALLEY AQUIFER WATER BUDGET
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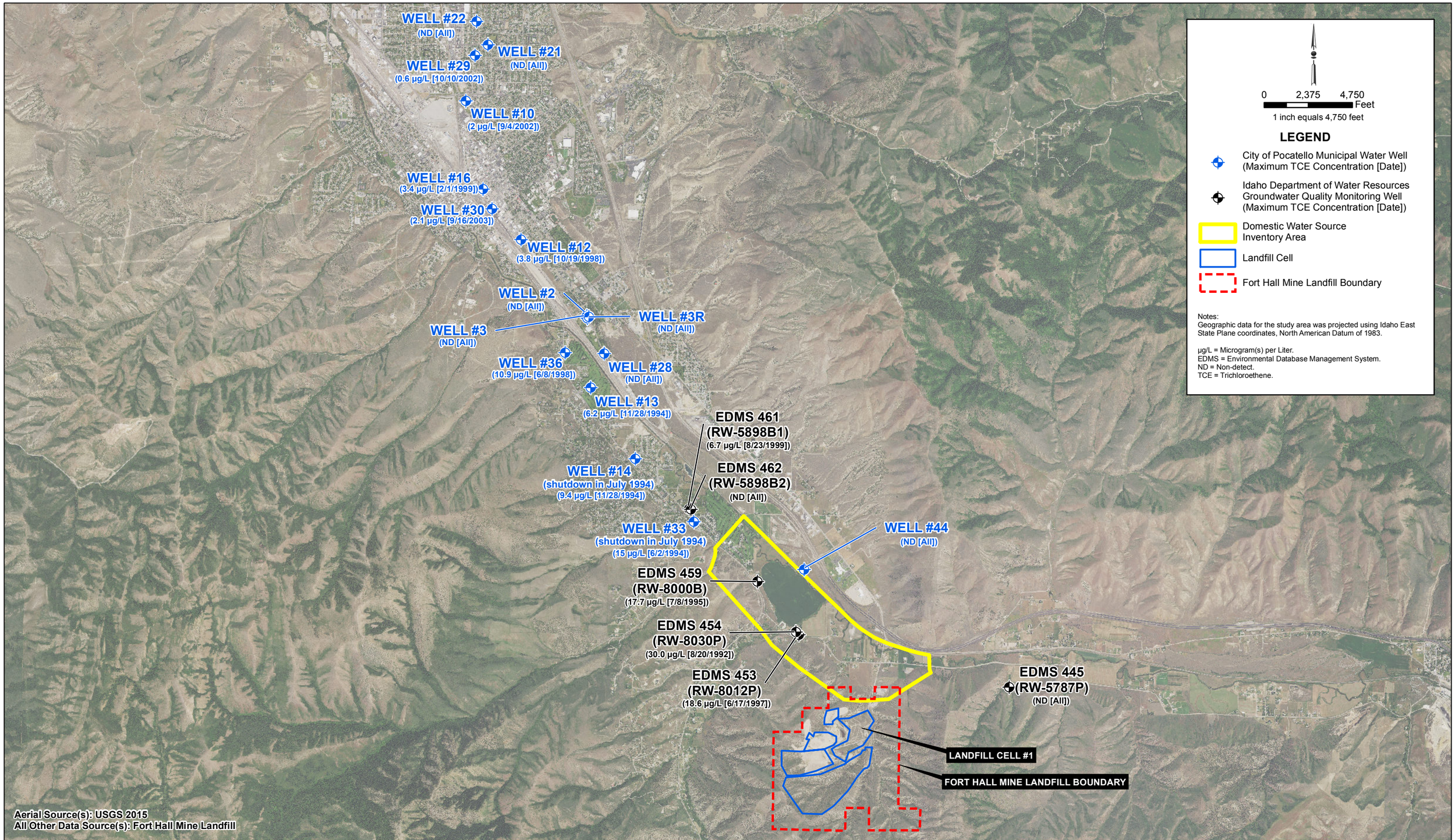


FIGURE 4-8

CITY OF POCATELLO MUNICIPAL WELLS AND EDMS WATER QUALITY WELLS NEAR FORT HALL MINE LANDFILL

2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

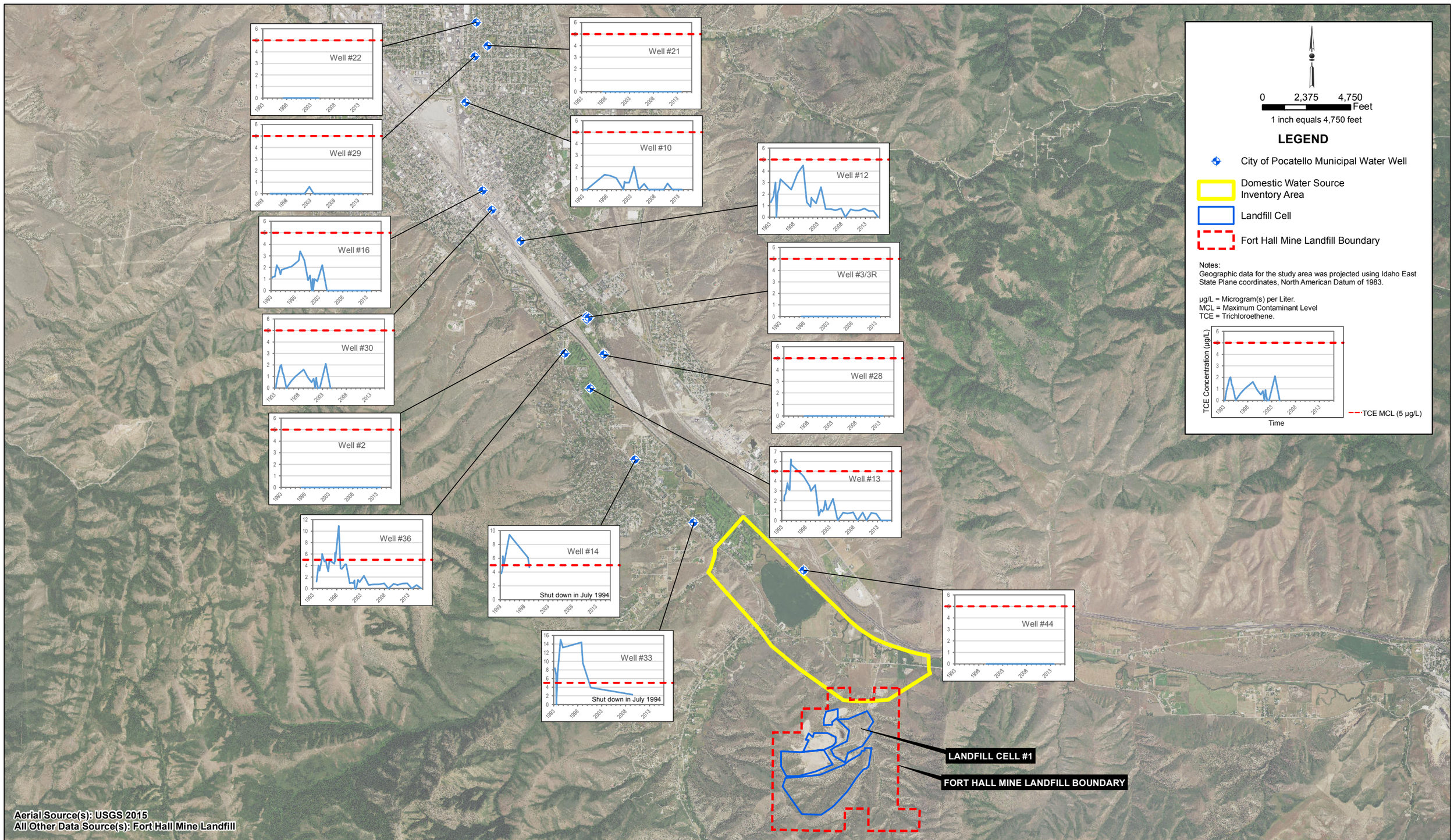


FIGURE 4-9

HISTORICAL TCE CONCENTRATIONS IN CITY OF POCATELLO MUNICIPAL WATER WELLS

2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

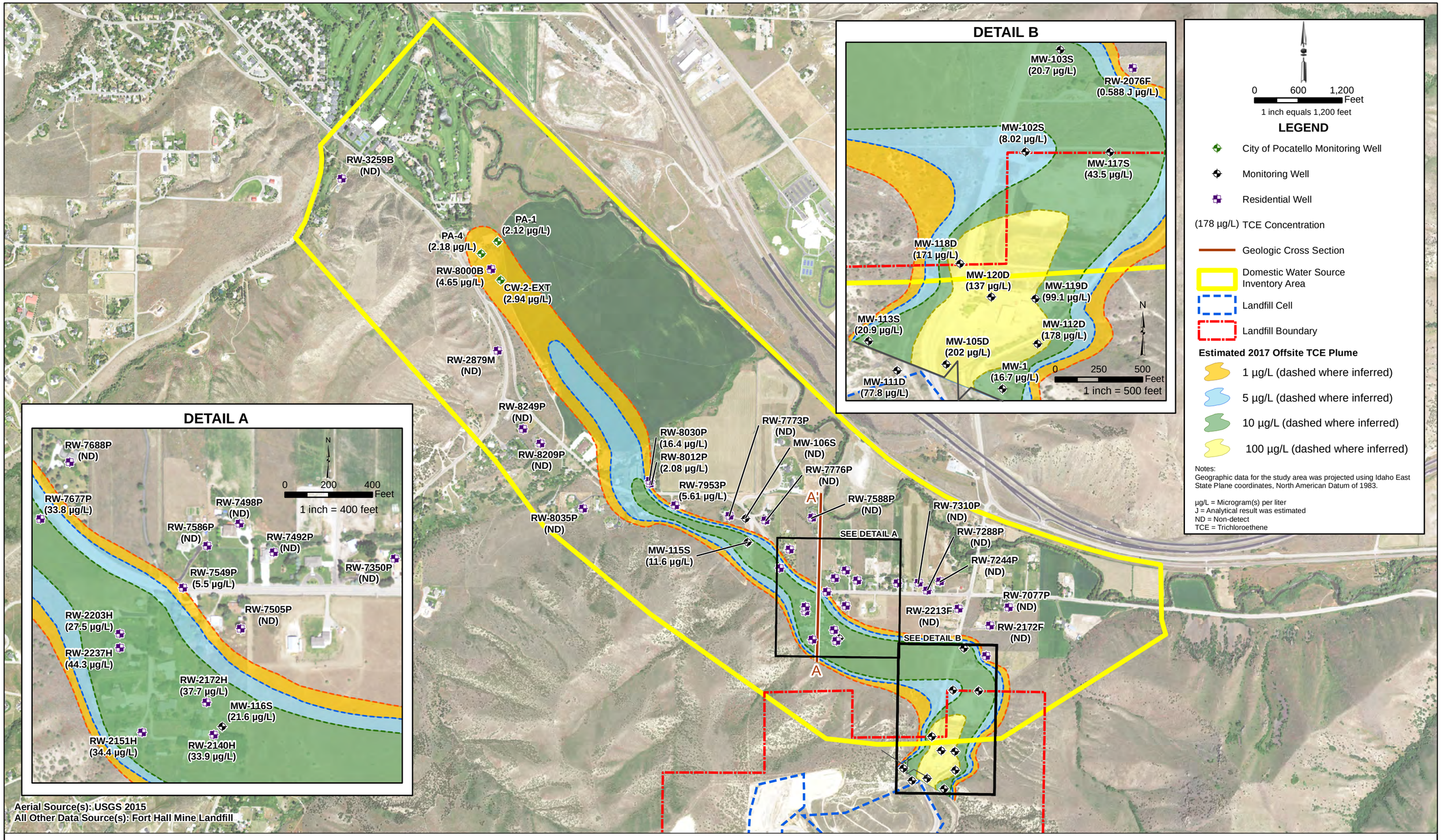


FIGURE 4-10

ESTIMATED EXTENT OF THE CURRENT TCE PLUME IN THE LOWER PORTNEUF VALLEY AQUIFER

2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

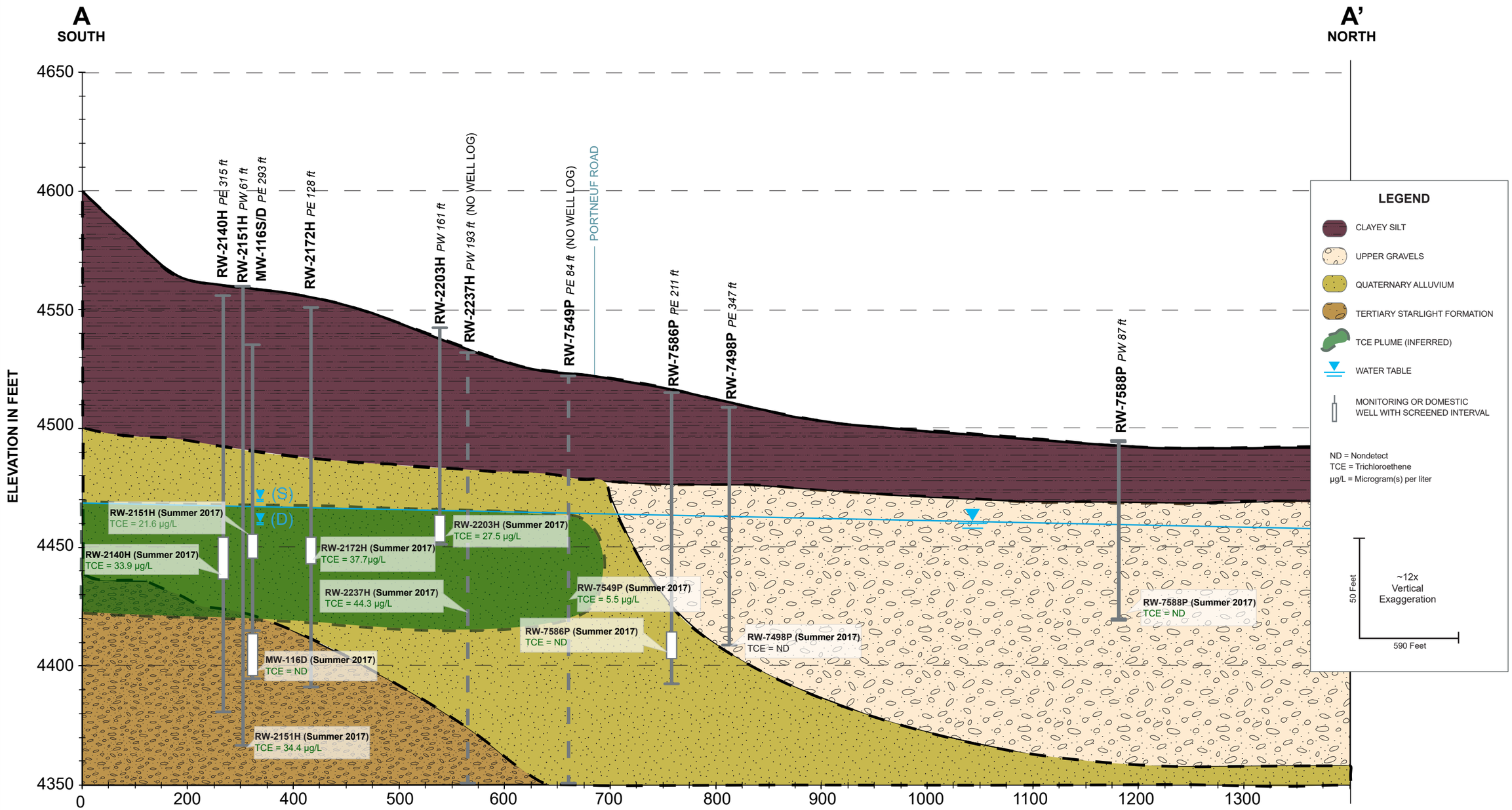


FIGURE 4-11
CROSS-SECTION A-A'
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL - BANNOCK COUNTY, IDAHO

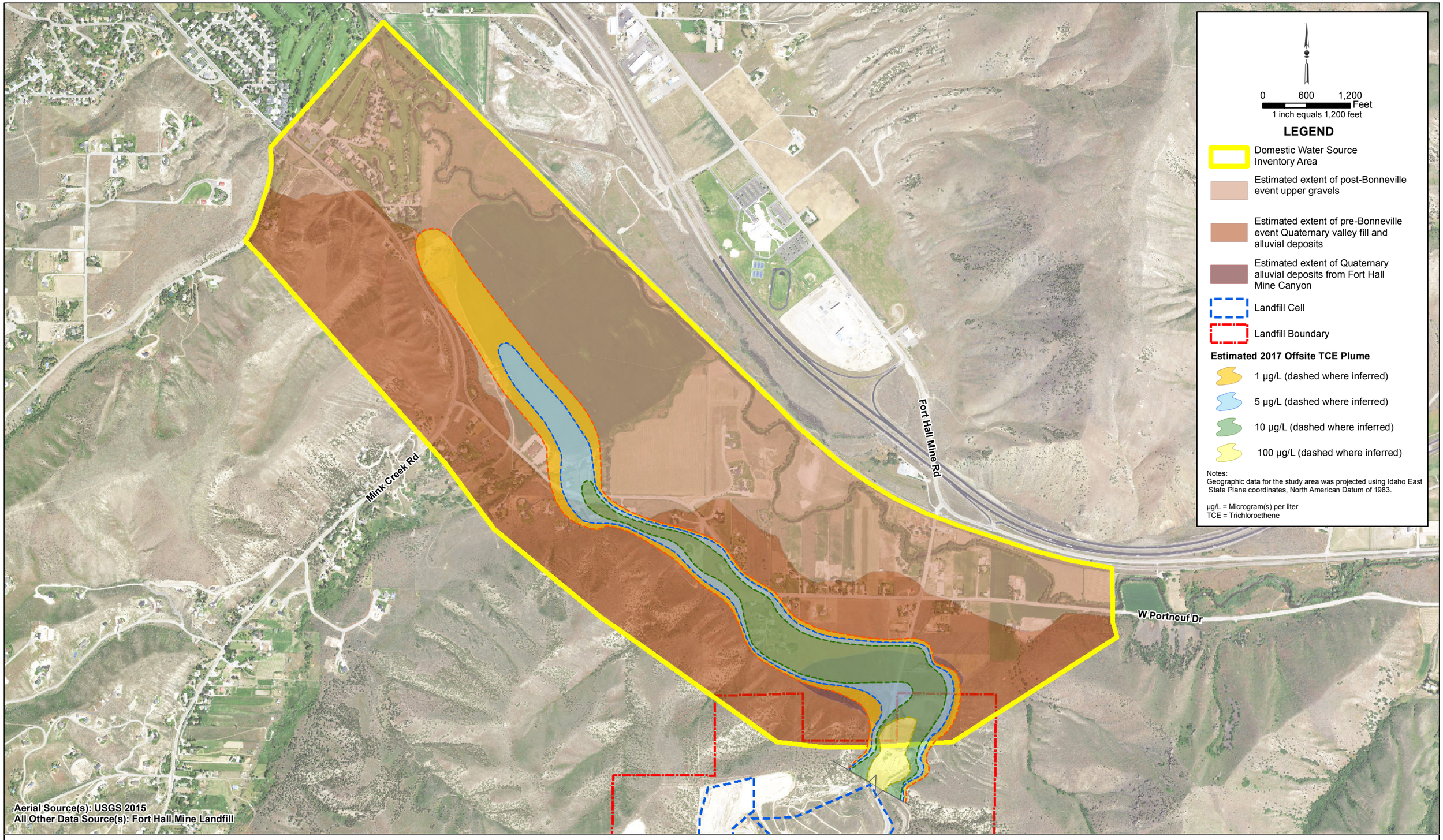


FIGURE 4-12

CURRENT INTERPRETATION OF THE OFFSITE TCE PLUME WITH RESPECT TO LPRV SEDIMENTARY DEPOSITS

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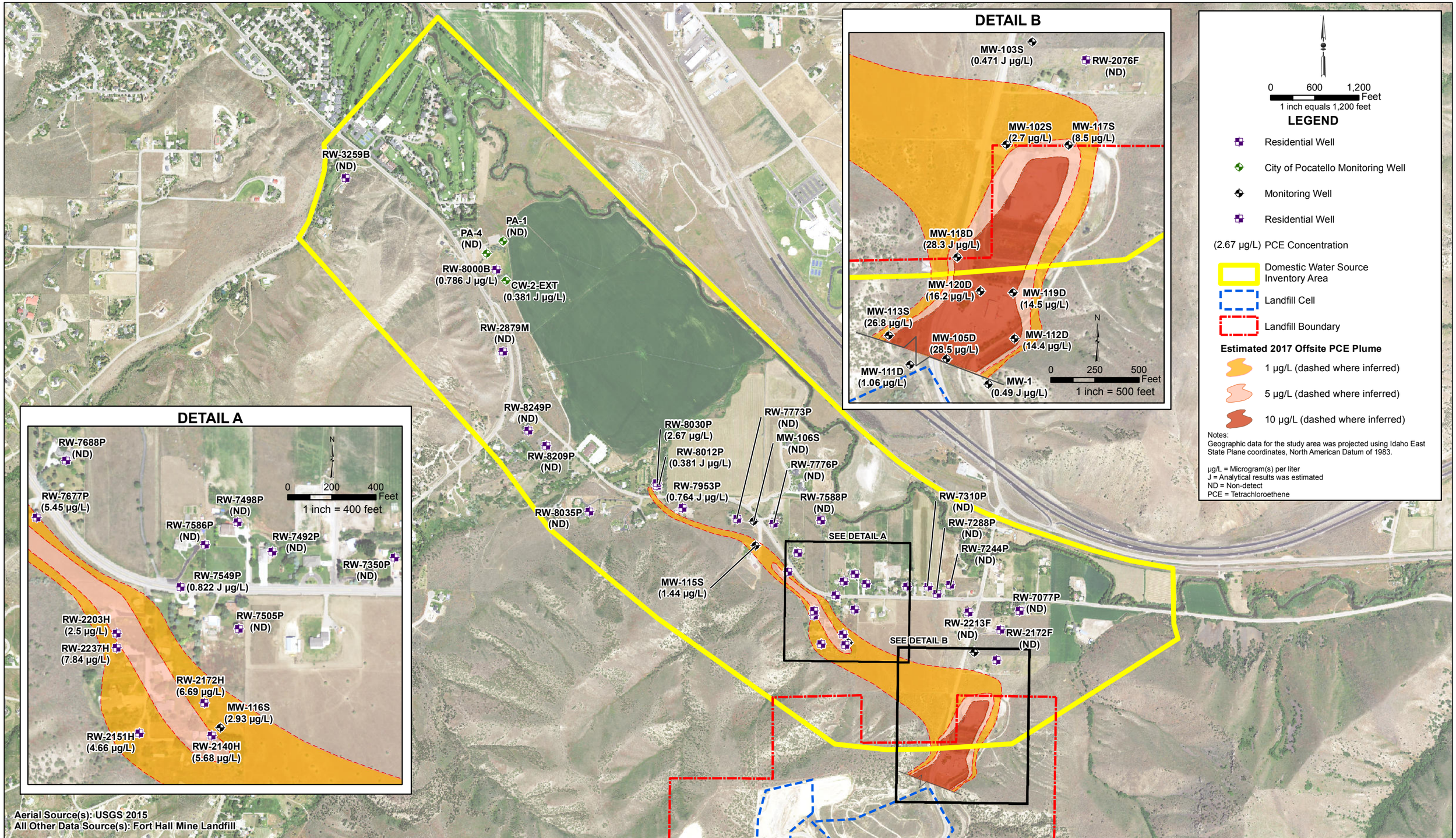


FIGURE 4-13

ESTIMATED EXTENT OF THE CURRENT PCE PLUME IN THE LOWER PORTNEUF VALLEY AQUIFER

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5.0 Screening Level Risk Assessment

The WP (AEEC 2017b) proposed to assess risks to human health based on groundwater sampling results and the offsite conceptual site model (CSM). Specific risks to be assessed include:

- Human health risks due to use of groundwater downgradient of the FHML as the sole source of household water on properties not connected to Pocatello city water services.
- Human health risks due to use of groundwater downgradient of the FHML for irrigation.
- Potential future risks to City of Pocatello Water Department municipal wells located in the LPVA.
- Human health risks due to potential vapor intrusion into residences located above contaminated groundwater.

The WP assumes that human health risks will be assessed in a baseline human health risk assessment (BHHRA) conducted in accordance with the guidelines presented by EPA in the Risk Assessment Guidance for Superfund Volume 1, Human Health Evaluation Manual (EPA, 1989).

Potential risks include, but are not limited to:

- Direct ingestion, vapor inhalation (i.e. shower steam), and dermal exposure to impacted groundwater by offsite residents and workers using a domestic well for their sole source of household water (i.e. they are not connected water services from the City of Pocatello Water Department).
- Direct ingestion, vapor inhalation (i.e. fine water mist created with sprayers), and dermal exposure to impacted groundwater by residents using a domestic well for irrigation water.
- Ingestion of crops watered by domestic wells used for irrigation.
- Dermal exposure to crops and other plants that have been watered by domestic wells used for irrigation.
- Vapor intrusion into residences located above impacted groundwater, with subsequent inhalation of vapors by residents.
- Continued degradation of the LPVA, a sole-source aquifer that is used as the drinking water source for the cities of Pocatello and Chubbuck, Idaho.

A quantitative BHHRA must consider seasonal variations in groundwater contaminant concentrations and incorporate a sufficient number of samples to support statistical analysis. Collection of time series data

for established contaminants of concern improves the confidence that variability around mean concentration values have been accurately estimated.

Following collection of a sufficiently large data set, the data must be evaluated to assure a minimum level of data quality, compare data to background conditions and confirm contaminants of concern. Based on the validated data, toxicity and exposure assessments will need to be performed to enable risk characterization.

At the current time, only one round of recent, reliable groundwater sampling data has been collected to assess contaminant concentrations in offsite domestic well supplies. This sampling was completed in November 2017. Samples collected prior to that time have not been included in this assessment as they may not be representative of current conditions and data quality has not been assessed. Soil, soil vapor and indoor air have not been sampled.

Because the sufficient time series data and data for all potentially contaminated media have not yet been collected, a BHHRA is beyond the scope of this report. Instead, a preliminary screening level risk assessment (SLRA) is presented, based on comparison of groundwater data with EPA Regional SLs for tap water and Vapor Intrusion Screening Levels estimated from groundwater concentrations using the EPA VISL Calculator. It is anticipated that a full BHHRA will be prepared when sufficient data are available.

Health risks have not been quantified for each residence, as additional data is needed to support a BHHRA. However, exceedances of Regional Screening Levels (RSLs) indicate properties that may be at risk due to exposure to impacted groundwater that is the sole source of household water at these residences. Similarly, groundwater samples collected from City of Pocatello monitoring wells PA-1, PA-3, PA-4 and CW-2-EXT are compared to RSLs. The potential health risks associated with impacted groundwater used for irrigation cannot be assessed at the screening level. Screening level risks have been generated for indoor air that may be subject to vapor intrusion at residences located above contaminated groundwater. Screening level risks are discussed further in Section 5.3 and Section 5.4.

5.1 Current and Potential Future Uses of Groundwater

The Bannock County Zoning Map identifies properties within the Drinking Water Source Inventory Area (DWSIA) as primarily residential suburban or residential rural (Figure 5-1). The northeastern part of the DWSIA includes parcels within the Pocatello City limits that are either residential or commercial properties. A few parcels at the southern boundary of the area are zoned for agriculture; including the FHML property. The Landfill was in operation before the zoning ordinance became effective and continues to operate under a "non-conforming use" provision. The Bannock County Future Land Use Plan (Figure 5-2) appears to be consistent with current zoning (BCPDS 2018).

The LPVA is the sole source of drinking water for the Pocatello and Chubbuck communities, as well as surrounding unincorporated county land. Residential wells also supply water for agricultural purposes (gardening/crop irrigation). There are approximately 69 properties within the DWSIA that have residential wells: 56 of those properties are connected to the municipal water supply and use residential

well water for irrigation purposes; 13 of those properties are not connected to the municipal water supply. Potential future use of groundwater is expected to remain the same.

5.2 HHRA Approach

The methods used to conduct this SLRA include:

- Data Validation and Evaluation;
- Toxicity Assessment;
- Exposure Assessment;
- Risk Characterization; and
- Uncertainty Analysis.

This approach is consistent with EPA's Risk Assessment Guidance for Superfund (RAGS), although it has been abbreviated for this screening level evaluation.

5.2.1 Data Evaluation/Hazard Identification

Identification of contaminants of potential concern (COPCs) for this SLRA is based on: 1) detection of volatile organic compounds at concentrations above the laboratory's reporting limit; and 2) detection of metals above the Federal Primary Drinking Water MCLs. Establishing contaminants of concern during a BHHRA should also consider:

- Existing background concentrations;
- Site-specific exposure assumptions for risk calculations; and
- Assessment of all potential exposure media using data from analysis of samples or calculated values.

TCE and PCE are the primary volatile organic contaminants that have been detected in groundwater within the DWSIA (Table 5-1). Cis-1,2-Dichloroethene was also detected in several samples. Toluene was detected, but at low concentrations that were either below the laboratory reporting limit or less than 10 times the concentration found in associated blank samples. These four constituents are retained for further assessment. However, toluene may be attributable to laboratory contamination. TCE has been detected in 19 wells at concentrations ranging from below the reporting limit in RW-2076F to 44.3 µg/L in RW-2237H. The highest TCE concentrations occurred in groundwater samples collected near the mouth of the canyon. PCE was detected in 14 of the residential well samples that contained TCE.

Metals are naturally occurring constituents in groundwater. They occur in elemental form, as soluble salts or as metal compounds. For the purposes of this SLRA, elemental metals are assessed. A list of 23 metals, alkalinity, cyanide, chloride, and sulfate were considered for this SLRA (Table 5-2). Arsenic was detected above the MCL in one sample, MW-116D. Lead was detected in sample RW-7549P above the MCL. These two metals are retained for further assessment.

5.2.2 Toxicity Assessment

Several EPA sources are used to obtain the default toxicity criteria (cancer slope factors and non-carcinogenic reference doses/reference concentrations, inhalation unit risks, etc.) listed in the EPA SL tables. The list of sources includes the following:

- EPA's Integrated Risk Information System (IRIS);
- The Provisional Peer Reviewed Toxicity Values (PPRTVs) derived by EPA's Superfund Health Risk Technical Support Center (STSC) for the EPA Superfund program; and
- Other sources of information that may include:
    - California EPA toxicity values;
    - The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk levels (MRLs); and
    - EPA's Health Effects Assessment Summary Table (HEAST) toxicity values, among others.

5.2.3 Exposure Assessment

The exposure assessment describes how residents in the DWSIA could come in contact with chemicals in groundwater. The assessment addresses exposures that could result under existing conditions and from reasonably anticipated potential land uses in the future. The exposure assessment contributes to the SLRA by describing the following:

- Populations that might be exposed;
- Exposure pathways by which individuals could become exposed; and
- Magnitude, frequency, and duration of potential exposures.

5.2.3.1 Potential Offsite Receptors

This SLRA evaluates exposures, cancer risks, and non-cancer health hazards from groundwater used as domestic tap water within the DWSIA. For groundwater exposure, adult and child residents are evaluated as potential receptors. In addition, non-residential and construction workers, who may be hired by homeowners or local government entities are also included. Exposures and risks from soil gas vapor intrusion into residential buildings are estimated using EPA's Vapor Intrusion Screening Level (VISL) calculator.

5.2.3.2 Conceptual Exposure/Pathway Analysis

Groundwater exposure routes include the following:

- Ingestion (primary exposure route for VOCs and metals). Potential use of groundwater for potable use presents risks of human health exposure to the contaminants through ingestion of drinking water and use in food.

- Inhalation (primary exposure route for VOCs). Potential use of groundwater for domestic purposes presents risks of human health exposure to VOCs through inhalation during activities such as bathing and dishwashing.

- Dermal absorption (not a primary exposure route for VOCs). Potential use of groundwater for domestic purposes presents risks of human health exposure to VOCs and metals through skin contact during activities such as bathing.

Indoor air exposure routes include only inhalation.

5.2.3.3 Site Conceptual Exposure Model

A human health site conceptual exposure model (SCEM) has been prepared for the Fort Hall Mine Landfill. The SCEM consists of the following components.

- A primary contamination source (FHML);

- Contamination release mechanisms (e.g., leaching from former Cell 1);

- Potential secondary contamination sources (e.g., contaminated soil);

- Contaminant transport mechanisms (e.g., infiltration to groundwater, groundwater to soil vapor partitioning, vapor intrusion and accumulation in residential living spaces);

- Contaminated exposure media (e.g., groundwater, soil, soil gas, indoor air);

- Exposure routes (e.g., ingestion, direct dermal contact, and inhalation of COCs during domestic water use; inhalation of COCs from indoor air; ingestion of COCs from contaminated produce); and

- Potentially exposed receptors (e.g., residents and nonresidential or construction workers).

Additional exposures that may be considered in a BHHRA include:

- Ingestion, inhalation and dermal exposure to well water during irrigation activities;

- Ingestion of fruits and vegetables irrigated with well water and; and

- Dermal exposure and incidental ingestion of soils during digging or excavation activities.

Figure 5-3 presents the SCEM for the FHML and offsite residents. The SCEM illustrates and explains how the exposure pathways create the potential for human health risk. The exposure pathways define how the contaminant source, impacted media, transport mechanisms, and exposure routes are linked together to make contaminants available for uptake by human receptors. Darkened boxes under the "Potential Receptors" part of Figure 5-3 indicate that the exposure pathway from source to receptor is incomplete or "closed". Boxes with open circles indicate that the exposure pathway is potentially complete or "open". This model focuses on volatile organic COCs.

5.2.3.4 Exposure Assessment

Generic SLs are based on default exposure parameters and factors that represent Reasonable Maximum Exposure (RME) conditions for long-term/chronic exposures. The RME scenario includes but is not limited to the assumptions listed in Table 5-3 for adult and child residents and non-resident/construction workers (EPA 1989; EPA 1991a; EPA 1997c; EPA 2011). This combination of conservative assumptions provides some assurance that the estimated risks presented under the RME scenario represent the high end of plausible exposure.

5.3 Risk Characterization for Groundwater

The SLs presented in Table 5-4 for VOCs and metals represent concentrations above which exposure to tap water via one of the exposure routes would result in a $1x\ 10^{-6}$ (one in one million) excess lifetime risk of contracting cancer or a target hazard index of 0.1 resulting in non-carcinogenic adverse health risk. The SLs shown in this table are the carcinogenic target risk of 1×10^{-6} or the non-cancer hazard index 0.1 for a child. These numbers represent the total of ingestion, inhalation and dermal contact risks and/or hazard quotients from the use of tap water.

5.3.1 Volatile Organic Compounds

Of the 62 Appendix I VOC constituents that were analyzed in groundwater samples, only cis-1,2-DCE, TCE, toluene, and PCE were detected above laboratory reporting limits. Toluene was detected, but at low concentrations that were either below the laboratory reporting limit or less than 10 times the concentration found in associated blank samples. Toluene may be a product of laboratory contamination. Both TCE and PCE exceeded their respective generic screening levels, which represent the lower of a 1×10^{-6} excess cancer risk or a 0.1 non-carcinogenic target hazard index. TCE was the most widespread contaminant of concern and was detected in 19 residential well samples at concentrations above its screening level. PCE was detected in 4 of the residential well samples that contained TCE at concentrations that exceeded the generic SLs for tap water. Cis-1,2-DCE did not exceed its screening level in any samples collected from residential wells in the DWSIA.

5.3.2 Metals

Based on this screening level comparison, it appears that arsenic and lead are the only metals that exceeded MCLs. EPA has not reached a consensus on Reference Dose (RfD) or Chronic Slope Factor (CSF) values for inorganic lead, so it is not possible to calculate SLs. EPA therefore evaluates lead exposure by using blood-lead modeling, such as the Integrated Exposure-Uptake Biokinetic Model (IEUBK).

The EPA Office of Solid Waste has also released a detailed directive on risk assessment and cleanup of residential soil lead. The directive recommends that soil lead levels less than 400 mg/kg are generally safe for residential use. Above that level, the document suggests collecting data and modeling blood-lead levels with the IEUBK model. For the purposes of screening, therefore, 400 mg/kg is recommended for residential soils. For water, EPA suggests the Federal Drinking Water maximum contaminant level (MCL) of 15 µg/L, and for air, the National Ambient Air Quality Standard of 0.15 µg/m^3 as appropriate screening levels. One sample exceeded the tap water SL at 19.8 µg/L and two other samples approached the SL at 12 µg/L and 12.9 µg/L. All other samples were either below the SL or the laboratory reporting limit.

5.4 Risk Characterization for Indoor Air

The EPA VISL calculator was used to calculate potential indoor air concentrations and the associated carcinogenic risk and non-cancer health hazards based on groundwater concentrations for volatile contaminants of potential concern (COPCs). cis-1,2-DCE does not have the necessary inhalation toxicity information to calculate indoor air risks, therefore the risk of exposure to contaminated indoor air is based on the potential presence of the remaining COPCs: PCE, Toluene and TCE.

The subsurface target concentrations in the VISL Calculator are based on the generic conceptual model for vapor intrusion described in EPA's draft vapor intrusion guidance. This conceptual model assumes a groundwater or vadose zone source of volatile vapors that diffuse upwards through unsaturated soils towards the surface and into buildings. In this model, the soil in the vadose zone is considered to be relatively homogeneous and isotropic, though horizontal layers of soil types can be accommodated. The receptors are assumed to be occupants in buildings with poured concrete foundations (for example, basement or slab on grade foundations or crawlspaces with a liner or other vapor barrier).

The generic conceptual model is described as follows: Vapor intrusion is a potential human exposure pathway for a specific building or collection of buildings when the following conditions are met:

- A subsurface source of vapor-forming chemicals is present (e.g., in the soil or in groundwater) underneath or near the building(s);

- Vapors form and have a route along which to migrate (be transported) toward the building(s);

- The building(s) is(are) susceptible to soil gas entry, which means openings exist for the vapors to enter the building and driving 'forces' exist to draw the vapors from the subsurface through the openings into the building(s);

- One or more vapor-forming chemicals comprising the subsurface vapor source(s) is (or are) also present in the indoor environment; and

- The building(s) is (or are) occupied by one or more individuals when the vapor-forming chemical(s) is (or are) present indoors.

If one (or more) of these conditions is currently absent and is reasonably expected to be absent in the future (e.g., vapor migration is significantly and persistently impeded by natural geologic, hydrologic, or biochemical (e.g., biodegradation) processes and conditions), the vapor intrusion pathway is referred to as "incomplete" (EPA 2015).

The underlying assumption for this generic model is that site-specific subsurface characteristics will tend to reduce or attenuate vapor concentrations as vapors migrate upward from the source and that site-specific building characteristics will tend to further dilute the vapors as they mix with the air in the building (EPA 2014). Depth to groundwater and the soil profile of the vadose zone are expected to reduce the upward migration of volatile organic vapors to potential receptors. Therefore, calculated VISLs and associated risks are likely to be conservative.

Table 5-4 summarizes the detected groundwater concentrations compared to target groundwater concentrations that would result in a target cancer risk of 1×10^{-6} or target (non-carcinogenic) hazard quotient of 0.1 in indoor air based on generic conceptual model assumptions for vapor intrusion. The use of the 0.1 target hazard quotient is particularly conservative for establishing a target groundwater concentration when less than 10 volatile contaminants are considered. Table 5-5 summarizes indoor air concentrations and associate risks calculated using EPA's VISL Calculator. Calculations are based on the concentrations of COPCs detected in groundwater samples from wells on properties in the DWSIA and generic conceptual model and attenuation factors. The generic conceptual model for vapor intrusion assumes a groundwater or vadose zone source of volatile vapors that diffuse upwards through unsaturated soils towards the surface and into buildings (EPA, 2014). Not all of these properties have residential structures currently on them, but zoning allows for residential building in the future.

5.5 Overall Risk

One way to estimate the total risk from multiple contaminants is the sum of ratios method described in the Regional Screening Levels User's Guide (EPA 2017). This method sums the concentration of each contaminant of concern divided by its respective SL. The result is multiplied by either the target risk or target hazard quotient for the site (Table 5-4). The calculation uses the maximum concentration or the 95% upper confidence limit on the mean for each COC. Maximum concentrations were used for this screening level assessment. As can be seen from the calculations at the end of Table 5-4, the maximum total excess cancer risk for the most highly contaminated well is 1.18×10^{-4}, which exceeds the residential target cancer risk of 1×10^{-6}. This is based on the concentrations of PCE, TCE and arsenic detected in the

groundwater sample collected from RW-2237H. Carcinogenic SLs are not available for cis-1,2-DCE; therefore, this constituent is not included in the calculation of cancer risk. The maximum total non-carcinogenic hazard index is 16.2 based on concentrations of TCE, PCE, and arsenic in the sample collected from RW-2237H. This exceeds the target hazard index of 1.0. These calculations only address potential risks of exposure to tap water.

TCE appears to be the primary risk driver for vapor intrusion. TCE exceeded the target groundwater concentration that would result in a 1×10^{-6} risk of cancer or target hazard quotient of 0.1 due to indoor air inhalation in most of the groundwater samples in which COCs were detected (Table 5-5). Calculated cancer risks for TCE ranged from 3.0×10^{-7} to 2.3×10^{-5} in these samples. Similarly, calculated cancer risks for PCE ranged from 1.8×10^{-8} to 3.0×10^{-7}. The target risk value is 1×10^{-6}. The hazard quotient for TCE (non-carcinogenic health effects) ranged from 0.069 to 5.2 in these samples and is compared to a target hazard quotient of 0.1. The hazard quotient for PCE ranged from 4.7×10^{-3} to 7.8×10^{-2}. The carcinogenic risks and non-cancer hazard quotients for each COPC are additive. Cis-1,2-DCE is not a listed chemical in the VISL calculator. Toluene can be screened out of this assessment based on low concentrations below the RDL. Therefore, these constituents may be excluded from further vapor intrusion assessment.

5.6 Uncertainty Analysis

Based on this preliminary screening level risk assessment, it appears that TCE, PCE, arsenic and lead would be retained as primary COPCs in groundwater for a BHHRA. Similarly, TCE and PCE would be retained for further analysis in a baseline assessment of vapor intrusion risks and health hazards. However, site-specific exposure assumptions and factors could result in reduced risks for these constituents or their elimination from the list of COPCs. The presence of lead in domestic water supplies may be related to conveyance piping. Arsenic was detected in one sample at a concentration that is an order of magnitude higher than in any other samples and may be anomalous.

Potential risk associated with exposure to VOCs via vapor intrusion was calculated using generic conceptual model assumptions and default exposure parameters. EPA cautions that the calculated VISLs may be inappropriate where:

- Contaminant sources originate in landfills where methane is generated in sufficient quantities to induce advective transport in the vadose zone.

- Vapor-forming chemicals can be released within an enclosed space and the density of the chemicals' vapor may result in significant advective transport of the vapors downward through cracks and openings in floors and into the vadose zone.

- Leaking vapors originate from pressurized gas transmission lines.

In addition, residential building construction and the presence of preferred vapor migration pathways can greatly affect the vapor intrusion process and resulting indoor air quality and must be thoroughly

understood. The depth to groundwater and vadose zone soil characteristics may greatly reduce the actual risks and health hazards associated with vapor intrusion.

Contact with contaminated soil and ingestion of fruits and vegetables that have been irrigated with impacted domestic well water may increase the risk of exposure to COCs. A BHHRA will be required to address these uncertainties and refine the estimation of risk for individual properties in the DWSIA.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-7505P	RW-2172H	MW-116S	MW-116D	RW-2140H	RW-2203H
			Date:	7/13/2017	8/8/2017	8/11/2017	8/11/2017	8/11/2017	8/9/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	2.15	1.11	< 1	1.89	2.1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10 UJ	< 10	< 10	< 10	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50 UJ	< 50	< 50	< 50	< 50 UJ
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	6.69	2.93	< 1	5.68	2.5
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	0.502 J	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5
SW 8260B	Trichloroethene	µg/L		< 1	37.7	21.6	< 1	33.9	27.5
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-2151H	RW-7588P	RW-7244P	RW-7288P	RW-7310P	RW-7350P
			Date:	11/16/2017	7/14/2017	8/8/2017	7/14/2017	7/13/2017	8/3/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1-Dichloroethane	µg/L		0.284 J	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5 UJ
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10 UJ
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10 UJ
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50	< 50	< 50 UJ
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50	< 50	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10 UJ
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		3.85	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10	< 10 UJ	< 10	< 10	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50 UJ	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Tetrachloroethene	µg/L		4.66	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	R
SW 8260B	Trichloroethene	µg/L		34.4	< 1	< 1	< 1	< 1	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3 UJ
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	0.00614 J	< 0.01	< 0.01	< 0.01

NOTES:

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J = Estimated result.

MCL = Maximum Contaminant Level.

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RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-7492P	RW-7498P	MW-103S	MW-103D	RW-2076F	RW-2213F
			Date:	7/12/2017	7/12/2017	8/9/2017	8/9/2017	8/2/2017	8/2/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1 UJ	< 1 UJ
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5 UJ	< 5 UJ
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	1 UB	1 UB
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10	< 10 UJ	< 10 UJ	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50 UJ	< 50 UJ	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	0.471 J	< 1	< 1	< 1
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	0.972 J	< 1	1.16 UB
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Trichloroethene	µg/L		< 1	< 1	1.72	< 1	0.588 J	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-2172F	RW-7077P	RW-3259B	RW-8035P	PA-1	PA-3
			Date:	8/2/2017	8/2/2017	8/16/2017	8/1/2017	8/10/2017	8/10/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1 UJ	< 1 UJ	< 1	< 1 UJ	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50 UJ	< 50 UJ	< 50	< 50 UJ	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50	< 50
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5 UJ	< 5 UJ	< 5	< 5 UJ	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		1 UB	1 UB	< 1	1 UB	< 1	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10	< 10	< 10	< 10 UJ	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5 UJ	< 2.5	< 2.5 UJ	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		< 1	< 1	< 1	< 1	2.12	1.66
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	PA-4	RW-7776P	RW-7688P	RW-7586P	MW-115S	MW-115D
			Date:	8/10/2017	8/8/2017	8/8/2017	7/13/2017	8/15/2017	8/15/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	1 UB	1 UB
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10 UJ	< 10 UJ	< 10	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50 UJ	< 50 UJ	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	< 1	< 1	1.44	< 1
SW 8260B	Toluene	µg/L		0.513 J	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5 UJ	< 2.5	< 2.5	< 2.5	< 2.5 UJ	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		2.18	< 1	< 1	< 1	11.6	2.17
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-7677P	MW-106S	MW-106D	RW-7773P	RW-2237H	RW-7549P
			Date:	8/9/2017	8/15/2017	8/15/2017	8/15/2017	8/3/2017	7/14/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1 UJ	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1 UJ	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10 UJ	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50 UJ	< 50	< 50	< 50	< 50 UJ	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50
SW 8260B	Acrylonitrile	µg/L		< 10 UJ	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5 UJ	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		2.34	< 1	< 1	< 1	3.18 B	0.266 J
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10	< 10	< 10	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50 UJ	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		5.45	< 1	< 1	< 1	7.84	0.822 J
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5	< 2.5
SW 8260B	Trichloroethene	µg/L		33.8	< 1	< 1	< 1	44.3	5.5
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10 UJ	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-8000B	RW-8209P	RW-8249P	RW-2879M	RW-8030P	RW-8012P
			Date:	8/3/2017	8/2/2017	8/16/2017	8/11/2017	8/1/2017	8/3/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1 UJ	< 1 UJ	< 1	< 1	< 1 UJ	< 1 UJ
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5 UJ
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10 UJ
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10 UJ
SW 8260B	Acetone	µg/L		< 50 UJ	< 50 UJ	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50 UJ	< 50 UJ	< 50 UJ	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10 UJ
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Bromomethane	µg/L		< 5 UJ	< 5 UJ	< 5	< 5	< 5 UJ	< 5 UJ
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		1 UB	1 UB	< 1	< 1	1.16 UB	1 UJ
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Iodomethane	µg/L		< 10	< 10	< 10	< 10 UJ	< 10	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5 UJ
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	Tetrachloroethene	µg/L		0.786 J	< 1	< 1	< 1	2.67	0.381 J
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1 UJ
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5	R
SW 8260B	Trichloroethene	µg/L		4.65	< 1	< 1	< 1	16.4	2.08
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3 UJ
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	CW-2-EXT	RW-7953P	RW-8105PS	RW-8105PN	RW-0808A	RW-0712A
			Date:	8/10/2017	8/16/2017	8/11/2017	8/11/2017	8/8/2017	7/12/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50 UJ	< 50	< 50	< 50	< 50
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	1 UB	< 1	< 1	2.52	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10	< 10 UJ	< 10 UJ	< 10 UJ	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50	< 50	< 50 UJ	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		0.381 J	0.764 J	< 1	< 1	6.68	< 1
SW 8260B	Toluene	µg/L		0.493 J	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5	< 2.5
SW 8260B	Trichloroethene	µg/L		2.94	5.61	< 1	< 1	37.2	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-0802A	RW-0808B	RW-0816A	RW-0803A
			Date:	8/2/2017	8/8/2017	8/16/2017	8/3/2017
	VOCs - SW 8260						
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1 UJ	< 1	< 1	< 1 UJ
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50 UJ	< 50	< 50	< 50 UJ
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50 UJ	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5 UJ	< 5	< 5	< 5 UJ
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		1 UB	< 1	< 1	1 UB
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10 UJ	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50 UJ	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	< 1	0.47 J
SW 8260B	Toluene	µg/L		1.16 UB	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5 UJ	< 2.5
SW 8260B	Trichloroethene	µg/L		< 1	< 1	< 1	2.03
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3
	VOCs - SW 8011						
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

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J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

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UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-1
Analytical Results – VOCs in Groundwater
2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID: / Date:	EPA RSL Carcinogenic TR = 1 x 10 -6 µg/L	EPA RSL Noncarcinogenic THI (child) - 1 µg/L	MCL
	VOCs - SW 8260					
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		5.7 E-01	4.8 E+02	nl
SW 8260B	1,1,1-Trichloroethane	µg/L		nl	8.0 E+3	200
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		7.6 E-02	3.6 E+02	nl
SW 8260B	1,1,2-Trichloroethane	µg/L		2.8 E-01	4.1 E-01	5
SW 8260B	1,1-Dichloroethane	µg/L		2.8	3.8 E+03	nl
SW 8260B	1,1-Dichloroethene	µg/L		nl	2.8 E+02	7
SW 8260B	1,1-Dichloropropene	µg/L		nl	nl	nl
SW 8260B	1,2,3-Trichloropropane	µg/L		nl	6.2 E-01	nl
SW 8260B	1,2,4-Trichlorobenzene	µg/L		1.2	4	70
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		3.3 E-04	3.7 E-01	nl
SW 8260B	1,2-Dibromoethane	µg/L		7.5 E-03	1.7 E+01	0.05
SW 8260B	1,2-Dichlorobenzene	µg/L		nl	3.0 E+02	600
SW 8260B	1,2-Dichloroethane	µg/L		1.7 E-01	1.3 E+01	5
SW 8260B	1,2-Dichloropropane	µg/L		8.5 E-01	8.2	nl
SW 8260B	1,3-Dichlorobenzene	µg/L		nl	nl	nl
SW 8260B	1,3-Dichloropropane	µg/L		nl	3.7 E+02	nl
SW 8260B	1,4-Dichlorobenzene	µg/L		4.8 E-01	5.7 E+02	nl
SW 8260B	2,2-Dichloropropane	µg/L		nl	nl	nl
SW 8260B	2-Butanone (MEK)	µg/L		nl	5.6 E+03	nl
SW 8260B	2-Hexanone	µg/L		nl	3.8 E+01	nl
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		nl	6.3 E+03	nl
SW 8260B	Acetone	µg/L		nl	1.4 E+04	nl
SW 8260B	Acetonitrile	µg/L		nl	1.3 E+02	nl
SW 8260B	Acrolein	µg/L		nl	4.2 E-02	nl
SW 8260B	Acrylonitrile	µg/L		5.2 E-02	4.1	nl
SW 8260B	Allyl Chloride	µg/L		7.3 E-01	2.1	nl
SW 8260B	Benzene	µg/L		4.6 E-01	3.3 E+01	5
SW 8260B	Bromochloromethane	µg/L		nl	8.3 E+01	nl
SW 8260B	Bromodichloromethane	µg/L		1.3 E-01	3.8 E+02	80
SW 8260B	Bromoform	µg/L		3.3	3.8 E+02	80
SW 8260B	Bromomethane	µg/L		nl	7.5	nl
SW 8260B	Carbon Disulfide	µg/L		nl	8.1 E+02	nl
SW 8260B	Carbon tetrachloride	µg/L		4.6 E-01	4.9 E+01	5
SW 8260B	Chlorobenzene	µg/L		nl	7.8 E+01	100
SW 8260B	Chlorodibromomethane	µg/L		nl	nl	nl
SW 8260B	Chloroethane	µg/L		nl	nl	nl
SW 8260B	Chloroform	µg/L		2.2 E-01	9.7 E+01	80
SW 8260B	Chloromethane	µg/L		nl	1.9 E+02	nl
SW 8260B	Chloroprene	µg/L		nl	nl	nl
SW 8260B	cis-1,2-Dichloroethene	µg/L		nl	3.6 E+01	70
SW 8260B	cis-1,3-Dichloropropene	µg/L		nl	3.6 E+02	nl
SW 8260B	Dibromomethane	µg/L		nl	8.3	nl
SW 8260B	Dichlorodifluoromethane	µg/L		nl	2.0E+02	nl
SW 8260B	Ethyl methacrylate	µg/L		nl	nl	nl
SW 8260B	Ethylbenzene	µg/L		1.5	8.1 E+02	700
SW 8260B	Iodomethane	µg/L		nl	nl	nl
SW 8260B	Isobutanol	µg/L		nl	5.9 E+03	nl
SW 8260B	Methacrylonitrile	µg/L		nl	1.9	nl
SW 8260B	Methyl methacrylate	µg/L		nl	1.4 E+03	nl
SW 8260B	Methylene chloride	µg/L		11	1.1 E+02	5
SW 8260B	Propionitrile	µg/L		nl	nl	nl
SW 8260B	Styrene	µg/L		nl	1.2 E+03	100
SW 8260B	Tetrachloroethene	µg/L		1.1 E+01	4.1 E+01	5
SW 8260B	Toluene	µg/L		nl	1.1 E+03	1000
SW 8260B	trans-1,2-Dichloroethene	µg/L		nl	3.6 E+02	100
SW 8260B	trans-1,3-Dichloropropene	µg/L		nl	nl	nl
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		1.3 E-03	nl	nl
SW 8260B	Trichloroethene	µg/L		4.9 E+01	2.8	5
SW 8260B	Trichlorofluoromethane	µg/L		nl	5.2 E+03	nl
SW 8260B	Vinyl Acetate	µg/L		nl	4.1 E+02	nl
SW 8260B	Vinyl Chloride	µg/L		1.9 E-02	4.4 E+01	2
SW 8260B	Xylene (Total)	µg/L		nl	1.9 E+02	10000
	VOCs - SW 8011					
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		3.3 E-04	3.7 E-01	0.2
SW 8011	1,2-Dibromoethane	µg/L		7.5 E-03	1.7 E+01	0.05

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

1. The EPA Screening Level (SL) shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

2. If a blank contains chemicals considered by EPA to be common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene and phthalate esters), the associated sample results are considered positive only if the concentration in the sample exceeds ten times the maximum amount detected in any blank.

3. If a blank contains detectable levels of any uncommon laboratory chemical, site sample results are considered positive only if the measured concentration in the sample exceeds five times the maximum amount detected in any blank. Samples containing less than five times the blank concentration should be classified as nondetects.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-2

Analytical Results – Inorganics

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID: / Date:	CW-2-EXT 8/10/2017	MW-103D 8/9/2017	MW-103S 8/9/2017	MW-106D 8/15/2017	MW-106S 8/15/2017	MW-115D 8/15/2017	MW-115S 8/15/2017	MW-116D 8/11/2017	MW-116S 8/11/2017	PA-1 8/10/2017	PA-3 8/10/2017	PA-4 8/10/2017
	ALKALINITY														
SM2320 B	Alkalinity, Total as $CaCO_3$	µg/L		283000	264000 B	285000 B	272000 B	269000 B	311000 B	341000 B	180000 B	341000 B	283000 B	286000 B	282000 B
	CYANIDE														
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	2.82 J	< 5	< 5	< 5
	METALS, TOTALS														
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.61 J	0.399 J	2.03	1.77 J	1.76 J	2.05	2.31	12.1	1.28 J	1.72 J	1.66 J	1.62 J
SW 6020	Barium, Total	µg/L		128	59.6	106	99	98.1	116	152	142	140	127	131	132
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	0.231 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Chromium, Total	µg/L		4.85	< 2	1.22 J	0.899 J	0.979 J	1.13 J	1.39 J	0.808 J	0.908 J	0.866 J	0.947 J	0.802 J
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	0.301 J	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		< 5	2.3 J	< 5	< 5	0.566 J	0.595 J	0.849 J	1.65 J	1.13 J	< 5	0.706 J	0.713 J
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SW 6020	Iron, Total	µg/L		90.6 J	458	< 100	32.8 J	< 100	< 100	< 100	1580	16.2 J	< 100	27.6 J	< 100
SW 6020	Lead, Total	µg/L		< 2	0.805 J	< 2	< 2	< 2	< 2	< 2	0.519 J	< 2	< 2	< 2	< 2
SW 6020	Manganese, Total	µg/L		1.56 J	90.4 B	5 UB	0.706 J	0.414 J	1.74 J	0.374 J	543	1.39 J	0.362 J	0.583 J	< 5
SW 6020	Nickel, Total	µg/L		< 2	0.678 J	< 2	< 2	< 2	< 2	< 2	0.956 J	0.649 J	< 2	< 2	< 2
SW 6020	Selenium, Total	µg/L		0.516 J	< 2	0.555 J	0.432 J	0.396 J	0.665 J	0.644 J	< 2	0.399 J	0.654 J	0.814 J	0.676 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		< 2	0.853 J	< 2	2 UB	2 UB	2 UB	2 UB	2 UB	2 UB	0.331 J	0.761 J	< 2
SW 6020	Vanadium, Total	µg/L		1.53 J	0.242 J	1.47 J	1.45 J	1.39 J	1.53 J	1.84 J	0.877 J	1.2 J	1.48 J	1.7 J	1.5 J
SW 6020	Zinc, Total	µg/L		< 25	37.9	< 25	< 25	< 25	< 25	< 25	8.08 J	< 25	< 25	< 25	< 25
	INORGANIC IONS														
SW 9056A	Chloride	µg/L		58300	61900	49800	47900 B	48900 B	62800 B	90900 B	81400	99800	52700	56800	57700
SW 9056A	Sulfate	µg/L		39500	36800	38500	36600	37800	42400	51300	4950 J	69200	37400	40400	39800

NOTES:

µg/L = microgram per liter.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-2

Analytical Results – Inorganics

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID: / Date:	RW-0712A 7/12/2017	RW-0802A 8/2/2017	RW-0803A 8/3/2017	RW-0808A 8/8/2017	RW-0808B 8/8/2017	RW-0816A 8/16/2017	RW-2076F 8/2/2017	RW-2140H 8/11/2017	RW-2151H 11/16/2017	RW-2172F 8/2/2017	RW-2172H 8/8/2017	RW-2203H 8/9/2017
	ALKALINITY														
SM2320 B	Alkalinity, Total as $CaCO_3$	µg/L		286000 B	264000	296000 B	360000 B	274000 B	187000 B	280000 B	350000 B	238000	279000	358000 B	201000 B
	CYANIDE														
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
	METALS, TOTALS														
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.54 J	1.73 J	1.88 J	1.12 J	1.93 J	< 2	1.93 J	1.06 J	0.476 J	1.84 J	1.14 J	0.303 J
SW 6020	Barium, Total	µg/L		110	98.2 B	113 B	163	108	130	97.6 B	143	198	85 B	161	45.3
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Chromium, Total	µg/L		0.592 J	0.646 J	0.921 J	0.65 J	< 2	< 2	0.722 J	< 2	0.562 J	0.629 J	< 2	< 2
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	1.77 J
SW 6020	Copper, Total	µg/L		36.3 J	3.56 J	3.07 J	1.75 J	8.63	3 J	17.6	2.3 J	13.1	17.5	1.61 J	4.39 J
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SW 6020	Iron, Total	µg/L		< 100	< 100	< 100	71.4 J	24.5 J	< 100	< 100	< 100	1090	24.4 J	63.9 J	23600
SW 6020	Lead, Total	µg/L		1.01 J	0.3 J	0.371 J	0.554 J	0.413 J	0.257 J	0.473 J	< 2	5.99	1.75 J	0.51 J	1.41 J
SW 6020	Manganese, Total	µg/L		0.352 J	5 UB	1.55 J	3.82 J	2.43 J	0.615 J	5 UB	1.09 J	27.6 B	5 UB	3.07 J	933 B
SW 6020	Nickel, Total	µg/L		< 2	< 2	< 2	1.11 J	< 2	< 2	< 2	0.449 J	1.06 J	< 2	0.805 J	2.73
SW 6020	Selenium, Total	µg/L		0.619 J	0.5 J	0.588 J	0.533 J	0.484 J	0.78 J	0.525 J	0.559 J	< 2	0.458 J	0.554 J	< 2
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		2 UB	2 UB	2 UB	< 2	0.415 J	2 UB	< 2	2 UB	2 UB	< 2	< 2	< 2
SW 6020	Vanadium, Total	µg/L		1.18 J	1.34 J	1.41 J	1.05 J	1.49 J	< 5	1.3 J	1.03 J	0.516 J	1.23 J	1.12 J	0.26 J
SW 6020	Zinc, Total	µg/L		133	25 UB	46.1 B	136	2.68 J	26.1	52.3 B	59.6	265 B	171 B	133	448
	INORGANIC IONS														
SW 9056A	Chloride	µg/L		45500 B	45200	60000	129000 B	45500 B	113000 B	47400	124000	95300	45800	131000 B	141000
SW 9056A	Sulfate	µg/L		34900	36000	41300 B	83100	35800	21800	37400	84400	31200	37700	83300	113000

NOTES:

µg/L = microgram per liter.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-2

Analytical Results – Inorganics

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID: / Date:	RW-2213F 8/2/2017	RW-2237H 8/3/2017	RW-2879M 8/11/2017	RW-3259B 8/16/2017	RW-7077P 8/2/2017	RW-7244P 8/8/2017	RW-7288P 7/14/2017	RW-7310P 7/13/2017	RW-7350P 8/3/2017	RW-7492P 7/12/2017	RW-7498P 7/12/2017	RW-7505P 7/13/2017
	ALKALINITY														
SM2320 B	Alkalinity, Total as $CaCO_3$	µg/L		268000 B	371000 B	230000	181000 B	274000 B	272000 B	284000 B	284000 B	271000 B	283000 B	290000 B	315000 B
	CYANIDE														
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
	METALS, TOTALS														
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.88 J	1.42 J	< 2	1.44 J	1.94 J	1.89 J	1.52 J	1.8 J	1.82 J	1.78 J	1.67 J	1.71 J
SW 6020	Barium, Total	µg/L		98.9 B	184 B	229	39.6	83.7 B	111	111	106	101 B	113	115	118
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Chromium, Total	µg/L		0.645 J	0.623 J	1.29 J	1.11 J	< 2	0.627 J	0.644 J	0.776 J	0.795 J	0.632 J	0.9 J	0.612 J
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		3.45 J	19.4	4.79 J	114	8.29	1.83 J	2.76 J	31.1	8.67	22.7	2.52 J	5.88
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SW 6020	Iron, Total	µg/L		< 100	34.1 J	650	1050	60.3 J	< 100	100 UB	< 100	15.8 J	< 100	< 100	< 100
SW 6020	Lead, Total	µg/L		< 2	< 2	5.05	12.9	0.766 J	< 2	< 2	0.378 J	0.667 J	1.26 J	0.349 J	0.294 J
SW 6020	Manganese, Total	µg/L		5 UB	1.62 J	20.5	8.01	1.71 J	4.15 J	2.26 J	0.432 J	5 UB	0.745 J	1.48 J	0.295 J
SW 6020	Nickel, Total	µg/L		< 2	0.876 J	2.13	0.575 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Selenium, Total	µg/L		0.382 J	< 2	3.73	< 2	< 2	0.661 J	0.536 J	0.429 J	< 2	0.498 J	< 2	0.444 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		< 2	2 UB	< 2	2 UB	2 UB	0.514 J	< 2	< 2	< 2	2 UB	2 UB	2 UB
SW 6020	Vanadium, Total	µg/L		1.43 J	1.27 J	0.353 J	1.41 J	1.13 J	1.52 J	1.35 J	1.32 J	1.43 J	1.31 J	1.29 J	1.18 J
SW 6020	Zinc, Total	µg/L		25 UB	30.3 B	1440	301	162 B	51.8	15.6 J	202	138 B	143	92.9	34
	INORGANIC IONS														
SW 9056A	Chloride	µg/L		45200	139000	294000	16400 B	44600	46000 B	46500	44800 B	45800	45300 B	45600 B	45600 B
SW 9056A	Sulfate	µg/L		36100	82300 B	66100	6890	37100	35400	35900	34900	34600	34800	34800	36200

NOTES:

µg/L = microgram per liter.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-2

Analytical Results – Inorganics

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-7549P	RW-7586P	RW-7588P	RW-7677P	RW-7688P	RW-7773P	RW-7776P	RW-7953P	RW-8000B	RW-8012P	RW-8030P	RW-8035P
			Date:	7/14/2017	7/13/2017	7/14/2017	8/9/2017	8/8/2017	8/15/2017	8/8/2017	8/16/2017	8/3/2017	8/3/2017	8/1/2017	8/1/2017
	ALKALINITY														
SM2320 B	Alkalinity, Total as $CaCO_3$	µg/L		306000 B	287000 B	286000 B	355000 B	271000 B	276000 B	265000 B	315000 B	287000 B	297000 B	311000 B	221000 B
	CYANIDE														
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5
	METALS, TOTALS														
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.67 J	1.76 J	1.67 J	1.58 J	1.86 J	1.79 J	1.68 J	1.69 J	1.6 J	1.79 J	1.49 J	0.261 J
SW 6020	Barium, Total	µg/L		131	112	107	187	108	98	117	133	125 B	121 B	136 B	134 B
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Chromium, Total	µg/L		0.781 J	0.641 J	0.71 J	< 2	0.577 J	0.673 J	0.797 J	1.41 J	0.766 J	0.943 J	0.911 J	< 2
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		77.2	2.54 J	5.39	1.42 J	7.69	2.49 J	1.63 J	1.26 J	1.85 J	4.09 J	5.95	10.9
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SW 6020	Iron, Total	µg/L		< 100	35.5 J	< 100	< 100	< 100	131	16 J	< 100	< 100	< 100	42.2 J	23 J
SW 6020	Lead, Total	µg/L		19.8	< 2	0.433 J	0.252 J	< 2	0.626 J	< 2	< 2	0.485 J	0.418 J	0.527 J	0.318 J
SW 6020	Manganese, Total	µg/L		5 UB	0.856 J	< 5	5 UB	5 UB	4.27 J	5 UB	0.272 J	5 UB	5 UB	1.74 J	2.74 J
SW 6020	Nickel, Total	µg/L		0.357 J	< 2	< 2	0.485 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Selenium, Total	µg/L		0.447 J	0.495 J	0.546 J	0.418 J	0.539 J	0.52 J	0.686 J	0.683 J	0.77 J	0.492 J	< 2	0.5 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		2.92	2 UB	< 2	< 2	< 2	2 UB	0.404 J	2 UB	< 2	2 UB	2 UB	2 UB
SW 6020	Vanadium, Total	µg/L		1.45 J	1.3 J	1.46 J	1.22 J	1.51 J	1.34 J	1.59 J	1.47 J	1.37 J	1.48 J	1.4 J	0.186 J
SW 6020	Zinc, Total	µg/L		403	9.59 J	47.8	37.5	< 25	111	11.3 J	< 25	25 UB	49.5 B	25 UB	22.5 J
	INORGANIC IONS														
SW 9056A	Chloride	µg/L		59900	45100 B	47600	123000 B	45500 B	46800 B	48200 B	82000 B	69900	59900	90600	66200
SW 9056A	Sulfate	µg/L		41800	34900	38000	61700	35800	35700	37200	48400 J	44200 B	41200 B	48500	24800

NOTES:

µg/L = microgram per liter.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-2

Analytical Results – Inorganics

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID: / Date:	RW-8105PN 8/11/2017	RW-8105PS 8/11/2017	RW-8209P 8/2/2017	RW-8249P 8/16/2017	MCL
	ALKALINITY							
SM2320 B	Alkalinity, Total as $CaCO_3$	µg/L		325000	298000	165000 B	189000 B	nl
	CYANIDE							
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	200
	METALS, TOTALS							
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	6
SW 6020	Arsenic, Total	µg/L		1.11 J	2.24	< 2	< 2	10
SW 6020	Barium, Total	µg/L		207	155	107 B	128	2000
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	4
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	5
SW 6020	Chromium, Total	µg/L		< 2	< 2	< 2	< 2	100
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	nl
SW 6020	Copper, Total	µg/L		13.9	< 5	267	3.26 J	1300
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	2
SW 6020	Iron, Total	µg/L		61.1 J	2080	81.4 J	< 100	nl
SW 6020	Lead, Total	µg/L		0.944 J	0.255 J	12	0.285 J	15
SW 6020	Manganese, Total	µg/L		3.16 J	196	5 UB	0.63 J	nl
SW 6020	Nickel, Total	µg/L		1.39 J	0.385 J	< 2	< 2	nl
SW 6020	Selenium, Total	µg/L		2.52	< 2	6.1	0.838 J	50
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	nl
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	2
SW 6020	Tin, Total	µg/L		< 2	< 2	2 UB	2 UB	nl
SW 6020	Vanadium, Total	µg/L		2.34 J	0.352 J	< 5	< 5	nl
SW 6020	Zinc, Total	µg/L		338	348	86.5 B	25.5	nl
	INORGANIC IONS							
SW 9056A	Chloride	µg/L		221000	77200	840000	113000 B	nl
SW 9056A	Sulfate	µg/L		88600	34900	214000	22000	nl

NOTES:

µg/L = microgram per liter.

B = Analyte is detected in an associated blank.

J = Estimated result.

MCL = Maximum Contaminant Level.

nl = not listed for the specific form of analyte.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

TABLE 5-3

Reasonable Maximum Exposure Assumptions

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Assumption	Adult	Child
Exposure Duration	26 years	6 years
Exposure Frequency	350 days/year	350 days
Exposure Time	24 hrs/day	24 hrs/day
Drinking Water Ingestion Rate	2.5 liters/day	0.78 liter/day
Inhalation rate	15 cubic meters/day	10 cubic meters/day
Water Exposure Time	0.71 hrs/bath or shower event	0.54 hrs/bath or shower event
Water Exposure Events	1/day	1/day
Expected Lifetime	70 years	6 years
Body weight	80 kilograms	15 kilograms
Averaging Time (lifetime)	25,550 days	2,190 days
Averaging Time (exposure duration)	10,950 days	2,190 days

TABLE 5-4

Analytical Results – Contaminants of Potential Concern in Groundwater

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-7505P	RW-2172H	MW-116S	MW-116D	RW-2140H	RW-2203H	RW-2151H	RW-7588P	RW-7244P	RW-7288P	RW-7310P
			Lab Sample:	L922572-05	L928991-04	L929552-03	L929552-04	L929552-02	L928991-12	L951790	L922695-03	L928991-03	L922695-04	L922572-07
			Date:	7/13/2017	8/8/2017	8/11/2017	8/11/2017	8/11/2017	8/9/2017	11/162017	7/14/2017	8/8/2017	7/14/2017	7/13/2017
	VOCs													
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	2.15	1.11	< 1	1.89	2.1	**3.85**	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	**6.69**	2.93	< 1	**5.68**	2.5	4.66	< 1	< 1	< 1	< 1
SW 8260B	Toluene	µg/L		<1	<1	<1	0.502 J	<1	<1	<1	<1	<1	<1	<1
SW 8260B	Trichloroethene	µg/L		< 1	**37.7**	**21.6**	< 1	**33.9**	**27.5**	**34.4**	< 1	< 1	< 1	< 1
	METALS													
SW 6020	Arsenic	µg/L		1.71 J	1.14 J	1.28 J	**12.1**	1.06 J	0.303 J	0.476 J	1.67 J	1.89 J	1.52 J	1.8 J
SW 6020	Lead, Total	µg/L		0.294 J	0.51 J	< 2	0.519 J	< 2	1.41 J	5.99	0.433 J	< 2	< 2	0.378 J

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

(1) The EPA Screening Level shown in this column is the carcinogenic target risk of 1 x 10-6 or the non-cancer child hazard index of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact and inhalation risks from the use of tap water.

(2) EPA cannot calculate a SL for Lead. EPA suggests using 15 µg/L, the Federal Primary Drinking Water Maximum Contaminant Level (MCL) as a screening level for water.

BOLD = Value exceeds one or both of the Tap Water RSL values (far right column).

µg/L = Microgram(s) per liter.

C = Value is based on a target excess cancer risk of 1 X 10^{-6}.

EPA = U.S. Environmental Protection Agency.

J = Estimated result.

na = Not available for this constituent.

NC = Value is based on a non-carcinogenic target hazard index of 0.1.

RSL = Regional Screening Level.

SL = EPA Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

VOCs = Volatile organic compounds.

Sum of the Ratios Calculations:

RW-2237H Total Cancer Risk = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ TR$

= (7.84/11 + 44.3/0.49 + 1.42/0.052) x 10-6 = 1.18 x 10-4

where: C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

RW-2237H Total Hazard Index = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ THQ$

= (7.84/4.1 + 44.3/0.28 + 1.42/0.6) x 0.33 = 16.2

where: THQ = target hazard quotient (0.1)
C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

TABLE 5-4

Analytical Results – Contaminants of Potential Concern in Groundwater

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-7350P	RW-7492P	RW-7498P	RW-0712A	MW-103S	MW-103D	RW-2076F	RW-2213F	RW-0802A	RW-2172F	RW-0808A
			Lab Sample:	L927108-06	L922572-03	L922572-02	L922572-05	L928991-08	L928991-10	L927108-04	L927145-07	L927145-08	L927108-09	L928991-05
			Date:	8/3/2017	7/12/2017	7/12/2017	7/12/2017	8/9/2017	8/9/2017	8/2/2017	8/2/2017	8/2/2017	8/2/2017	8/8/2017
	VOCs													
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1 UJ	< 1	< 1	<1	< 1	< 1	1 UB	1 UB	0.297 BJ	1 UB	2.52
SW 8260B	Tetrachloroethene	µg/L		< 1 UJ	< 1	< 1	<1	0.471 J	< 1	< 1	< 1	<1	< 1	**6.68**
SW 8260B	Toluene	µg/L		<1 UJ	<1	<1	<1	<1	0.972 J	<1	1.16 UB	1.16 B	<1	<1
SW 8260B	Trichloroethene	µg/L		< 1	< 1	< 1	<1	**1.72**	< 1	**0.588 J**	< 1	<1	< 1	**37.2**
	METALS													
SW 6020	Arsenic	µg/L		1.82 J	1.78 J	1.67 J	1.54 J	2.03	0.399 J	1.93 J	1.88 J	1.73 J	1.84 J	1.12 J
SW 6020	Lead, Total	µg/L		0.667 J	1.26 J	0.349 J	1.01 J	< 2	0.805 J	0.473 J	< 2	0.300 J	1.75 J	0.554 J

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

(1) The EPA Screening Level shown in this column is the carcinogenic target risk of 1 x 10-6 c of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact ar tap water.

(2) EPA cannot calculate a SL for Lead. EPA suggests using 15 µg/L, the Federal Primary Dr Contaminant Level (MCL) as a screening level for water.

BOLD = Value exceeds one or both of the Tap Water RSL values (far right column).

µg/L = Microgram(s) per liter.

C = Value is based on a target excess cancer risk of 1 X 10^{-6}.

EPA = U.S. Environmental Protection Agency.

J = Estimated result.

na = Not available for this constituent.

NC = Value is based on a non-carcinogenic target hazard index of 0.1.

RSL = Regional Screening Level.

SL = EPA Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

VOCs = Volatile organic compounds.

Sum of the Ratios Calculations:

RW-2237H Total Cancer Risk = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ TR$

= (7.84/11 + 44.3/0.49 + 1.42/0.052) x 10-6 = 1.18 x 10-4

where: C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

RW-2237H Total Hazard Index = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ THQ$

= (7.84/4.1 + 44.3/0.28 + 1.42/0.6) x 0.33 = 16.2

where: THQ = target hazard quotient (0.1)
C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

TABLE 5-4

Analytical Results – Contaminants of Potential Concern in Groundwater

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-0808B	RW-7077P	RW-3259B	RW-8035P	PA-1	PA-3	PA-4	RW-7776P	RW-7688P	RW-7586P	MW-115S
			Lab Sample:	L928991-07	L927108-05	L930223-08	L92145-02	L929120-04	L929120-03	L929120-02	L928991-02	L928991-06	L922572-06	L930223-05
			Date:	8/8/2017	8/2/2017	8/16/2017	8/1/2017	8/10/2017	8/10/2017	8/10/2017	8/8/2017	8/8/2017	7/13/2017	8/15/2017
	VOCs													
SW 8260B	cis-1,2-Dichloroethene	µg/L		<1	1 UB	< 1	1 UB	< 1	< 1	< 1	< 1	< 1	< 1	1 UB
SW 8260B	Tetrachloroethene	µg/L		<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.44
SW 8260B	Toluene	µg/L		<1	<1	<1	<1	<1	<1	0.513 J	<1	<1	<1	<1
SW 8260B	Trichloroethene	µg/L		<1	< 1	< 1	< 1	**2.12**	**1.66**	**2.18**	< 1	< 1	< 1	**11.6**
	METALS													
SW 6020	Arsenic	µg/L		1.93 J	1.94 J	1.44 J	0.261 J	1.72 J	1.66 J	1.62 J	1.68 J	1.86 J	1.76 J	2.31
SW 6020	Lead, Total	µg/L		0.413 J	0.766 J	12.9	0.318 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

(1) The EPA Screening Level shown in this column is the carcinogenic target risk of 1 x 10-6 c of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact ar tap water.

(2) EPA cannot calculate a SL for Lead. EPA suggests using 15 µg/L, the Federal Primary Dr Contaminant Level (MCL) as a screening level for water.

BOLD = Value exceeds one or both of the Tap Water RSL values (far right column).

µg/L = Microgram(s) per liter.

C = Value is based on a target excess cancer risk of 1 X 10^{-6}.

EPA = U.S. Environmental Protection Agency.

J = Estimated result.

na = Not available for this constituent.

NC = Value is based on a non-carcinogenic target hazard index of 0.1.

RSL = Regional Screening Level.

SL = EPA Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

VOCs = Volatile organic compounds.

Sum of the Ratios Calculations:

RW-2237H Total Cancer Risk = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ TR$

= (7.84/11 + 44.3/0.49 + 1.42/0.052) x 10-6 = 1.18 x 10-4

where: C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

RW-2237H Total Hazard Index = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ THQ$

= (7.84/4.1 + 44.3/0.28 + 1.42/0.6) x 0.33 = 16.2

where: THQ = target hazard quotient (0.1)
C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

TABLE 5-4

Analytical Results – Contaminants of Potential Concern in Groundwater

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	MW-115D	RW-7677P	MW-106S	MW-106D	RW-7773P	RW-2237H	RW-7549P	RW-8000B	RW-0803A	RW-8209P	RW-8249P
			Lab Sample:	L930223-06	L928991-11	L930223-02	L930223-03	L930223-04	L927108-05	L922695-02	L927108-05	L927108-04	L927108-06	L930223-09
			Date:	8/15/2017	8/9/2017	8/15/2017	8/15/2017	8/15/2017	8/3/2017	7/14/2017	8/3/2017	8/3/2017	8/2/2017	8/16/2017
	VOCs													
SW 8260B	cis-1,2-Dichloroethene	µg/L		1 UB	2.34	< 1	< 1	< 1	3.18 B	0.266 J	1 UB	0.444 BJ	1 UB	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	**5.45**	< 1	< 1	< 1	**7.84**	0.822 J	0.786 J	0.470 J	< 1	< 1
SW 8260B	Toluene	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
SW 8260B	Trichloroethene	µg/L		**2.17**	**33.8**	< 1	< 1	< 1	**44.3**	**5.5**	**4.65**	**2.03**	< 1	< 1
	METALS													
SW 6020	Arsenic	µg/L		2.05	1.58 J	1.76 J	1.77 J	1.79 J	1.42 J	1.67 J	1.6 J	1.88J	< 2	< 2
SW 6020	Lead, Total	µg/L		< 2	0.252 J	< 2	< 2	0.626 J	< 2	**19.8**	0.485 J	0.371 J	12	0.285 J

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

(1) The EPA Screening Level shown in this column is the carcinogenic target risk of 1 x 10-6 c of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact ar tap water.

(2) EPA cannot calculate a SL for Lead. EPA suggests using 15 µg/L, the Federal Primary Dr Contaminant Level (MCL) as a screening level for water.

BOLD = Value exceeds one or both of the Tap Water RSL values (far right column).

µg/L = Microgram(s) per liter.

C = Value is based on a target excess cancer risk of 1 X 10^{-6}.

EPA = U.S. Environmental Protection Agency.

J = Estimated result.

na = Not available for this constituent.

NC = Value is based on a non-carcinogenic target hazard index of 0.1.

RSL = Regional Screening Level.

SL = EPA Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

VOCs = Volatile organic compounds.

Sum of the Ratios Calculations:

RW-2237H Total Cancer Risk = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ TR$

= (7.84/11 + 44.3/0.49 + 1.42/0.052) x 10-6 = 1.18 x 10-4

where: C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

RW-2237H Total Hazard Index = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ THQ$

= (7.84/4.1 + 44.3/0.28 + 1.42/0.6) x 0.33 = 16.2

where: THQ = target hazard quotient (0.1)
C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

TABLE 5-4

Analytical Results – Contaminants of Potential Concern in Groundwater

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Method	Analyte	Units	Sample ID:	RW-2879M	RW-8030P	RW-8012P	CW-2-EXT	RW-0816A	RW-7953P	RW-8105PS	RW-8105PN	EPA RSL	
			Lab Sample:	L929120-09	L92145-03	L927108-03	L929120-05	L930223-10	L930223-11	L929120-07	L929120-08	Tap Water [1]	
			Date:	8/11/2017	8/1/2017	8/3/2017	8/10/2017	8/16/2017	8/16/2017	8/11/2017	8/11/2017	(C)	(NC)
	VOCs												
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	1.16 UB	1 UJ	< 1	<1	1 UB	< 1	< 1	na	3.6
SW 8260B	Tetrachloroethene	µg/L		< 1	2.67	0.381 J	0.381 J	<1	0.764 J	< 1	< 1	11	4.1
SW 8260B	Toluene	µg/L		<1	<1	<1 UJ	0.493 J	<1	<1	<1	<1	na	110
SW 8260B	Trichloroethene	µg/L		< 1	**16.4**	**2.08**	**2.94**	<1	**5.61**	< 1	< 1	0.49	0.28
	METALS												
SW 6020	Arsenic	µg/L		< 2	1.49 J	1.79 J	1.61 J	<2	1.69 J	2.24	1.11 J	0.052	0.6
SW 6020	Lead, Total	µg/L		5.05	0.527 J	0.418 J	< 2	0.257 J	< 2	0.255 J	0.944 J	na	15 [2]

NOTES:

< = Non-detects are reported as less than the laboratory reporting limit.

[1] The EPA Screening Level shown in this column is the carcinogenic target risk of 1 x 10-6 c of 0.1 for tap water, whichever is less. This number is the total of ingestion, dermal contact ar tap water.

[2] EPA cannot calculate a SL for Lead. EPA suggests using 15 µg/L, the Federal Primary Dr Contaminant Level (MCL) as a screening level for water.

BOLD = Value exceeds one or both of the Tap Water RSL values (far right column).

µg/L = Microgram(s) per liter.

C = Value is based on a target excess cancer risk of 1 X 10^{-6}.

EPA = U.S. Environmental Protection Agency.

J = Estimated result.

na = Not available for this constituent.

NC = Value is based on a non-carcinogenic target hazard index of 0.1.

RSL = Regional Screening Level.

SL = EPA Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ =Non-detected estimated.

VOCs = Volatile organic compounds.

Sum of the Ratios Calculations:

RW-2237H Total Cancer Risk = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ TR$

= (7.84/11 + 44.3/0.49 + 1.42/0.052) x 10-6 = 1.18 x 10-4

where: C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

RW-2237H Total Hazard Index = $\frac{Cw}{SLw} + \frac{Cx}{SLx} + \frac{Cy}{SLy} x\ THQ$

= (7.84/4.1 + 44.3/0.28 + 1.42/0.6) x 0.33 = 16.2

where: THQ = target hazard quotient (0.1)
C = site contaminant concentration (max)
SL = screening level
x, y, z = contaminants of concern

TABLE 5-5

Summary of Calculated Indoor Air Concentrations and Risks

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Sample ID	Groundwater Constituent	Groundwater Concentration (µg/L)	[1] Target Groundwater Concentration (µg/L)	[1] Calculated Indoor Air Concentration (µg/m^3)	[1] VI Carcinogenic Risk	[1] VI Non-cancer Hazard
RW-2237H	cis-1,2-DCE	3.18 B	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	7.84	9.5	3.46	3.2 E-7	8.29 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	44.3	0.80	11.6	2.43 E-5	5.6
RW-2172H	cis-1,2-DCE	2.15	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	6.69	9.5	2.95	2.73 E-7	7.07 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	37.7	0.80	9.88	2.07 E-5	4.74
RW-2151H	cis-1,2-DCE	3.85	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	4.66	9.5	2.06	1.9 E-7	4.93 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	34.4	0.80	9.02	1.88 E-5	4.32
RW-2140H	cis-1,2-DCE	1.89	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	5.68	9.5	2.5	2.32 E-7	6.0 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	33.9	0.80	8.88	1.86 E-5	4.26
RW-7677P	cis-1,2-DCE	2.34	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	5.45	9.5	2.4	2.23 E-7	5.76 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	33.8	0.80	8.86	1.85 E-5	4.25
RW-2203H	cis-1,2-DCE	2.10	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	2.50	9.5	1.1	1.02 E-7	2.6 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	27.5	0.80	7.21	1.51 E-5	3.46
MW-116S	cis-1,2-DCE	1.11	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	2.93	9.5	1.29	1.2 E-7	3.1 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	21.6	0.80	5.66	1.18 E-5	2.71
RW-8030P	cis-1,2-DCE	1.16 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	2.67	9.5	1.2	1.09 E-7	2.82 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	16.4	0.80	4.30	8.99 E-6	2.06
MW-115S	cis-1,2-DCE	1 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	1.44	9.5	0.635	5.88 E-8	1.52 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	11.6	0.80	3.04	6.35 E-6	1.46
RW-7953P	cis-1,2-DCE	1 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.764 J	9.5	0.337	3.12 E-8	8.08 E-3
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	5.61	0.80	1.47	3.07 E-6	0.71
RW-7549P	cis-1,2-DCE	0.266 J	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.822 J	9.5	3.62	3.36 E-7	8.69 E-2
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	5.50	0.80	1.44	3.01 E-6	0.69
RW-8000B	cis-1,2-DCE	1 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.786 J	9.5	0.347	3.21 E-8	8.31 E-3
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	4.65	0.80	1.22	2.55 E-6	0.58
CW-2-EXT	cis-1,2-DCE	<1	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.381 J	9.5	0.168	1.56 E-8	4.03 E-3
	Toluene	0.493 J	3080	0.0834	-- [3]	1.60 E-5
	Trichloroethene	2.94	0.80	0.77	1.61 E-6	0.37
PA-4	cis-1,2-DCE	<1	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	<1	9.5	0.00	0.00	0.00
	Toluene	0.513 J	3080	0.0868	-- [3]	1.66 E-5
	Trichloroethene	2.18	0.80	0.571	1.19 E-6	0.27

TABLE 5-5

Summary of Calculated Indoor Air Concentrations and Risks

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho

Sample ID	Groundwater Constituent	Groundwater Concentration (µg/L)	[1] Target Groundwater Concentration (µg/L)	[1] Calculated Indoor Air Concentration (µg/m^3)	[1] VI Carcinogenic Risk	[1] VI Non-cancer Hazard
MW-115D	cis-1,2-DCE	1 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	<1	9.5	0.00	0.00	0.00
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	2.17	0.80	0.569	1.19 E-6	0.27
PA-1	cis-1,2-DCE	<1	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	<1	9.5	0.00	0.00	0.00
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	2.12	0.80	0.555	1.16 E-6	0.27
RW-8012P	cis-1,2-DCE	1 UJ	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.381 J	9.5	0.168	1.56 E-8	4.03 E-3
	Toluene	<1 UJ	3080	0.00	-- [3]	0.00
	Trichloroethene	2.08	0.80	0.545	1.14 E-6	0.26
RW-0803A	cis-1,2-DCE	1 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.47 J	9.5	0.207	1.92 E-8	4.97 E-3
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	2.03	0.80	0.532	1.11 E-6	0.26
MW-103S	cis-1,2-DCE	<1	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	0.471 J	9.5	0.208	1.92 E-8	4.98 E-3
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	1.72	0.80	0.451	9.42 E-7	0.22
PA-3	cis-1,2-DCE	<1	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	<1	9.5	0.00	0.00	0.00
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	1.66	0.80	0.435	9.09 E-7	0.21
RW-2076F	cis-1,2-DCE	1 UB	-- [2]	-- [2]	-- [2]	-- [2]
	Tetrachloroethene	<1	9.5	0.00	0.00	0.00
	Toluene	<1	3080	0.00	-- [3]	0.00
	Trichloroethene	0.588 J	0.80	0.154	3.22 E-7	7.39 E-2

NOTES:

[1] Calculated values are adusted for an average groundwater temperature of 15.5 °C during sampling.

[2] There is no inhalation toxicity data available for cis-1,2-DCE. Therefore, a value cannot be calculated.

[3] Toluene is not classifiable as a human carcinogen and has no reference concentration (RfC). Therefore, a carcinogenic risk cannot be calculated.

µg/m^3 = Microgram(s) per cubic meter.

µg/L = Microgram(s) per liter.

°C = Degrees celsius.

B = Analyte is detected in an associated blank.

cis-1,2-DCE = cis-1,2-Dichloroethene.

J = Result is estimated.

RSL = EPA Regional Screening Level.

UB = Presence or absence cannot be determined due to blank contamination.

UJ = Non-detected estimated.

VI = Vapor intrusion.

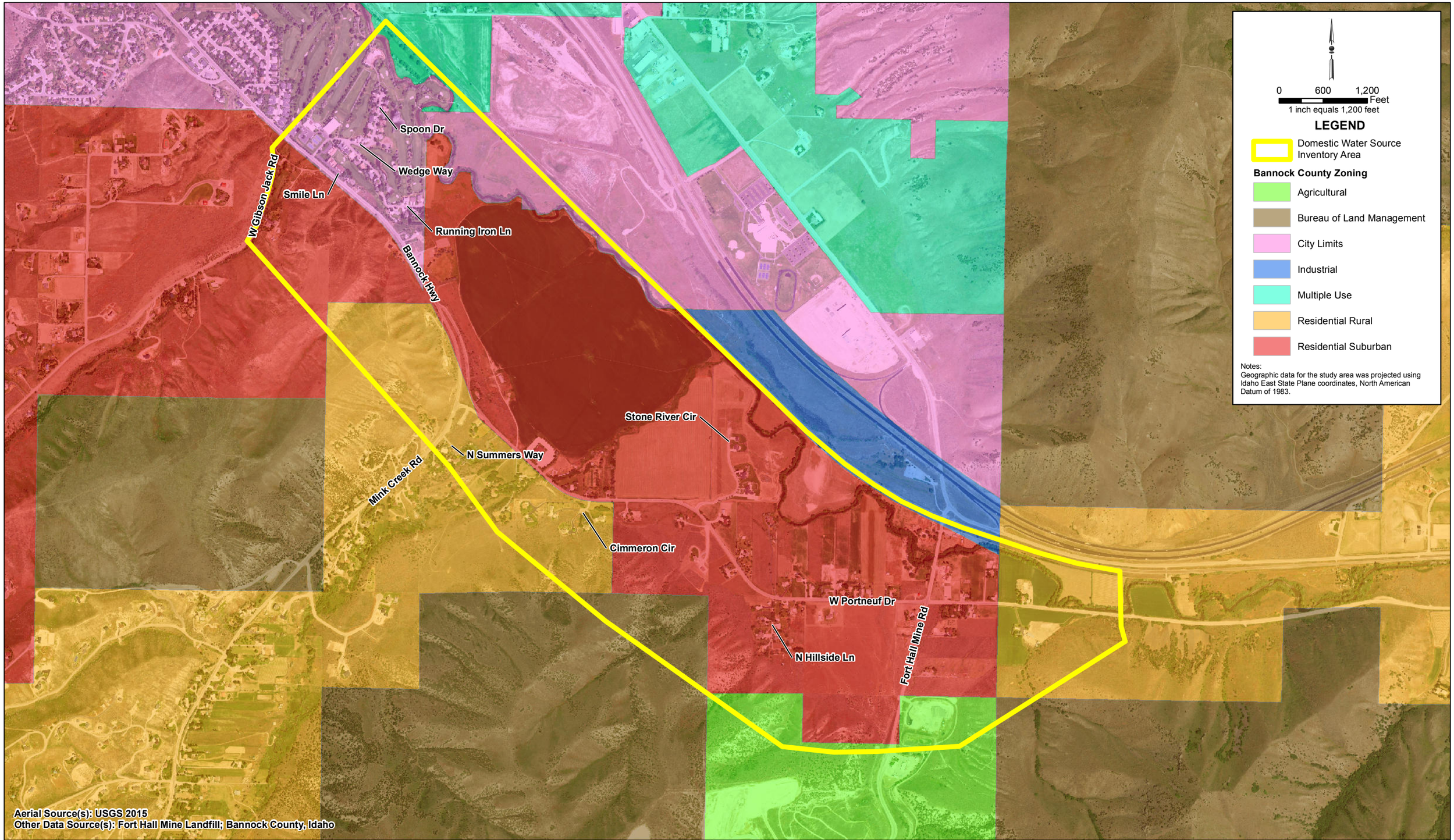


FIGURE 5-1
BANNOCK COUNTY CURRENT ZONING
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

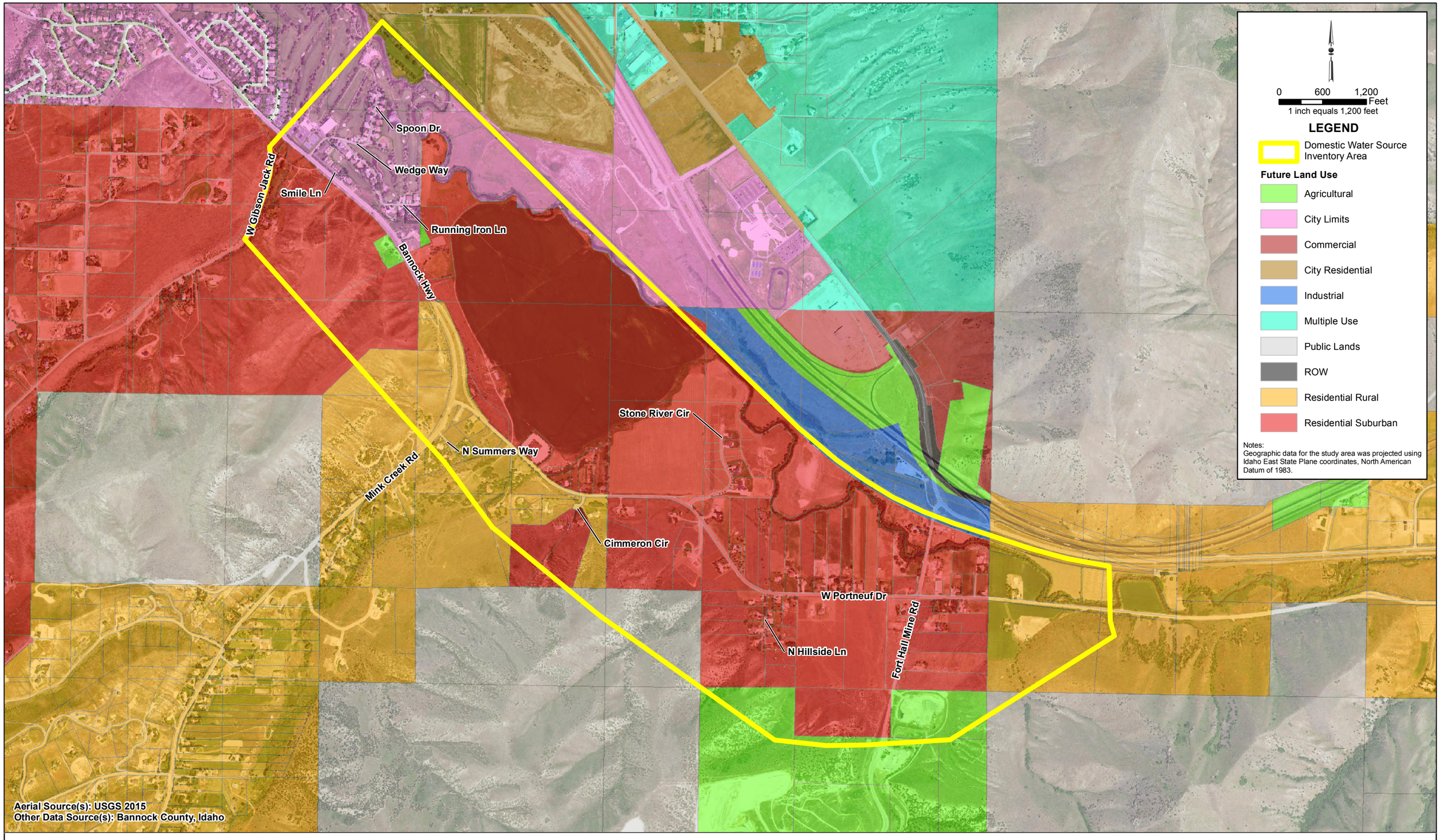


FIGURE 5-2
BANNOCK COUNTY FUTURE LAND USE PLAN
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

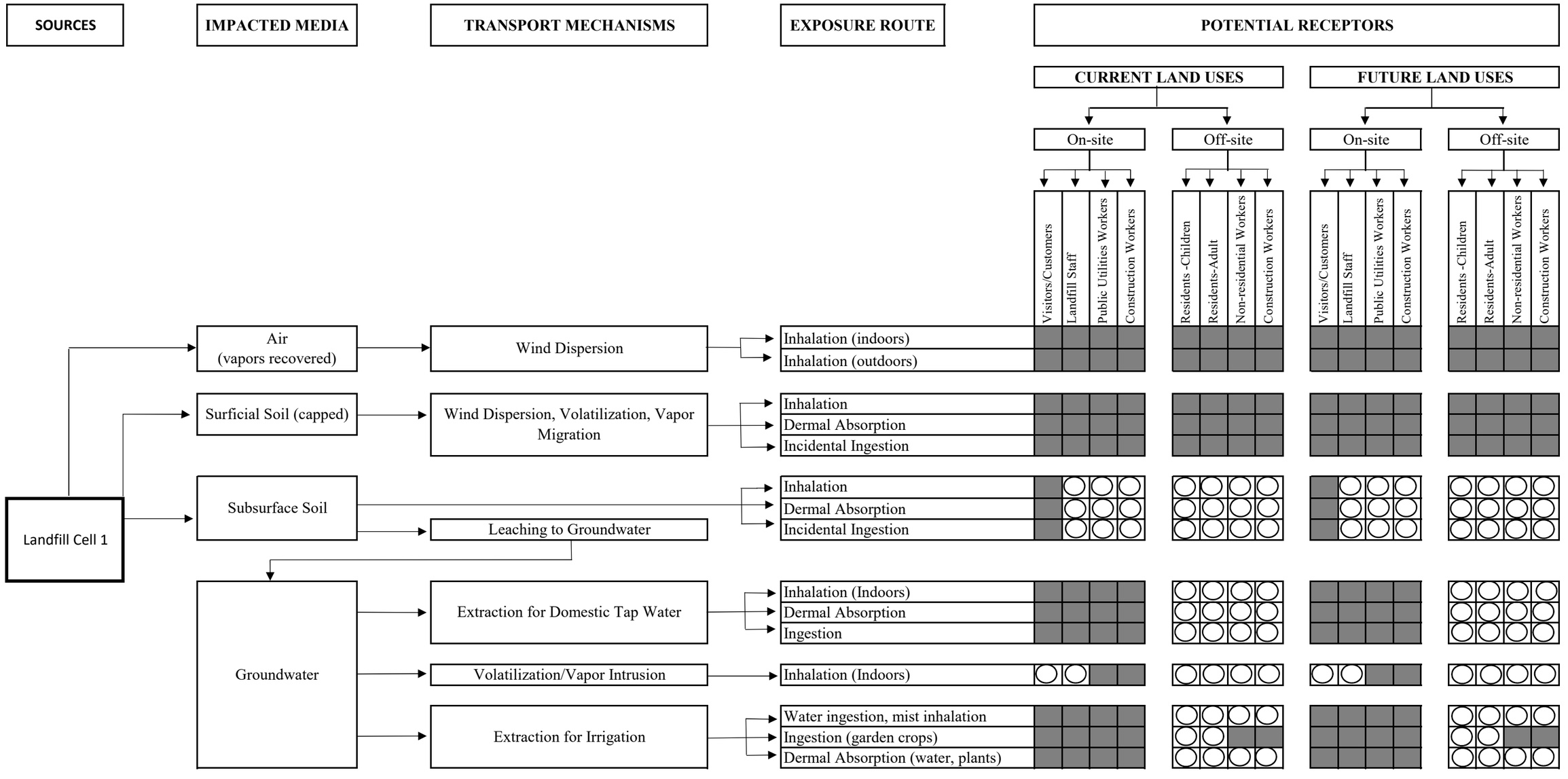


FIGURE 5-3
SITE CONCEPTUAL EXPOSURE MODEL / EXPOSURE PATHWAYS
2017 OFFSITE GROUNDWATER MONITORING REPORT
FORT HALL MINE LANDFILL, BANNOCK COUNTY, IDAHO

6.0 Conclusions

6.1 Results of 2017 Offsite Groundwater Monitoring Sampling Event

Based on the 2017 offsite monitoring event sampling results:

- Three properties with a domestic well and that are not connected to city water had VOC results above MCLs;
- Six properties with a domestic well and that are connected to city water had VOC results above MCLs;
- One property with a monitoring well and that is not connected to city water had a VOC result above its MCL;
- Six properties had VOC results above laboratory MDLs but below MCLs; and
- 20 properties had no VOCs detected above the laboratory RDL.

Lead was detected above its MCL in one domestic well and may be attributable to the property water system infrastructure and not FHML contamination.

Consent was not received to sample four domestic wells:

- RW-7474P (Property not connected to city water. Domestic-Single Residence, Stock Well. No Historical PCE or TCE data available);
- RW-7201P (Property not connected to city water. Domestic-Single Residence Well. No Historical PCE or TCE data available);
- RW-7455P (Property not connected to city water. Irrigation Well. No Historical PCE or TCE detected); and
- RW-7070B (Property connected to city water. Domestic-Single Residence Well. Historical PCE below MCL; TCE above MCL).

Impacts to groundwater in offsite domestic and monitoring wells continues as evidenced by TCE and PCE concentrations at certain locations above their respective MCLs. TCE concentrations in offsite domestic wells ranged from nondetect (22 of 34 wells) to 44.3 µg/L (RW-2237H). PCE concentrations ranged from nondetect (26 of 34 wells) to 7.84 µg/L (RW-2237H). TCE concentrations at offsite landfill nested monitoring wells ranged from non-detect to 21.6 µg/L (MW-116S) and PCE concentrations ranged from nondetect to 2.93 µg/L (MW-116S). TCE concentrations at FHML northern landfill property

boundary monitoring wells ranged from 4.1 (MW-117D) to 171 µg/L (MW-118D) and PCE concentrations ranged from 2.11 (MW-117D) to 28.3 (MW-118D) µg/L. Concentrations relative to prior sampling results varied across all monitoring locations as some were higher, some were lower, and some were more or less stable.

The current interpretation of the offsite TCE plume, based on results of the 2017 offsite groundwater sampling event, extends from the mouth of Fort Hall Mine Canyon northwestward, along the southwestern edge of the LPVA, extending at least 1.5 miles downgradient into the vicinity of the Juniper Hills golf course. The northern edge of the TCE plume, as defined as by TCE concentrations greater than 1 µg/L, has not been completely delineated, with the northern-most samples collected from the City of Pocatello monitoring wells located along the northern edge of the LDS agricultural field (Map Parcel Key 217) ranging from 2.12 µg/L up to 4.65 µg/L.

The current interpretation of the offsite PCE plume, based on the results of the 2017 offsite groundwater sampling event, extends from the mouth of Fort Hall Mine Canyon northwestward, similar to the TCE plume, along the southwestern edge of the LPVA, likely terminating somewhere beneath the LDS agricultural field.

6.2 Screening Level Risk Assessment

A screening level risk assessment was performed to identify and evaluate preliminary contaminants of concern that could present health risk to offsite residents. Potential receptors were identified within the area defined by IDEQ as the Drinking Water Source Inventory Area. This area includes approximately 1,063 acres in the Portneuf Valley and consists largely of suburban and rural residential properties. Potential contaminants of concern were identified based on detection of VOCs above the laboratory's reporting limit and metals above the MCLs. TCE and PCE are identified as primary contaminants of concern although cis-1,2-DCE may contribute to the overall risk of exposure to organic constituents. Arsenic and lead were detected in two samples and are incorporated into the screening level risk assessment; however, further evaluation will be required to determine if these metals are representative of actual aquifer conditions or can be screened out from further assessment.

The risk of exposure to COPCs is evaluated for adult and child residents and non-resident/construction workers through groundwater ingestion, inhalation and dermal exposure as well as inhalation of indoor air effected by groundwater vapor intrusion. Both excess cancer risk and non-carcinogenic health hazards due to direct exposure to groundwater are assessed through comparison with EPA Regional Screening Levels. The maximum total excess cancer risk for the most highly contaminated well is 1.18×10^{-4}, based on the concentrations of PCE, TCE and arsenic detected in a groundwater sample. This exceeds the residential target cancer risk of 1×10^{-6}. The maximum total non-carcinogenic hazard index is 16.2 based on concentrations of TCE, PCE, and arsenic in the sample. This exceeds the target hazard index of 1.0. These calculations only address potential risks of exposure to tap water.

TCE is the primary risk driver for vapor intrusion. Calculated cancer risks for TCE ranged from 3.0×10^{-7} to 2.3×10^{-5}. Similarly, calculated cancer risks for PCE ranged from 1.8×10^{-8} to 3.0×10^{-7}. The target risk value is 1×10^{-6}. The hazard quotient for TCE (non-carcinogenic health effects) ranged

from 0.069 to 5.2 in these samples and is compared to a target hazard quotient of 0.1. The hazard quotient for PCE ranged from 4.7×10^{-3} to 7.8×10^{-2}.

The screening level risk assessment is based on generic conceptual model assumptions incorporated into EPA's Regional Screening Levels and Vapor Intrusion Screening Level calculator. A more thorough BHHRA will likely be conducted when more groundwater and exposure pathway data has been collected. Site specific exposure factors used in a BHHRA could result in significantly lower residential risks and/or health hazards.

6.3 Data Gaps

The following data gaps have been identified in association with the uncertainties discussed above.

- The full extent of contamination, particularly the northern edge of the TCE plume and the lateral extent of the TCE plume beneath the LDS agriculture field, have not been delineated. Future site characterization efforts will be required to ensure that all areas at risk of water quality degradation are identified and assessed.

- The potential for impact to municipal wells in the lower Portneuf Valley by contaminant plumes originating from the FHML will need to be assessed as part of future site characterization efforts.

- The presence of lead and arsenic was detected above groundwater screening levels in samples collected from two wells. Additional monitoring and data analysis will be required to determine if these concentrations are anomalous, representative of actual groundwater conditions, or related to other factors such as conveyance piping.

- A BHHRA will be required to evaluate site-specific exposure factors and to quantify risks to:

    - Residential wells that are used as the sole source of household water;

    - Residential wells that are used only for irrigation purposes, including incidental exposure to irrigation water, ingestion of crops and dermal exposure to crops irrigated by this water.

    - Municipal wells in the Lower Portneuf Valley.

    - Residences above contaminated groundwater that may be at risk of vapor intrusion.

- A current and reliable database of offsite groundwater monitoring results is needed to support statistical analysis of off-site groundwater quality trends and a BHHRA. A minimum of eight monitoring events is typically required to support statistical analysis and to determine compliance with MCLs.

- Indoor air data are not currently available for offsite residences that are located above contaminated groundwater. The following information is needed to assess the risk of exposure to

vapor intrusion hazards: a) analysis of near-foundation soil gas samples; b) analysis of 24-hr indoor air samples; c) assessment of building construction to identify potential vapor intrusion pathways; and d) the presence of household chemicals that may be detected in indoor air samples and interfere with interpretation of analytical results.

7.0 Recommendations

Based on the results of the 2017 offsite groundwater monitoring activities, the following recommendations are presented for future interim offsite groundwater monitoring and characterization:

- Collect depth to water and depth to bottom of well measurements for all domestic wells to be sampled in the future. Consider surveying the wells for precise location coordinates and monitoring point elevations.

- Conduct an interim Offsite Groundwater Monitoring Event in 2018 in accordance with the schedule presented in Figure 7-1 and as detailed in Table 7-1, to include (at a minimum):

    - Sample all FHML Offsite monitoring wells.

    - Sample all domestic wells that had any detectable TCE or PCE in previous offsite groundwater monitoring events.

    - Sample the two additional domestic wells that IDEQ requested to be sampled in 2017, RW-7091R and RW-8048P.

    - Sample a subset of the residential wells that had no contaminants in the 2017 Offsite groundwater monitoring event, to assess for variability in the lateral extents of the TCE and PCE plumes.

    - Sample any additional residential wells to establish lateral and vertical Offsite plume extent.

- Seek permission from the property owner of RW-2203H (Map Parcel Key ID 7) to convert the unused domestic well into a monitoring well for future Offsite groundwater monitoring. Conversion of this domestic well would include (but not be limited to):

    - Removing any unused pumps or other equipment from the domestic well;

    - Rehabilitating the well to remove the extensive biofouling observed during the 2017 sampling event; and

    - Confirm the integrity and construction of the monitoring well using a down-hole camera.

- Investigate the extent of suspected biofouling in offsite monitoring well MW-116D using a downhole camera and rehabilitate if needed.

- Sample all City of Pocatello monitoring wells (and the extraction well and injection well) located along the northern border of the LDS agricultural property (Map Parcel Key ID 210).

- Continue to assess the risks to human health and the environment based on past, present, and future groundwater contaminant concentrations, refining the calculated risks based upon site-specific exposure factors.

- Investigate the nature of potential human health risks due to vapor intrusion in the following four phases:

    - Phase 1: Evaluate existing data, assess VI potential and preliminary risk consistent with EPA guidance (EPA 2015).

        - Evaluate existing soil and groundwater data to support the development of model input parameters.

        - Assess existing data quality.

        - Establish source strength (concentrations of COCs beneath at-risk residences) and proximity.

        - Establish criteria for effected area based on vertical and lateral distance from plume (e.g., 100 ft. lateral).

        - Assess the type of building construction (i.e., basement, crawl space, slab on grade) of at-risk residences.

        - Identify potential vapor entry points (underground utilities and piping, sewer lines, foundation cracks, sumps, crawl spaces, etc.).

        - Identify the subsurface soil types/lithology present between the water table and foundation of at-risk residences. This may require extrapolation of borehole log information from nearby monitoring wells, if residential well logs are not available or do not provide the necessary detail.

        - Conduct mathematical modeling to estimate potential indoor air concentrations.

        - Compare modeled concentrations to risk-based screening levels for resident air.

        - Based on multiple lines of evidence from the data evaluation, determine if the vapor intrusion pathway is potentially complete and risk screening levels are exceeded.

    A Schedule for completion of Phase 1 of the vapor intrusion investigation is provided as Figure 7-2.

- Phase 2: If potentially complete pathways are identified above risk screening levels from the data evaluation, prepare a work plan detailing the investigative approach and any additional sampling and sampling methodologies needed to generate input for risk assessment modeling.

    - Submit work plan to IDEQ for review and approval prior to conducting any field activities.

    - Collect soil gas samples immediately adjacent to at-risk residences using direct push technology and passive soil gas samplers to determine if contaminants from groundwater have caused measurable VOCs in the vadose zone. Assess the distribution of soil gas contaminant concentrations to a reasonable depth below the foundation.

    - Collect ambient outdoor air samples upwind of residence to determine if contaminants of concern are present at anthropogenic background levels, i.e. not related to groundwater dissolution and soil gas, which might influence indoor air sample results.

    - Evaluate soil gas and ambient outdoor air data.

- Phase 3: If soil gas sampling results confirm pathways exist with results above risk screening levels, prepare a work plan and sampling protocol for collecting indoor air samples from at-risk residences to determine if volatile organics are present in indoor air and if they differ from groundwater, soil gas and outdoor air COCs.

    - Submit the work plan to IDEQ for review and approval prior to conducting any field activities.

    - Use SUMMA canisters to collect 24-hr samples or passive air sampling techniques to collect time-integrated samples over a 1 to 2-week period from breathing zone air in the lowest habitable space(s) of selected at-risk residences.

    - Compare indoor air sample results to soil gas and ambient outdoor air results and EPA's RSLs for residential air at a 1×10^{-6} excess lifetime cancer risk and a target hazard index of 1.0.

    - If elevated indoor air concentrations are identified, consider the need to and feasibility of identifying possible indoor air sources and removing them from the residence.

    - Consider the need for additional rounds of indoor air sampling to determine seasonal variability affecting long-term exposure.

- Determine the need for interim response actions to protect human health.

- Phase 4: Conduct a BHHRA for the vapor intrusion pathway to quantify risk and develop appropriate risk-based screening levels and risk-based action levels.

  - Perform risk assessment calculations consistent with equations described in EPA Risk Assessment Guidance for Superfund Volume 1 (EPA 1989, 1991a, 2009).

  - Use current toxicity and exposure assumptions in the risk calculations to develop a reasonable maximum exposure scenario for receptors.

  - Consider multiple lines of evidence to support the uncertainty analysis. Lines of evidence may include as data from multiple groundwater sampling events, soil gas sampling, ambient outdoor air sampling, indoor air sampling; building construction and vapor entry points; subsurface soil types and properties (related bulk density, vadose permeability, organic carbon content), etc.

- Based on the resulting action levels, determine if long-term corrective measures will be required to protect the health of residents in potentially affected area(s).

- Determination if the vapor intrusion pathway is potentially complete and risk screening levels are exceeded will be presented in the 2018 Offsite Groundwater Monitoring Report. If necessary, soil gas and ambient outdoor air sampling will occur concurrent with planned site characterization activities. Indoor air sampling and BHHRA would begin within a year after completion of the soil gas and ambient outdoor air sampling if it is determined to be required.

- Conduct at least two supplemental offsite groundwater sampling events during 2018 to assess the seasonal variability of groundwater contaminant concentrations (and thus varying human health risk throughout the year) for the subset of wells identified in Table 7-1 and in accordance with the schedule presented in Figure 7-1. The existing datasets for offsite locations were evaluated for indications of seasonal variation; however, representative data points across multiple seasons over multiple years is not consistently available for most locations and where available (MW-103S, MW-116S, RW-2076F; RW-8030P), no seasonal variability is apparent. To establish the subset of wells to be sampled during the supplemental offsite groundwater sampling events in 2018, locations with no previous positive PCE or TCE detections, on property not accessible for certain seasons (i.e. city wells on the LDS Church Farm), where property owners did not grant permission to sample during 2017, or already monitored quarterly (MW-103S) as part of other program requirements were eliminated. From the remaining locations, the following were selected:

  - RW-2140H, RW-2151H, RW-2172H, RW-2203H, RW-2237H, RW-7677P, RW-8030P, MW-115S, and MW-116S because of their relatively higher TCE concentrations in 2017 and relative closer proximity to the landfill;

- RW-7505P, RW-7549P, RW-7953P, and RW-8012P because of their location near or outside the estimated plume extents and cross gradient relative to higher TCE concentrations in 2017; and

- RW-2076F as it has had the highest historical offsite TCE concentration.

Based on the results, future supplemental offsite groundwater sampling events to assess the seasonal variability of groundwater contaminant concentrations may be conducted and may include additional wells beyond the current estimated plume extents that are nondetect for TCE or are located further downgradient. Samples will be analyzed for VOCs at a minimum.

TABLE 7-1

Sampling and Analysis Plan for 2018 Offsite Groundwater Monitoring - Annual Event

Fort Hall Mine Landfill Offsite Groundwater Monitoring Work Plan, Bannock County, Idaho

Parcel (Map Key from Table 3-1)	Well Identification	Sample Depth (ft bmp)	Current Parcel Owner	House #	Street	Direction	Sampling Methodology	FD	MS/MSD	Date Sampled	SW8260B App I (VOCs), HCl, 3x40-mL Amber VOA vials, 14 days. (1)	SW8011 (VOCs), Na2S2O3, 3x40-mL Amber, 14 days. (2)	SW6020 (Total Metals), HNO3, 250-mL HDPE, 180 days. (3)	SW7470A (Mercury), HNO3, 250-mL HDPE, 28 days.	4500CN E-2011 (Cyanide), NaOH Pellets, 250-mL Dark Plastic, 14 days.	SW6020 (Cations), HNO3, 250-mL HDPE, 180 days. (4)	SW9056A (Chloride, Sulfate), None, 125-mL HDPE, 28 days.	SM 2320B (Alkalinity) None, 125-mL HDPE, 14 days.	Field Parameters (5)
3	**RW-7505P**		LARKIN, MIKE	7505	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
4	**RW-2172H**		PAULSEN, KIM W	2172	HILLSIDE LN	N	S				X	X	X	X	X	X	X	X	X
5	**MW-116S**		GARDNER, CYNTHIA JANE	2140	HILLSIDE LN	N	LF	FD			X	X	X	X	X	X	X	X	X
	MW-116D						LF		MS/MSD		X	X	X	X	X	X	X	X	X
6	**RW-2140H**		GARDNER, CYNTHIA JANE	2140	HILLSIDE LN	N	S				X	X	X	X	X	X	X	X	X
7	**RW-2203H**		BRADISH, RAE J	2203	HILLSIDE LN	N	S				X	X	X	X	X	X	X	X	X
9	**RW-2151H**		GARDNER, PAUL E JR	2151	HILLSIDE LN	N	S				X	X	X	X	X	X	X	X	X
20	MW-103S		HOSSEINZADEH, AHMAD	2108	FORT HALL MINE RD	N	LF				X	X	X	X	X	X	X	X	X
	MW-103D						LF				X	X	X	X	X	X	X	X	X
21	**RW-2076F**		STEED, KARI LYNN	2076	FORT HALL MINE RD	N	S				X	X	X	X	X	X	X	X	X
24	RW-7201P		STANGER, DAVID B	7201	PORTNEUF RD	W	S	FD			X	X	X	X	X	X	X	X	X
	MW-108S						LF				X	X	X	X	X	X	X	X	X
	MW-108D						LF				X	X	X	X	X	X	X	X	X
26	RW-2213F		JENSON, JOHN W	2213	FORT HALL MINE RD	N	S				X	X	X	X	X	X	X	X	X
29	RW-2172F		MYERS, ROBERT W	2172	FORT HALL MINE RD	N	S		MS/MSD		X	X	X	X	X	X	X	X	X
46	**MW-115S**		THOMPSON, ROBERT LEE	7775	PORTNEUF RD	W	LF				X	X	X	X	X	X	X	X	X
	MW-115D						LF				X	X	X	X	X	X	X	X	X
60	RW-8035P		STREVA, PAUL	8035	PORTNEUF RD	W	S	FD			X	X	X	X	X	X	X	X	X
88	RW-7455P		STANGER, DAVID B	7455	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
	MW-107S						LF				X	X	X	X	X	X	X	X	X
	MW-107D						LF				X	X	X	X	X	X	X	X	X
97	RW-7688P		HOWARD, KERT W	7688	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
98	RW-7586P		SUTTON, RICHARD THOMAS	7586	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
99	**RW-7677P**		LANCE, KELLY G	7677	PORTNEUF RD	W	S	FD			X	X	X	X	X	X	X	X	X
100	RW-7773P		MUNN, DAVID	7773	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
	MW-106S						LF				X	X	X	X	X	X	X	X	X
	MW-106D						LF				X	X	X	X	X	X	X	X	X
101	**RW-2237H**		WINWARD, ROBERT H	2237	HILLSIDE LN	N	S				X	X	X	X	X	X	X	X	X
103	**RW-7549P**		BROWNING, C REX	7549	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
115	RW-8000B		L D S CHURCH	8000	BANNOCK HWY		S				X	X	X	X	X	X	X	X	X
143	RW-7091R		HARRIS, SHAD	7091	RUNNING IRON LN		S				X	X	X	X	X	X	X	X	X
157	RW-7070B		SPRAGUE, DON	7070	BANNOCK HWY		S				X	X	X	X	X	X	X	X	X
199	RW-8249P		NORVICK, ALBERT	8249	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
205	**RW-8030P**		NELSON, GREGORY A	8030	PORTNEUF RD	W	S	FD			X	X	X	X	X	X	X	X	X
206	**RW-8012P**		HOKANSON, JON R	8012	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
210	CW-1-INJ		L D S CHURCH		No Street; By RR		LF				X	X	X	X	X	X	X	X	X
	CW-2-EXT						LF				X	X	X	X	X	X	X	X	X
	PA-1	141					LF				X	X	X	X	X	X	X	X	X
	PA-2	127					LF				X	X	X	X	X	X	X	X	X
	PA-3	61					LF				X	X	X	X	X	X	X	X	X
	PA-4/70	70					LF				X	X	X	X	X	X	X	X	X

TABLE 7-1

Sampling and Analysis Plan for 2018 Offsite Groundwater Monitoring - Annual Event

Fort Hall Mine Landfill Offsite Groundwater Monitoring Work Plan, Bannock County, Idaho

Parcel (Map Key from Table 3-1)	Well Identification	Sample Depth (ft bmp)	Current Parcel Owner	House #	Street	Direction	Sampling Methodology	FD	MS/MSD	Date Sampled	SW8260B App I (VOCs), HCl, 3x40-mL Amber VOA vials, 14 days. (1)	SW8011 (VOCs), Na2S2O3, 3x40-mL Amber, 14 days. (2)	SW6020 (Total Metals), HNO3, 250-mL HDPE, 180 days. (3)	SW7470A (Mercury), HNO3, 250-mL HDPE, 28 days.	4500CN E-2011 (Cyanide), NaOH Pellets, 250-mL Dark Plastic, 14 days.	SW6020 (Cations), HNO3, 250-mL HDPE, 180 days. (4)	SW9056A (Chloride, Sulfate), None, 125-mL HDPE, 28 days.	SM 2320B (Alkalinity) None, 125-mL HDPE, 14 days.	Field Parameters (5)
210	PA-4/105	105	L D S CHURCH		No Street; By RR		LF				X	X	X	X	X	X	X	X	X
	PA-4/142	142					LF				X	X	X	X	X	X	X	X	X
	PA-5/43	43					LF				X	X	X	X	X	X	X	X	X
	PA-5/75	75					LF				X	X	X	X	X	X	X	X	X
	PA-6/37	37					LF				X	X	X	X	X	X	X	X	X
	PA-6/72	72					LF				X	X	X	X	X	X	X	X	X
	PA-7/174	174					LF	FD	MS/MSD		X	X	X	X	X	X	X	X	X
	PA-8/43	43					LF				X	X	X	X	X	X	X	X	X
	PA-8/83	83					LF				X	X	X	X	X	X	X	X	X
	PA-8/123	123					LF				X	X	X	X	X	X	X	X	X
214	**RW-7953P**		MUNN, DAVID C	7953	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
219	RW-2485C		SEMONS, MARK S	2485	CIMMERON CIR		S				X	X	X	X	X	X	X	X	X
220	RW-8048P		PEARSON, GERALD	8048	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
226	RW-8284P		DAVIS, EDDY D	8284	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
227	RW-8170P (6)		L D S CHURCH	8170	PORTNEUF RD	W	S				X	X	X	X	X	X	X	X	X
SAMPLE COUNT	**Subtotal:**										56	56	56	56	56	56	56	56	56
	FD:										6	6	6	6	6	6	6	6	0
	MS/MSD:										6	6	6	6	6	6	6	6	0
	TB:										10	10	0	0	0	0	0	0	0
	EB:										10	10	0	0	0	0	0	0	0
	SB:										2	2	0	0	0	0	0	0	0
	Total:										**90**	**90**	**68**	**68**	**68**	**68**	**68**	**68**	**56**

FD = 10 percent
MS/MSD = Every 20 Samples
TB = 1 per cooler w VOC samples
EB = 1 per sampling day
SB = 1 per source water container

NOTES:

Bold Well Identification: Indicates well will be sampled to evaluate seasonal variation; Only VOCs during seasonal events

(1) RCRA Appendix I VOCs per Worksheet #15 of the FHML Environmental Program QAPP

(2) VOCs to be analyzed via EPA Method 8011 include 1,2-dibromoethane and 1,2-dibromo-3-chloropropane only.

(3) RCRA Appendix I total metals per Worksheet #15 of the FHML Environmental Program QAPP

(4) Cations include calcium, iron, magnesium, manganese, potassium, and sodium.

(5) Field parameters include pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), specific conductivity, turbidity, and temperature.

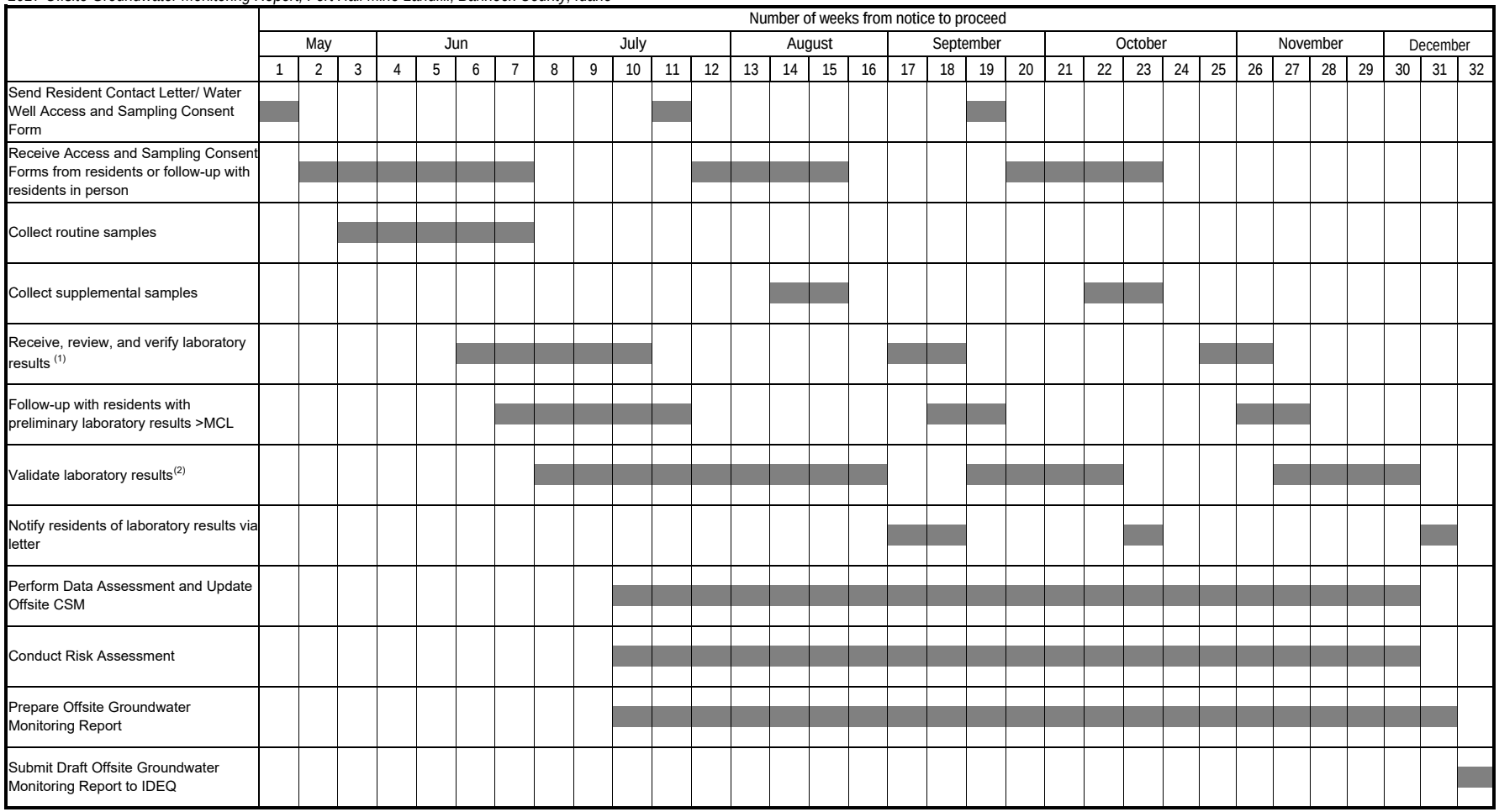
(6) Sample irrigation well(s) if possible.

EB = Equipment rinsate blank sample
FD = Field duplicate sample
FHML = Fort Hall Mine Landfill
HCl = Hydrochloric acid
HDPE = High density polyethylene container
HS = Hydrasleeve
HNO3 = Nitric acid
L = Liters
LF = Low flow sample method
mL = Milliliters
MS/MSD = Matrix spike/matrix spike duplicate sample
MW = Offsite landfill monitoring well
QAPP = Quality Assurance Program Plan
RW = Residential well
S = Spigot sample method
SB = Source water blank sample
RR = Railroad
TB = Trip blank sample
VOA = Volatile organic analysis container
VOCs = Volatile organic compounds
X = Required analysis

FIGURE 7-1

2018 Offsite Groundwater Monitoring Schedule

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho



NOTES:

(1) Laboratory data results will be reviewed and verified per Worksheet #35 of the FHML QAPP.

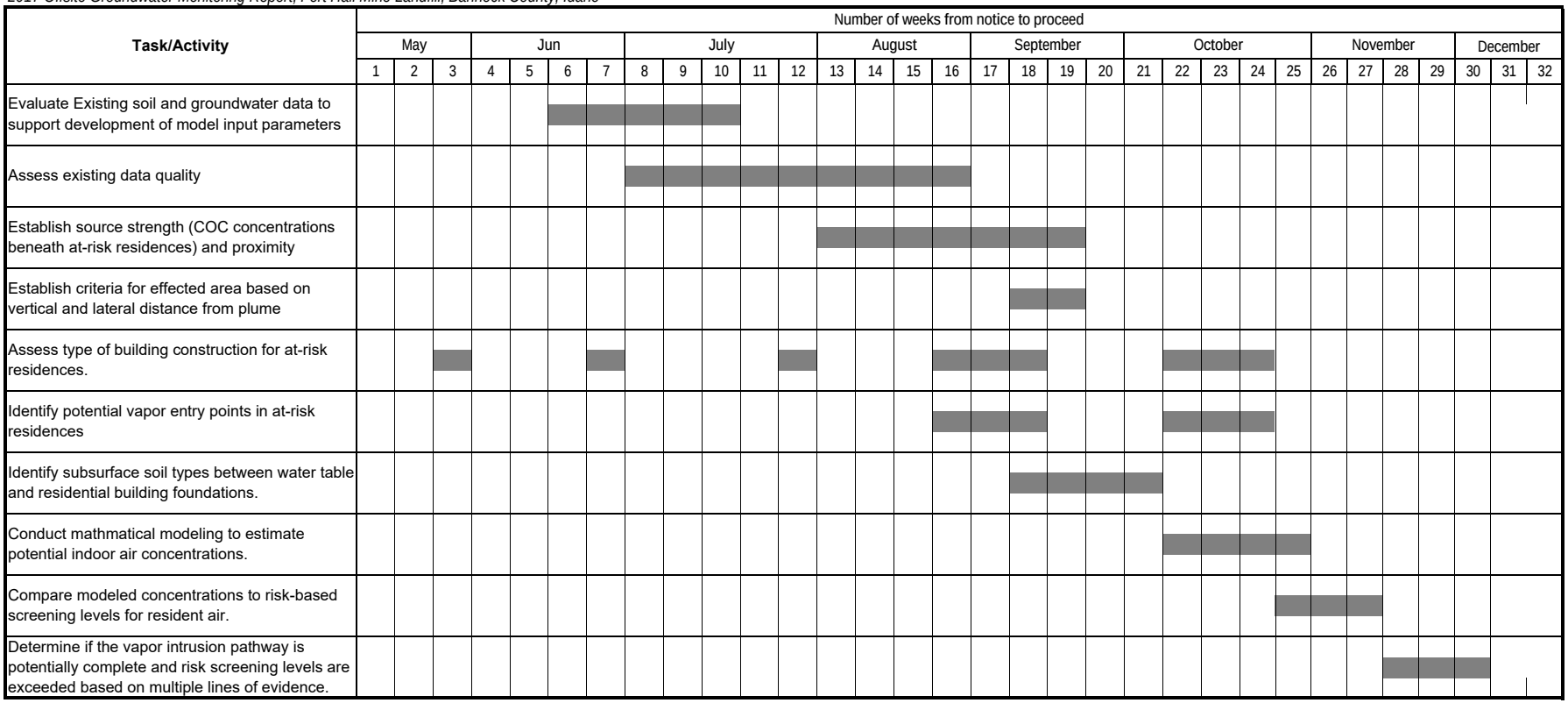
(2) Laboratory data results will be validated per Worksheet #36 of the FHML QAPP.

CSM = Conceptual site model
FHML = Fort Hall Mine Landfill
IDEQ = Idaho Department of Environmental Quality
MCL = Maximum Contaminant Level
QAPP = Quality Assurance Program Plan

FIGURE 7-2

2018 Vapor Intrusion Investigation Schedule (Phase I)

2017 Offsite Groundwater Monitoring Report, Fort Hall Mine Landfill, Bannock County, Idaho



NOTES:

8.0 References

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Appendix A
2017 Offsite Groundwater Monitoring Field Documentation

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APPENDIX A INDEX

Table	Title
A-1	Chain of Custody Forms Variances

Sub-Appendix	Title
A-1	Equipment Calibration Forms
A-2	Groundwater Sampling Logs
A-3	Chain of Custody Forms

Acronym	Definition
LF	low flow sampling method
LOCID	location identification
MS	matrix spike
MSD	matrix spike duplicate
S	spigot sample method
VOC	volatile organic compound
YSI	As measured by the YSI water quality sensor

TABLE A-1

Chain of Custody Forms Variances

2017 Offsite Groundwater Monitoring Field Documentation and Reported Data

Chain of Custody L Number	Comment
L929120	VOC results by SW846 Method 8011 for trip blank sample TB-20170810 were not reported due to possible cross contamination with another sample during sample preparation as determined by the laboratory. The samples associated with this trip blank are CW-2-EXT, EB-20170810, PA-1, PA-3, PA-4, RW-2879M, RW-8105PN, and RW-8105PS. The results for these samples may be biased high.

Sub-Appendix A-1
Equipment Calibration Forms

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: AGRL
Weather: Clear ~80

Project #: 1615
Date: 7-12-17
Time: 0930

Instrument: YSI Model #: EXO Serial #: 15J100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	11-4-17	26.752	144.9	1413	~~1413.0~~	1413.1
pH 4	10/2017	25.791	4.20	4.00	~~4.08~~	4.00
pH 7	11/7-17	25.912	6.94	~~7.00~~	~~7.08~~	7.98
pH 10	11-11-17	25.861	10.00	10.00	Y	9.99
ORP (240 mV)	5-24-17	26.851	240.2	2400	Y	2403
Turbidity (0 NTU)	11-22-17	26.175	0.15	0.0	Y	0.00
Turbidity (10 NTU)	11-22-17	25.192	9.26	10.0	Y	9.96
Turbidity (1000 NTU)	11-22-17	25.888	1026.4	1000.0	Y	1000.0
DO (at Saturation) - mg/L	N/A	23.672	81.8	/	Y	84.9
DO (Zero) - mg/L	10-24-17	26469	0.12	0.00	N/A	0.12

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 645.2

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: KDR
Weather: Clear ~70

Project #: 1615
Date: 7-13-17
Time: 0802

Instrument: YSI Model #: EXO Serial #: 14S100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	11.4.17	25.229	1351.6	1413	Y	1413.0
pH 4	10.31.17	26.701	3.85	4.00	Y	4.00
pH 7	9/2017	25.720	7.21	7.00	Y	7.00
pH 10	4/2019	25.190	9.98	10.00	Y	9.88
ORP (240 mV)	4/2022	27.559	242.6	240	Y	240.0
Turbidity (0 NTU)	11.22.17	26.913	0.12	0.0	Y	0.00
Turbidity (10 NTU)	11.22.17	27.297	9.59	10.0	Y	10.01
Turbidity (1000 NTU)	11.22.17	25.835	939.60	1000.0	Y	1000.1
DO (at Saturation) - mg/L	N/A	22.625	91.8	/	Y	85.0
DO (Zero) - mg/L	10.24.17	25.277	1.73	0.0	N/A	1.73

SC = Specific Conductivity
µS/cm = microsiemens per centimeter
ORP = Oxidation Reduction Potential
mV = millivolts
NTU = Nephelometric Units
DO = Dissolved Oxygen
mg/L = milligrams per liter

Barometric Pressure (mmHg): 646.3

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: ALORZ
Weather: Clear ~80

Project #: 1615
Date: 7.14.17
Time: 0730

Instrument: YSI Model #: EXO Serial #: 14J10023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	11.4.17	23.304	1359.9	1413	Y	1413.3
pH 4	10.31.17	23.713	3.98	4.00	Y	4.00
pH 7	9/2017	23.393	6.98	7.00	Y	7.00
pH 10	4/2019	23.923	9.95	10.00	Y	10.00
ORP (240 mV)	4/2022	24.543	246.0	240	Y	240.0
Turbidity (0 NTU)	11.22.17	24.579	0.05	0.0	Y	0.00
Turbidity (10 NTU)	11.22.17	24.858	9.51	10.0	Y	10.00
Turbidity (1000 NTU)	11.22.17	24.712	1014.9	1000.0	Y	1000.2
DO (at Saturation) - mg/L	N/A	21.984	80.6	/	Y	85.2
DO (Zero) - mg/L	~~23.440~~ 10.24.17	23.440	0.22	0.0	N/A	0.22

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*
µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 647.5

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: KDEZ
Weather: Clear ~ 75

Project #: 1615
Date: 8-1-17
Time: 0730

Instrument: YSI Model #: EXO Serial #: 14D100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	23.632	1379.9	1413	Y	1413.1
pH 4	10/31/17	23.695	3.98	4.00	Y	4.00
pH 7	9/2017	23.639	7.11	7.00	Y	7.00
pH 10	4/2019	23.732	10.10	10.00	Y	10.00
ORP (240 mV)	4/2022	23.379	244.1	240	Y	240.0
Turbidity (0 NTU)	11/22/17	23.685	0.29	0.0	Y	0.01
Turbidity (10 NTU)	11/22/17	23.692	10.09	10.0	Y	10.02
Turbidity (1000 NTU)	11/22/17	22.993	1039.9	1000.0	Y	1000.5
DO (at Saturation) - mg/L	N/A	22.937	85.3	-	Y	85.3
DO (Zero) - mg/L	5/2018	23.888	0.11	0.0	N/A	0.11

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 648.7

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: RLopez
Weather: Clear ~75

Project #: 1615
Date: 8-2-17
Time: 0745

Instrument: YSI Model #: EXO Serial #: 14J100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	24.682	1448.1	1413	Y	1413.1
pH 4	10-31-17	24.684	4.14	4.00	Y	4.00
pH 7	9/2017	24.992	6.99	7.00	Y	7.00
pH 10	4/2019	24.931	9.82	10.00	Y	10.00
ORP (240 mV)	4/2022	25.049	236.0	240	Y	239.9
Turbidity (0 NTU)	11/22/17	25.382	0.20	0.0	Y	0.02
Turbidity (10 NTU)	11/22/17	24.907	9.63	10.0	Y	9.99
Turbidity (1000 NTU)	11/22/17	23.941	888.66	1000.0	Y	1000.2
DO (at Saturation) - mg/L	N/A	20.636	85.1	-	Y	85.2
DO (Zero) - mg/L	5/2018	24.092	0.10	0.0	N/A	0.10

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 647.2

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: MLopez
Weather: Clear ~75

Project #: 1615
Date: 8-3-17
Time: 0730

Instrument: YSI Model #: EXO Serial #: 14J100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	23.477	1373.8	1413	Y	1413.4
pH 4	10-31-17	23.447	3.99	4.00	y	4.00
pH 7	9/2017	24.082	7.01	7.00	y	7.00
pH 10	4/2019	24.096	10.01	10.00	y	10.00
ORP (240 mV)	9/2022	23.415	241.3	240.0	y	240.0
Turbidity (0 NTU)	11/22/17	23.737	0.23	0.0	y	0.00
Turbidity (10 NTU)	11/22/17	23.883	11.01	10.0	y	10.01
Turbidity (1000 NTU)	11/22/17	23.766	1040.5	1000.0	y	1000.0
DO (at Saturation) - mg/L	N/A	21.343	84.9	/	y	85.0
DO (Zero) - mg/L	5/2017	23513	0.11	0.0	N/A	0.11

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 646.4

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: AKorz
Weather: Cloudy ~ 65

Project #: 1615
Date: 8-8-17
Time: 0730

Instrument: YSI Model #: EXO Serial #: 17H100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	23.676	1413.4	1413.0	Y	1413.0
pH 4	10-31-17	23.412	4.14	4.00	Y	4.00
pH 7	9/2017	23.473	7.03	7.00	Y	7.00
pH 10	4/2019	23.372	9.97	10.00	Y	10.02
ORP (240 mV)	4/2022	22.964	241.2	240	Y	240.0
Turbidity (0 NTU)	11/22/17	23.063	0.22	0.0	Y	0.01
Turbidity (10 NTU)	11/22/17	23.196	7.58	10.0	Y	10.00
Turbidity (1000 NTU)	11/22/17	22.958	1025.8	1000.0	Y	1000.0
DO (at Saturation) - mg/L	N/A	19.479	85.8	/	Y	85.1
DO (Zero) - mg/L	5/2017	23.142	0.10	0.0	N/A	0.10

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 646.6

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHMN
Personnel: HLOPEZ
Weather: PC ~ 60

Project #: 1615
Date: 8.9.17
Time: 0700

Instrument: YSI Model #: EXO Serial #: 14J100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12.20.17	14.861	1447.7	1413	Y	1413.1
pH 4	10.31.17	20.940	4.12	4.00	Y	4.00
pH 7	9/2017	20.960	7.03	7.00	Y	7.00
pH 10	4/2019	20.698	9.97	10.00	Y	10.00
ORP (240 mV)	4/2022	20.752	241.1	240	Y	240.0
Turbidity (0 NTU)	11/22/17	21.012	2.39	0.0	Y	0.01
Turbidity (10 NTU)	11/22/17	20.884	9.85	10.0	Y	9.95
Turbidity (1000 NTU)	11/22/17	20.583	952.03	1000	Y	1000.5
DO (at Saturation) - mg/L	N/A	17.147	86.0	/	Y	85.1
DO (Zero) - mg/L	5/2017	20.160	0.15	0.0	N/A	0.15

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 646.6

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: MLopez
Weather: PC ~ 60

Project #: 1615
Date: 8·10·17
Time: 0700

Instrument: YSI Model #: EXO Serial #: 14J100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12·20·17	21.358	1311.7	1413	y	1413.1
pH 4	10·31·17	20.939	4.09	4.00	y	4.00
pH 7	9/2017	20.925	7.01	7.00	y	7.00
pH 10	4/2019	20.697	9.98	10.00	y	10.00
ORP (240 mV)	4/2022	20.754	241.7	240	y	240.0
Turbidity (0 NTU)	11/22/17	21.012	0.25	0.0	y	0.0
Turbidity (10 NTU)	11/22/17	20.882	9.89	10.0	y	10.1
Turbidity (1000 NTU)	11/22/17	20.587	959.00	1000.0	y	1000.2
DO (at Saturation) - mg/L	N/A	19.045	85.0	/	y	85.1
DO (Zero) - mg/L	5/2017	20.745	0.10	0.0	N/A	0.10

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*
µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 647.3

Maintenance and/or Repair: _____

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: MDEZ
Weather: PC ~ 60

Project #: 1615
Date: 8-11-17
Time: 0700

Instrument: YSI Model #: EXO Serial #: 14J100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	21.376	1413.2	1413	Y	1413.1
pH 4	10-31-17	20.936	4.10	4.00	Y	4.00
pH 7	9/2017	20.762	7.05	7.00	Y	7.01
pH 10	4/2019	20.657	9.99	10.00	Y	10.01
ORP (240 mV)	4/2022	20.545	242.0	240	Y	240.0
Turbidity (0 NTU)	11/22/17	21.092	0.15	0.0	Y	0.00
Turbidity (10 NTU)	11/22/17	20.887	9.98	10.0	Y	10.00
Turbidity (1000 NTU)	11/22/17	20.045	962.92	1000.0	Y	1000.21
DO (at Saturation) - mg/L	N/A	19.077	85.0	/	Y	85.1
DO (Zero) - mg/L	5/2017	20.752	0.10	0.0	N/A	0.10

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 646.3

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: [illegible]
Weather: PC~60

Project #: 1615~
Date: 8-15-17
Time: 0800

Instrument: YSI Model #: EXO Serial #: 17H100023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	19.411	1346.7	1413	Y	1413.1
pH 4	10-31-17	19.452	3.92	4.00	Y	4.00
pH 7	9/2017	19.706	7.00	7.00	Y	7.00
pH 10	4/2019	19.556	10.08	10.00	Y	10.00
ORP (240 mV)	4/2022	19.049	244.2	240	Y	240.0
Turbidity (0 NTU)	11/22/17	19.263	0.17	0.0	Y	0.01
Turbidity (10 NTU)	11/22/17	19.131	7.42	10.0	Y	10.05
Turbidity (1000 NTU)	11/22/17	18.699	966.15	1000.0	Y	1000.3
DO (at Saturation) - mg/L	N/A	17.456	83.3	/	Y	84.6
DO (Zero) - mg/L	5/2017	19.055	0.19	0.0	N/A	0.19

SC = Specific Conductivity
µS/cm = microsiemens per centimeter
ORP = Oxidation Reduction Potential
mV = millivolts
NTU = Nephelometric Units
DO = Dissolved Oxygen
mg/L = milligrams per liter

Barometric Pressure (mmHg): 642.9

Maintenance and/or Repair:

FORT HALL MINE LANDFILL
Quarterly Sampling
Daily Equipment Calibration Record

Project: FHML
Personnel: AGez
Weather: Clear ~60

Project #: 1615
Date: 8-16-17
Time: 0700

Instrument: YSI Model #: EXO Serial #: 14J10023

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading
SC (1413µS/cm)	12-20-17	19.492	1346.6	1413	Y	1413.1
pH 4	10-31-17	19.872	3.97	4.00	Y	4.00
pH 7	9/2017	19.776	7.01	7.00	Y	7.00
pH 10	4/2019	19.545	10.08	10.00	Y	10.00
ORP (240 mV)	4/2022	19.472	244.4	240	Y	240.0
Turbidity (0 NTU)	11/22/17	19.379	0.17	0.0	Y	0.01
Turbidity (10 NTU)	11/22/17	19.777	7.45	10.0	Y	10.09
Turbidity (1000 NTU)	11/22/17	18.987	969.15	1000.0	Y	1000.3
DO (at Saturation) - mg/L	N/A	17432	83.3	/	Y	84.5
DO (Zero) - mg/L	5/2017	19.059	0.20	0.0	N/A	0.20

SC = Specific Conductivity *ORP = Oxidation Reduction Potential* *DO = Dissolved Oxygen*

µS/cm = microsiemens per centimeter *mV = millivolts* *NTU = Nephelometric Units* *mg/L = milligrams per liter*

Barometric Pressure (mmHg): 642.6

Maintenance and/or Repair:

Hill AFB PBR LTM/LTO and Compliance Monitoring
FA8903-09-D-8560 Task Order 0006

Equipment Calibration Form

Project: FH/ML
Personnel: KLORT
Weather: Cloudy ~40

Project #: 1615
Date: 11-16-17
Time: 1000

Instrument: YSI Model #: EXO Serial #: 14J101706

Calibration Standard	Exp. Date	Solution Temp °C	Meter Reading	Expected Reading	Calibration Required?	Final Calibration Reading	Slope/Offset (applicable to Troll only)
SC (1413µS/cm)	6-20-18	11.108	1447.7	1413	Y	1413	
pH 7	7-11-18	10.618	7.27	7.00	Y	7.00	
pH 10	3-13-18	10.724	10.01	10.00	Y	10.01	
ORP	7/2020	11.167	239.7	240	Y	240.0	
Turb (0 NTU)	N/A	16.205	0.32	0.0	Y	7.00	
Turb (10 NTU)	8-18-18	11.294	5.47	10.0	Y	10.02	
Turb (100 NTU)	8-18-18	16.831	1055.6	1000.0	Y	1003	
Chloride (100 mg/L)							
Chloride (1000 mg/L)							
Ammonia (1 mg/L)							
Ammonia (100 mg/L)							
Nitrate (1 mg/L)							
Nitrate (100 mg/L)							
DO (at Saturation) - mg/L	N/A	15.324	8.23		Y	8.23 mg/L	
DO (at Saturation) - %	N/A	15.324	83.5		Y	8.37 %	
DO (Zero) - mg/L	5/2018	11.478	0.75				
DO (Zero) - %	5/2018	11.478	8.5				

Barometric Pressure (mmHg): 636.0

Maintenance and/or Repair:

Sub-Appendix A-2
Groundwater Sampling Logs

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: MW-103S Date: 8-9-17 Sampler: AL

Weather: PC ~ 65 Visitors: —

Boring Dia. 10 Casing Dia. 4 DTW: 90.00 TD: 114.00 measured Pump Intake Depth: 100 Pump Top Depth: 97.50

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 90.04

Low Flow: Calculated Purge Volume

97.50 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 3500 (Purge Volume (ml)) = 3600 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + Screen Volume: (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell Tank 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? 90

Time	Purge Volume specify (ml) or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. µS/cm (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1022	0							90.00	Clear/colorless
1030	720	15.120	7.12	975.9	6.75	6.89	145.0	90.05	" "
1038	1440	13.059	7.10	801.9	4.22	6.53	152.6	90.04	" "
1046	2160	14.469	7.08	767.0	4.09	6.28	154.7	90.04	" "
1054	2880	14.880	7.06	768.3	4.02	6.28	155.8	90.04	" "
1102	3600	14.883	7.06	768.5	3.96	6.27	155.9	90.04	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-103S	1102	8-9-17	8260, 8011, HEK, CL, CYC, MET, CAT, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank	FB-20170809	1200	8-9-17	~~8060~~ 8260 8011	6

General Notes: Purged 5 Gal before starting parameters. Dedicated bladder pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: MW-106D Date: 8-15-17 Sampler: AL

Weather: PC ~ 70 Visitors:

Boring Dia. 10 Casing Dia. 4 DTW: 49.35 TD: 100.30 Pump Intake Depth: 95.00 Pump Top Depth: 94.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 49.37

Low Flow: Calculated Purge Volume: 94.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 3444 (Purge Volume (ml)) = 3500 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + [____ (Scr. Leng. (ft)) X ____ (Scr. Factor)] = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Bone 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? 100

Time	Purge Volume specify (ml or gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1130	0							49.35	Clear/colorless
1137	700	15.84	7.19	778.2	7.46	6.59	155.2	49.37	" "
1144	1400	19.60	7.17	785.9	3.99	6.51	161.1	49.37	" "
1151	2100	9.58	7.16	786.2	3.94	6.18	162.5	49.37	" "
1158	2800	9.93	7.16	787.0	3.25	6.17	162.4	49.37	" "
1205	3500	20.92	7.17	787.2	2.91	6.16	162.6	49.37	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-106D	1205	8-15-17	8260, 8011, ALK, Cl, CYN, MET, CAT, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 5 Gal Bef Sample 6 Parameters Portable Bladder Pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

RESAMPLED

Project No: 1615 Monitoring Point: MW-106S Date: 8-15-17 Sampler: AK

Weather: PC~65 Visitors:

Boring Dia. 10 Casing Dia. 4 DTW: 50.10 TD: 79.00 Pump Intake Depth: 74.00 Pump Top Depth: 73.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 50.12

Low Flow: Calculated Purge Volume: 73.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 2898 (Purge Volume (ml)) = 2900 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Contained 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? Y

Time	Purge Volume (specify ml or gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1010	0							50.10	Clear/odorless
1016	580	13.79	7.05	799.1	9.74	6.91	169.2	50.12	" "
1022	1160	13.69	7.05	798.4	3.90	6.89	169.9	50.12	" "
1028	1740	14.00	7.04	797.4	3.12	6.71	172.8	50.12	" "
1034	2320	14.17	7.03	798.0	2.89	6.72	173.5	50.12	" "
1040	2900	14.10	7.04	798.0	2.62	6.71	173.6	50.12	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-106S	1040	8-15-17	8260, 8011, HEK, CL, CYC, MET, CAL, MET	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 5 Cal bear parameters & sampling Portable Bladder Pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: MW-115D Date: 8-15-17 Sampler: AL

Weather: PC ~ 90 Visitors: /

Boring Dia. 8 Casing Dia. 2 DTW: 71.84 TD: 121.75 Pump Intake Depth: 112.00 Pump Top Depth: 111.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume

111.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 3886 (Purge Volume (ml)) = 3900 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + Screen Volume: (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Ft Hall Mine 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? 98

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. µS/cm (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1705	0							71.84	Clear/odorless
1713	780	18.60	7.20	917.9	4.65	8.13	152.4	71.85	" "
1721	1560	9.684	7.16	931.0	4.27	7.49	161.8	71.86	" "
1729	2340	9.519	7.14	929.4	3.98	7.62	167.0	71.86	" "
1737	3120	9.699	7.12	930.0	3.69	7.63	167.2	71.86	" "
1745	3900	9.712	7.13	929.9	3.72	7.62	167.5	71.86	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-115D	1745	8-15-17	8260, 8011, TM, Mer, CYC, CAT, CHLK	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank	FB-20170815	1815	8-15-17	8260/8011	6
Field Blank					

General Notes: Purged 5 Gal before parameters & samples Portable Bladder Pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: MW-115S Date: 8-15-17 Sampler: AL

Weather: PC~85 Visitors:

Boring Dia. 10 Casing Dia. 4 DTW: 71.85 TD: 91.50 Pump Intake Depth: 86.50 Pump Top Depth: 85.50

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: ~71.87

Low Flow: Calculated Purge Volume

85.50 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 3223 (Purge Volume (ml)) = 3300 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + Screen Volume: (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.84 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water Cell #2 Pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	~~Specific Cond.~~ (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1526	0							71.85	Clear/odorless
1533	660	9.145	7.21	1097.5	4.20	9.70	167.6	71.86	" "
1540	1320	9.587	7.18	1104.0	3.70	9.03	169.4	~71.87	" "
1547	1980	9.576	7.17	1107.9	3.68	9.02	171.0	~71.87	" "
1554	2640	9.132	7.16	1106.5	3.08	9.00	171.5	~71.87	" "
1601	3300	9.092	7.16	1106.9	2.97	9.01	171.2	~71.87	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-115S	1601	8-15-17	8260, 8011, HEK, Cl, CYC, Met, Cat, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 5 GAL before parameters & samples Portable bladder pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: MW-116D Date: 8-11-17 Sampler: AZ

Weather: PC ~85 75.85 Visitors:

Boring Dia. 8 Casing Dia. 2 DTW: ~~77.12~~ TD: 143.00 Pump Intake Depth: 133.00 Pump Top Depth: 132.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 94.70

Low Flow: Calculated Purge Volume

132.00 (Tubing Leng. (ft)) x 13 (Tubing Dia. Factor) + 500 (Pump Volume) x 2 = 4432 (Purge Volume (ml)) = 4500 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) x ____ (Casing Factor) x 3 = ____ (Casing Vol.) + Screen Volume: (____ (Scr. Leng. (ft)) x ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Tank 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? 100

Time	Purge Volume specify (ml) or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	~~MSCM~~ Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1521	0							75.85	Clear/odorless
1530	900	16.032	6.91	299.9	5.95	1.23	-64.1	99.60	" "
1539	1800	16.482	6.82	302.7	2.55	1.25	-65.0	97.65	" "
1548	2700	17.343	6.97	369.2	2.44	0.81	-88.7	97.15	" "
1557	3600	17.022	6.95	370.9	1.89	0.80	-89.1	96.25	" "
1606	4500	17.305	6.97	371.2	1.31	0.79	-89.3	94.70	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-116D	1606	8-11-17	8260, 8011, TM, Mn, Cl, CO3, Cl, HCO3	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank	EB-20170811	1630	8-11-17	8260, 8011	6
Field Blank					

General Notes: Purged 5 Gal before starting Parameters Portable bladder pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

RCRA-C

Project No: 1615 Monitoring Point: MW-116S Date: 8-11-17 Sampler: AL

Weather: PC~85 Visitors:

Boring Dia. 8 Casing Dia. 2 DTW: 66.95 TD: 92.70 Pump Intake Depth: 82.00 Pump Top Depth: 81.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 67.00

Low Flow: Calculated Purge Volume

81.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 3106 (Purge Volume (ml)) = 3200 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + Screen Volume: (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? Y

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1350	0							66.95	Clear/odorless
1357	640	14.36	7.05	1093.9	4.04	6.80	187.6	67.00	" "
1404	1280	14.20	6.98	1100.0	4.11	6.80	187.5	67.00	" "
1411	1920	14.29	6.91	1096.9	4.18	6.77	186.6	67.00	" "
1418	2560	14.32	6.92	1096.1	4.18	6.76	187.0	67.00	" "
1425	3200	13.98	6.92	1096.5	4.19	6.76	187.0	67.00	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	MW-116S	1425	8-11-17	8260, 8011, TM, Mer, CYA, Chl, CAT, ALK	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 5 Gal before Sampling Portable Bladder Pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: PA-1 Date: 8-10-17 Sampler: AL

Weather: PC ~ 80 Visitors:

Boring Dia. 10 Casing Dia. 4 DTW: 41.90 TD: 151.00 Pump Intake Depth: 141.00 Pump Top Depth: 140.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: 140.00 (Tubing Leng. (ft)) x 13 (Tubing Dia. Factor) + 500 (Pump Volume) x 2 = 4640 (Purge Volume (ml)) = 4700 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) x ____ (Casing Factor) x 3 = ____ (Casing Vol.) + [____ (Scr. Leng. (ft)) x ____ (Scr. Factor)] = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1235	0							41.90	Clear/odorless
1245	940	18.868	7.23	790.5	5.23	6.12	164.7	41.95	" "
1255	1880	19.087	7.15	805.9	4.63	5.90	174.5	41.95	" "
1305	2820	18.191	7.13	789.4	4.92	6.16	179.5	41.95	" "
1315	3760	18.205	7.13	789.0	4.56	6.14	180.7	41.95	" "
1325	4700	18.190	7.13	789.4	3.77	6.13	180.2	41.95	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	PA-1	1325	8-10-17	8260, 8011, TN, Mer, Cya, Cat, Cal, Hex	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 3 Gal before sampling Portable bladder pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: PA-3 Date: 8-10-17 Sampler: AL

Weather: PC ~60 Visitors:

Boring Dia. 10 Casing Dia. 4 DTW: 42.45 TD: 69.20 Pump Intake Depth: 61.00 Pump Top Depth: 60.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 42.47

Low Flow: Calculated Purge Volume: 60.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 2560 (Purge Volume (ml)) = 2600 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft) Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Coil #2 pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. (µS/cm) (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1100	0							42.45	Clear/odorless
1106	520	16.09	7.14	808.9	5.70	7.38	202.2	42.47	" "
1112	1040	16.70	7.12	817.2	4.83	7.12	201.9	42.47	" "
1118	1560	16.63	7.11	824.2	4.08	7.16	200.0	42.47	" "
1124	2080	16.83	7.12	823.9	4.12	7.14	199.7	42.47	" "
1130	2600	16.50	7.13	824.0	4.12	7.13	200.1	42.47	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	PA-3	1130	8-10-17	8260, 8011, TDS, Met, Cl/S, Cat, Chl, Alk	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 2.5 Gal besor Sampling portable bladder pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: PA-4 Date: 8-10-17 Sampler: AK

Weather: PC ~ 60 Visitors:

Boring Dia. 10 Casing Dia. 4 DTW: 57.80 TD: 147.00 Pump Intake Depth: 142.00 Pump Top Depth: 141.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 57.82

Low Flow: Calculated Purge Volume: 141.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 4666 (Purge Volume (ml)) = 4700 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell/Field Pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? Y

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0905	0							57.80	Clear/odorless
0915	940	13.921	7.22	820.3	5.72	6.90	202.3	57.82	" "
0925	1880	15.382	7.12	824.5	3.17	6.71	203.9	57.82	" "
0935	2820	16.251	7.10	824.7	3.81	6.64	203.9	57.82	" "
0945	3760	16.362	7.11	824.9	3.60	6.68	203.0	57.82	" "
0955	4700	16.239	7.11	825.0	2.47	6.67	203.3	57.82	" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	PA-4	0955	8-10-17	8260, 8011, TN, Mer, CYC, CCT, Chl, ALK	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Started Parameters after purging 5 Gal Portable bladder pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2076F Date: 8-2-17 Sampler: M

Weather: Clear ~ 80 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sonic port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Long. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0930	0								Clear/odorless
0935	1	16.341	7.29	714.9	2.84	5.47	199.0		" "
0940	2	15.685	7.29	722.5	2.78	5.33	199.3		" "
0945	3	15.442	7.27	722.0	2.70	5.32	200.1		" "
0950	4	15.525	7.26	721.0	2.02	5.34	201.0		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2076F	0950	8-2-17	8260, 8011, ALK, Cl, Cl/S, Met, Cal, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 30 Gal ~~Water~~ Before Sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2140H Date: 8-11-17 Sampler: AZ

Weather: PC ~ 80 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Simple Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume

_____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + Screen Volume: (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.84 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1235	0			1240.1					Clear/odorless
1240	1	12.790	7.10	1241.1	0.23	6.22	159.4		" "
1245	2	12.753	7.09	1241.2	0.23	6.23	158.0		" "
1250	3	12.666	7.02	1240.1	0.20	6.21	156.9		" "
1255	4	12.731	7.01	1240.2	0.26	6.20	156.4		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2140H	1255	8-11-17	8260, 8011, Alk, TM, Mn, Cl, Cl, Cal, [illegible]	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purge 200 Gal on ground as per land owner

Revised

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Project No: 1615 Monitoring Point: RW-2151H Date: 11-16-17 Sampler: AK

Weather: Cloudy ~40 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Grab Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume = Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume = TD (ft) - DTW (ft) = Water Column (ft) - Scr. Leng. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO2 Disposition of Purge Water: Collected and 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1315	0								Clear/colorless
1320	1	11.176	7.07	1544.1	12.99	5.69	-1.3		" "
1325	2	11.032	6.98	1530.1	3.73	5.57	-7.7		" "
1330	3	10.709	6.98	1528.4	2.44	5.56	-8.4		" "
1335	4	10.623	6.97	1528.6	2.60	5.55	-9.3		" "
1340	5	10.583	6.97	1528.3	2.39	5.53	-9.8		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2151H	1340	11-16-17	8260, 8011, TM, CYC, CAT, CS, AKK, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purge 500 Gal Before Sampling & Parameters.

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2172F Date: 8-2-17 Sampler: AR

Weather: Clear 85 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: / Pump Top Depth: /

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: /

Low Flow: Calculated Purge Volume / (Tubing Leng. (ft)) X / (Tubing Dia. Factor) + / (Pump Volume) X 2 = / (Purge Volume (ml)) = / (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume / (TD (ft)) - / (DTW (ft)) = / (Water Column (ft)) - / (Scr. Leng. (ft)) = / (Casing Leng.) X / (Casing Factor) X 3 = / (Casing Vol.) + Screen Volume (/ (Scr. Leng. (ft)) X / (Scr. Factor)) = / (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: / ft Sampling Flow Rate ≤ 100 ml/min? /

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	uS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1615	0								Clear/odorless
1620	1	15.350	7.42	7193	6.92	6.63	177.6		" "
1625	2	15.830	7.28	716.0	4.95	6.53	181.1		" "
1630	3	16.506	7.27	716.9	2.36	6.53	182.6		" "
1635	4	16.656	7.27	717.0	2.59	6.53	182.3		" "
									" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2172F	1635	8-2-17	8011, 8260, HARDCA, CYC, MET, CCT, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 ml before Sample & Parameters

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2172H Date: 8-8-17 Sampler: M

Weather: PC ~80 Visitors: -

Boring Dia. 1 Casing Dia. 2 DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Central Pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1° C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1345	0								Clear/odorless
1350	1	12.391	6.99	187.2	3.42	6.16	154.1		Y N
1355	2	12.281	6.95	1186.7	3.22	6.14	153.0		" "
1400	3	12.982	6.96	1186.6	3.43	6.15	154.1		" "
1405	4	12.986	6.96	1187.0	2.02	6.14	153.4		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2172H	1405	8-8-17	8260B(1), Alk, Cl, Cyc, Met, Cat, Mer	9
Duplicate	RW-0808A	1510	8-8-17	" " " " " " " "	9
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal Before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

1 OF 2 Resived

Project No: 1615 Monitoring Point: RW-2203H Date: 8-9-17 Sampler: AK

Weather: PC ~80 Visitors:

Boring Dia. 10 Casing Dia. 6 DTW: 58.35 TD: 77.00 Pump Intake Depth: 72.00 Pump Top Depth: 71.00

Purge/Sampling Method: LF Vial pH: Depth to Water @Sampling: 58.38

Low Flow: Calculated Purge Volume: 71.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 2846 (Purge Volume (ml)) = 2900 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Long. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + Screen Volume (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.68; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? Y

Time	Purge Volume specify (ml) or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. (mS/cm) +/- 10% (uS/cm)	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1650	0							58.35	LT yellow/odorless
1656	580	14.95	7.40	946.4	106.12	0.05	-205.7	58.38	" "
1702	1160	15.400	7.39	947.5	102.60	0.05	-208.7	58.38	" "
1708	1740	16.000	7.37	949.1	99.98	0.04	-209.3	58.38	" "
1714	2320	16.199	7.36	955.1	104.03	0.05	-200.4	58.38	" "
1720	2900	16.388	7.34	968.3	107.07	0.05	-219.8	58.38	" "
1726	3480	16.402	7.34	971.0	105.52	0.05	-206.4	58.38	" "
1732	4060	16.493	7.33	976.1	108.31	0.05	-227.8	58.38	" "
1738	4640	16.058	7.34	979.2	109.94	0.05	-223.7	58.38	" "
Field parameters stable?		(Y) N	(Y) N	Y N	Y (N)	(Y) N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2203H	1750	8-9-17	8260, 8011, ALK, Cl, CYA, Met, Cat, Nit	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 5 Gal bef parameters & samples Portable Bladder Pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

2 OF 2 Revised

Project No: 1615 Monitoring Point: RW-2203H Date: 8-9-17 Sampler: AL

Weather: PC ~ 80 Visitors: /

Boring Dia. 10 Casing Dia. 6 DTW: 58.35 TD: 77.00 Pump Intake Depth: 72.00 Pump Top Depth: 71.00

Purge/Sampling Method: LF Vial pH: 2.0 Depth to Water @Sampling: 58.38

Low Flow: Calculated Purge Volume: 71.00 (Tubing Leng. (ft)) X 13 (Tubing Dia. Factor) + 500 (Pump Volume) X 2 = 2846 (Purge Volume (ml)) = 2900 (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Central Pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1744	5220	15.943	7.34	979.7	102.92	0.06	-223.0	58.38	LT. yellow/odorless
1750	5800	15.886	7.34	979.7	106.25	0.06	-224.1	58.38	" " "
Field parameters stable?		(Y) N	(Y) N	(Y) N	Y (N)	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2203H	1750	8-9-17	8260, 8011, HEM, Cl, CYC, Met, COT, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank	EB-20170809	1832	8-9-17	8260, 8011	6
Field Blank					

General Notes: Purged 5 Gal best parameters & Samples Peristaltic Bladder Pump used

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2213F Date: 8-2-17 Sampler: AK

Weather: Clear ~85 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: ~~Sample Port~~ / Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: ____ (Tubing Leng. (ft)) X ____ (Tubing Dia. Factor) + ____ (Pump Volume) X 2 = ____ (Purge Volume (ml)) = ____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Ctl FH2 Landfill 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1° C	pH (0.0) +/- 0.2	~~Specific Cond. (mS/cm)~~ µS/cm Specific Cond. +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1500	0								Clear/odorless
1505	1	13.992	7.71	700.1	0.45	6.46	148.2		" "
1510	2	12.389	7.39	692.4	0.59	6.47	153.8		" "
1515	3	12.315	7.37	692.5	0.66	6.46	153.1		" "
1520	4	12.234	7.39	692.0	0.70	6.46	153.8		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2213F	1520	8-2-17	8260, 8011, Alk, Cl, Cyc, Met, Cat, Mer	9
Duplicate	RW-0802H	1615	8-2-17	" " " " " " " "	9
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2237H Date: 8-3-17 Sampler: AL

Weather: Clear ~ 80 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: [Casing Volume Above Screen: TD (ft) - DTW (ft) = Water Column (ft) - Scr. Leng. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol.] + [Screen Volume: Scr. Leng. (ft) X Scr. Factor] = Purge Volume (gal) (0.0)

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Central Pond 90% Recharge Level: ft Sampling Flow Rate ≤ 100 ml/min?

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0930	0								Clear/odorless
0935	1	14.178	7.35	1256.0	6.52	5.92	151.1		" "
0940	2	14.883	7.06	1245.6	4.92	5.77	161.1		" "
0945	3	15.781	7.02	1215.2	4.76	5.74	161.9		" "
0950	4	15.456	7.02	1245.7	4.82	5.75	161.3		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2237H	0950	8-3-17	8260, 8011, ALK, Cl, CYC, NET, CGT, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 20 Gal Before Parameters

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-2879M Date: 8-11-17 Sampler: KL

Weather: PC ~ 75 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume
Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

_____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Standard Method: Calculated Purge Volume

Casing Volume Above Screen: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft) Casing Leng.) = _____ X _____ (Casing Factor) X 3 = _____ (Casing Vol.)

Screen Volume: (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor))

+ _____ = _____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.64 gal/ft

Water Quality Instrument: ~~YSI~~ EXO Disposition of Purge Water: Collected & Poured 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	LRSCM Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1025	0								Clear/Odorless
1030	1	15.463	7.00	1568.3	7.43	5.31	47.8		" "
1035	2	15.666	6.94	1579.4	5.97	5.28	21.7		" "
1040	3	16.050	6.96	1579.1	2.29	5.28	30.1		" "
1045	4	16.280	6.96	1580.2	1.62	5.30	29.9		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-2879M	1045	8-11-17	8260, 8011, TM, Mn, CYC, CaCl, Chl, HAS	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purge 2.0 Gal Read Parameters & Sample

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-3259B Date: 8-16-17 Sampler: AC

Weather: Clear 75 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow:
Calculated Purge Volume _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method:
Calculated Purge Volume Casing Volume Above Screen: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Long. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + Screen Volume: (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/6"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Tank 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1010	0								Clear/odorless
1015	1	14.70	7.34	436.3	4.93	7.68	183.7		" "
1020	2	15.18	7.23	432.4	2.59	7.22	184.5		" "
1025	3	15.93	7.21	433.0	3.03	7.21	185.6		" "
1030	4	15.92	7.21	433.5	2.73	7.23	~~186~~ 186.0		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-3259B	1030	8-16-17	8260, 8011, TM, Mer, CYC, CCT, Chl, Sul, ALK	9
Duplicate					
MS/SD	RW-3259B	1030	8-16-17	" " " " " " " " "	18
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 100 Gal Before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7077P Date: 8-2-17 Sampler: KL

Weather: Clear ~ 80 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Simple Bail Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen; Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Carried to Tank 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1100	0								Clear/odorless
1105	1	12.20	7.44	706.2	3.59	6.45	170.9		" "
1110	2	12.17	7.36	702.0	2.96	6.22	164.5		" "
1115	3	12.50	7.34	703.0	2.05	6.20	164.7		" "
1120	4	12.765	7.35	703.1	1.97	6.19	164.1		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7077P	1120	8-2-17	8260, 8011, ALK, Cl, C/C, MET, Cal, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 gal on Ground as per land owner before sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-724P Date: 8-8-17 Sampler: AL

Weather: PC ~ 70 Visitors: -

Boring Dia. ' Casing Dia. ' DTW: ' TD: ' Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume ____ (Tubing Leng. (ft)) X ____ (Tubing Dia. Factor) + ____ (Pump Volume) X 2 = ____ (Purge Volume (ml)) = ____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))
Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 tank 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	~~mS/cm~~ uS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1020	0								Clear/odorless
1025	1	11.941	7.25	709.3	1.47	6.41	173.5		" "
1030	2	11.851	7.24	708.6	1.50	6.41	173.9		" "
1035	3	11.850	7.23	708.6	1.57	6.39	174.1		" "
1040	4	12.018	7.22	708.3	1.88	6.38	173.9		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-724P	1040	8-8-17	8260, 8011, Alk, Cl, CYC, Met, Cat, Mn	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7288P Date: 7-14-17 Sampler: AL

Weather: PC ~ 85 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Pump Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume ____ (Tubing Leng. (ft)) X ____ (Tubing Dia. Factor) ÷ ____ (Pump Volume) X 2 = ____ (Purge Volume (ml)) = ____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Long. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + Screen Volume (____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 pond 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1155	0								Clear/odorless
1200	1	13.406	7.47	691.3	1.12	6.33	191.8		" "
1205	2	13.176	7.29	690.8	1.24	6.38	172.0		" "
1210	3	13.329	7.27	690.4	1.37	6.36	171.5		" "
1215	4	13.202	7.26	691.0	1.39	6.37	171.9		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7288P	1215	7-14-17	8260, 8011, TM, Mer, CYC, Cal, Chlor	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 20 GAL before perimeters & sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7310P Date: 7-13-17 Sampler: M

Weather: Clear ~85 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1° C	pH (0.0) +/- 0.2	~~Specific Cond. (mS/cm)~~ µS/cm Specific Cond. +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
13.25	0								Clear/odorless
1330	1	13.667	7.33	666.0	1.10	6.33	123.6		" "
1335	2	13.663	7.20	665.2	1.26	6.26	135.2		" "
1340	3	13.591	7.16	664.1	1.26	6.24	142.9		" "
1345	4	13.331	7.14	664.9	1.27	6.24	143.5		" "
1350	5	13.739	7.15	665.1	1.30	6.21	144.0		" "
									✓ ✓
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7310P	1350	7-13-17	8260, 8011, TM, Mer, CYC, Cat, Chlor	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal befor Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7350P Date: 8-3-17 Sampler: AK

Weather: Clear ~ 90 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume
_____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume
_____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft) Casing Leng.) = _____ X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))
Casing Volume Above Screen; Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(lp): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water Cell #2 pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	uS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1455	0								Clear/odorless
1500	1	14.995	7.45	710.1	3.96	6.41	196.2		" "
1505	2	16.357	7.36	710.4	2.80	6.32	196.2		" "
1510	3	16.973	7.34	710.5	2.81	6.32	196.1		" "
1515	4	17.554	7.35	710.8	2.48	6.31	195.9		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7350P	1515	8-3-17	8260, 8011, ALK, Chlor, Nitrate, CAT, Mer	9
Duplicate					
MS/SD	RW-7350P	1515	8-3-17	" " " " " " " "	18
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 300 Gal before sampling & Parameters

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7492-P Date: 7-12-17 Sampler: AL

Weather: Clear ~90 Visitors: ✓

Boring Dia. ' Casing Dia. ' DTW: ' TD: ' Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow Calculated Purge Volume: Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: TD (ft) - DTW (ft) = Water Column (ft) - Scr. Long. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Central Pond 90% Recharge Level: ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1340	0								Clear/odorless
1345	1	13.687	7.37	637.1	2.00	6.42	182.4		" "
1350	2	13.897	7.38	639.0	2.69	6.43	186.1		" "
1355	3	13.779	7.37	639.2	2.63	6.41	187.0		" "
1400	4	13.782	7.36	640.1	2.60	6.41	187.6		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7492P	1400	7-12-17	8260, 8011, TM, Meth, CAG, CGI, Chlor	9
Duplicate	RW-0712A	1435	7-12-17	" " " " " " "	9
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 GAL befor Sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: ~~MW~~ RW-7498P Date: 7-12-17 Sampler: AL

Weather: Clear ~90 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume

_____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume

_____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Long. (ft)) = _____ X _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.83 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Certified BDL 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	~~MS/CM~~ Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1215	0								Clear/odorless
1220	1	14.014	7.08	644.8	4.08	6.34	176.5		" "
1225	2	14.130	7.11	643.4	4.07	6.34	175.8		" "
1230	3	14.184	7.11	643.4	4.04	6.33	175.8		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	WR-7498P	1230	7-12-17	8260, 8211, TM, Mer, Cyc, Cat, Chlor	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Parameters Started as Low Purging ~115 Gal

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7505P Date: 7-13-17 Sampler: AL

Weather: Clear ~ 75 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Long. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0950	0								Clear/odorless
0955	1	12.132	6.94	717.8	0.61	6.50	164.3		" "
1000	2	12.214	6.92	702.1	0.62	6.47	169.9		" "
1005	3	12.310	6.92	701.5	0.60	6.49	170.7		" "
1010	4	12.299	6.93	701.0	0.62	6.48	170.9		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7505P	1010	7-13-17	8260, 8011, TN, Mer, Cr6, Cot, Chla	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 GAL before parameters & sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7549P Date: 7-14-17 Sampler: AK

Weather: PC~65 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0920	0								Clear/odorless
0925	1	13.933	6.92	677.7	10.59	7.99	222.6		" "
0936	2	15.384	6.98	780.9	45.69	7.41	216.1		" "
0940	2.5	15.492	7.00	777.2	63.52	7.27	215.1		" "
0946	3	15.625	7.00	777.4	60.60	7.24	214.5		" "
0950	3.2	15.677	7.01	777.9	74.70	7.20	213.9		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7549P	0950	7-14-17	8260, 8011, TM, Meth, CYC, CCT, Chlor	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 100 Gal before Parameters & Samples Taken

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW 7586P Date: 7-13-17 Sampler: AL

Weather: Clear ~ 80 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: - Pump Top Depth: -

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: -

Low Flow: Calculated Purge Volume: - (Tubing Leng. (ft)) X - (Tubing Dia. Factor) + - (Pump Volume) X 2 = - (Purge Volume (ml)) = - (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: - (TD (ft)) - - (DTW (ft)) = - (Water Column (ft)) - - (Scr. Long. (ft)) = - (Casing Leng.) X - (Casing Factor) X 3 = - (Casing Vol.) + (- (Scr. Leng. (ft)) X - (Scr. Factor)) = - (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: - ft Sampling Flow Rate ≤ 100 ml/min? -

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1° C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1110	0								Clear/odorless
1115	1	14.354	7.30	666.4	0.95	6.51	178.4		" "
1120	2	14.940	7.31	667.0	0.92	6.50	178.6		" "
1125	3	15105	7.29	767.9	0.99	6.49	178.7		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7586P	1125	7-13-17	8260, 8011, TM, Met, C/C, CAT, Chlor	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before Samples & Parameters

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7588P Date: ~~7.13.17~~ 7.14.17 Sampler: AL

Weather: PC ~ 90 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell 2 Pond C 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1045	0								Clear/odorless
1050	1	13.175	7.25	703.2	1.46	6.56	206.9		" "
1055	2	13.551	7.20	704.0	1.34	6.58	207.1		" "
1100	3	13.804	7.23	704.1	1.32	6.56	207.7		" "
Field parameters stable?		Y N	Y N	Y N	Y N	Y N	Y N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7588P	1100	~~7.13.17~~ 7-14-17	8260, 8011, TDS, Met, CYC, CAT, Chlor	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-767P Date: 8-9-17 Sampler: AC

Weather: PC ~ 80 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: - Pump Top Depth: -

Purge/Sampling Method: Simple Port Vial pH: 2.0 Depth to Water @Sampling: -

Low Flow: Calculated Purge Volume: ___ (Tubing Leng. (ft)) X ___ (Tubing Dia. Factor) + ___ (Pump Volume) X 2 = ___ (Purge Volume (ml)) = ___ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ___ (TD (ft)) - ___ (DTW (ft)) = ___ (Water Column (ft)) - ___ (Scr. Leng. (ft)) = ___ (Casing Leng.) X ___ (Casing Factor) X 3 = ___ (Casing Vol.) + (___ (Scr. Leng. (ft)) X ___ (Scr. Factor)) = ___ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ___ ft Sampling Flow Rate ≤ 100 ml/min? ___

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1415	0								Clear/odorless
1420	1	14.68	7.54	1112.1	4.54	7.12	105.5		" "
1425	2	12.89	7.17	1105.8	3.19	7.12	124.2		" "
1430	3	12.66	7.18	1105.2	3.11	7.14	124.3		" "
1435	4	12.92	7.16	1105.1	2.94	7.15	125.1		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-767P	1435	8-9-17	8260, 8011, ALK, Cl, CYC, Met, Cat, Nen	9
Duplicate					
MS/SD	RW-767P	1435	8-9-17	" " " " " " " "	18
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purge 200 Cal Bear Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7688P Date: 8-8-17 Sampler: AR

Weather: PC ~ 80 Visitors: ,

Boring Dia. , Casing Dia. , DTW: , TD: , Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume ___ (Tubing Leng. (ft)) X ___ (Tubing Dia. Factor) + ___ (Pump Volume) X 2 = ___ (Purge Volume (ml)) = ___ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume ___ (TD (ft)) - ___ (DTW (ft)) = ___ (Water Column (ft)) - ___ (Scr. Long. (ft)) = ___ (Casing Leng.) X ___ (Casing Factor) X 3 = ___ (Casing Vol.) + (___ (Scr. Leng. (ft)) X ___ (Scr. Factor)) = ___ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.83 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ___ ft Sampling Flow Rate ≤ 100 ml/min? ___

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	uS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1500	0								Clear/colorless
1505	1	14.556	7.51	711.2	5.42	7.39	182.9		" "
1510	2	13.906	7.31	710.3	3.76	7.18	184.0		" "
1515	3	13.926	7.29	710.1	3.72	7.15	184.9		" "
1520	4	13.981	7.27	710.0	3.66	7.15	185.0		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7688P	1520	8-8-17	8260, 8011, HAK, Cl, SO4, NO3, TDS, Cat, Met	9
Duplicate	RW-0808B	1630	8-8-17	" " " " " " " "	9
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before parameters & samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-7773P Date: 8-15-17 Sampler: AL

Weather: PC ~ 80 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: / Pump Top Depth: /

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: /

Low Flow: Calculated Purge Volume — Tubing Leng. (ft) / Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume — Casing Volume Above Screen: TD (ft) - DTW (ft) = Water Column (ft) - Scr. Leng. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + Screen Volume (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Tank 90% Recharge Level: / ft Sampling Flow Rate ≤ 100 ml/min? /

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1350	0								Clear/odorless
1355	1	13.640	7.23	782.6	2.57	6.27	64.2		" "
1400	2	13.723	7.22	787.2	2.90	6.27	62.1		" "
1405	3	13.850	7.20	787.4	2.94	6.25	61.9		" "
1410	4	13.876	7.20	781.2	2.56	6.27	61.0		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7773P	1410	8-15-17	8260, 8011, ALK, TM, CYC, Cal, Cl, Mn	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before parameters & samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-776P Date: 8-8-17 Sampler: AL

Weather: Rain ~65 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: - Pump Top Depth: -

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: -

Low Flow: Calculated Purge Volume — Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume — Casing Volume Above Screen: TD (ft) - DTW (ft) = Water Column (ft) - Scr. Long. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + Screen Volume (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell 2 pond 90% Recharge Level: - ft Sampling Flow Rate ≤ 100 ml/min? -

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0900	0								Clear/odorless
0905	1	13.109	7.43	714.6	5.23	7.20	157.1		" "
0910	2	12.819	7.24	717.9	2.15	7.10	162.7		" "
0915	3	12.700	7.23	716.2	2.77	7.09	162.6		" "
0920	4	12.812	7.22	716.0	1.26	7.10	162.7		" "
									"
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-776P	0920	8-8-17	SO4, SO4, ALK, Cl, CYC, MET, CCT, Nit	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Results

Project No: 1615 Monitoring Point: RW-7953P Date: 8.16.17 Sampler: AL

Weather: Clear ~85 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Long. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Port 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	uS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1245	0								Clear/colorless
1250	1	12.44	7.04	1024.0	3.58	9.41	196.1		" "
1255	2	12.90	7.04	1021.2	2.60	8.98	191.6		" "
1300	3	12.89	7.04	1021.2	1.98	8.95	191.5		" "
1305	4	12.82	7.03	1020.9	1.75	8.97	191.4		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-7953P	1305	8.16.17	8260, 8011, TM, Mer, CC, Cat, Chl, Sul, ALK	9
Duplicate					
MS/SD	RW-7953P	1305	8.16.17	" " " " " " " " " "	18
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 2.00 Gal before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-8000B Date: 8-3-17 Sampler: KL

Weather: Clear ~85 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Simple Pump Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: TD (ft) - DTW (ft) = Water Column (ft) - Scr. Long. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°c	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1335	0			~~8~~42.4					Clear/colorless
1340	1	12.746	7.59	~~7~~59	8.66	7.49	163.3		" "
1345	2	12.770	7.43	846.5	4.93	7.15	172.4		" "
1350	3	12.414	7.31	839.6	2.60	7.20	179.2		" "
1355	4	12.366	7.29	839.4	2.22	7.18	180.6		" "
1400	5	12.408	7.29	839.5	2.13	7.20	180.6		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8000B	1400	8-3-17	8260, 8011, Alk, Cl, Ca, Met, Cat/Ani	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 300 Gal on Ground as per orders

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-8012P Date: 8-3-17 Sampler: AR

Weather: Clear ~ 80 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Simple Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume = Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume = TD (ft) - DTW (ft) = Water Column (ft) - Casing Volume Above Screen: Scr. Leng. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + Screen Volume: (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Central Pond 90% Recharge Level: ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1045	0								Clear/odorless
1050	1	13.009	7.55	821.4	2.95	7.36	180.5		" "
1055	2	12.762	7.42	820.2	2.30	7.37	181.5		" "
1100	3	12.588	7.29	819.4	2.13	7.28	185.1		" "
1105	4	12.702	7.27	819.0	2.30	7.26	185.6		" "
1110	5	12.663	7.27	819.0	2.38	7.25	185.5		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8012P	1110	8-3-17	8011, 8260, Alk, Cl, F, Met, Cat, Nut	9
Duplicate	RW-0803A	1215	8-3-17	" " " " " " " "	9
MS/SD	RW-8012P	1110	8-3-17	" " " " " " " "	18
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purge 200 Gal Before Parameters

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-8030P Date: 8-1-17 Sampler: AL

Weather: Clear ~80 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: - Pump Top Depth: -

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: -

Low Flow: Calculated Purge Volume: ___ (Tubing Leng. (ft)) X ___ (Tubing Dia. Factor) ÷ ___ (Pump Volume) X 2 = ___ (Purge Volume (ml)) = ___ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ___ (TD (ft)) - ___ (DTW (ft)) = ___ (Water Column (ft)) - ___ (Scr. Leng. (ft)) = ___ (Casing Leng.) X ___ (Casing Factor) X 3 = ___ (Casing Vol.) + (___ (Scr. Leng. (ft)) X ___ (Scr. Factor)) = ___ (Purge Volume (gal) (0.0))

Casing Volume Above Screen; Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/6"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ___ ft Sampling Flow Rate ≤ 100 ml/min? ___

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1130	0								Clear/odorless
1140	1	13.991	7.16	948.5	662	5.15	167.4		" "
1145	2	13.779	7.09	948.5	3.79	4.89	167.9		" "
1150	3	13.89	7.10	948.2	3.89	4.90	168.1		" "
1155	4	13.918	7.09	949.1	3.91	4.89	168.8		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8030P	1155	8-1-17	8011, 8260, Alk, Cl, CyC, MeT, Cal, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 300 Gal before sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-8035P Date: 8-1-17 Sampler: AK

Weather: Clear ~80 Visitors: /

Boring Dia. / Casing Dia. / DTW: / TD: / Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Tap Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow: Calculated Purge Volume: _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Long. (ft) Casing Leng.) = _____ X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Above Screen | Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 IDW 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? _____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1° C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1010	0								Clear/odorless
1015	1	14.883	7.53	679.6	2.90	4.60	174.0		" "
1020	2	15.439	7.39	679.8	2.73	4.46	177.2		" "
1025	3	15.761	7.39	680.3	2.00	4.49	178.0		" "
1030	4	15.780	7.38	680.5	2.15	4.49	178.2		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8035P	1030	8-1-17	8260, 8011, ALK, Cl, CYC, Met, CCT, Mer	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 GAL before sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-8105PN Date: 8-11-17 Sampler: JK

Weather: PC~65 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: ____ (Tubing Leng. (ft)) X ____ (Tubing Dia. Factor) + ____ (Pump Volume) X 2 = ____ (Purge Volume (ml)) = ____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: Casing Volume Above Screen: ____ (TD (ft)) - ____ (DTW (ft)) = ____ (Water Column (ft)) - ____ (Scr. Leng. (ft)) = ____ (Casing Leng.) X ____ (Casing Factor) X 3 = ____ (Casing Vol.) + (Screen Volume: ____ (Scr. Leng. (ft)) X ____ (Scr. Factor)) = ____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 6"/10"=2.84 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Onsite Ditch 90% Recharge Level: ____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0920	0								Clear/odorless
0925	1	12.699	6.92	1540.6	2.27	2.74	95.3		" "
0930	2	13.166	6.84	1537.9	2.27	2.73	94.4		" "
0935	3	13.451	6.82	1537.9	2.74	2.75	94.6		" "
0940	4	13.110	6.83	1538.1	2.72	2.73	94.7		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8105PN	0940	8-11-17	8260, 8011, TM, Mer, CYC, COT, CN, ALK	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before Parameters & Samples

FORT HALL MINE LANDFILL
Groundwater Sampling Log

REVISED

Project No: 1615 Monitoring Point: RW-8105PS Date: 8-11-17 Sampler: AL

Weather: PC~65 Visitors: -

Boring Dia. ' Casing Dia. ' DTW: ' TD: ' Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: Tubing Leng. (ft) X Tubing Dia. Factor + Pump Volume X 2 = Purge Volume (ml) = Rounded Purge Volume (Rounded up to nearest 100 ml)

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: Casing Volume Above Screen: TD (ft) - DTW (ft) = Water Column (ft) - Scr. Leng. (ft) = Casing Leng. X Casing Factor X 3 = Casing Vol. + Screen Volume (Scr. Leng. (ft) X Scr. Factor) = Purge Volume (gal) (0.0)

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 6"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.64 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Collect 200 mL 90% Recharge Level: ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	µS/cm Specific Cond. (~~mS/cm~~) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
0835	0								Clear/odorless
0840	1	11.513	7.12	884.8	0.59	0.15	-91.4		" "
0845	2	11.578	7.03	882.8	0.49	0.15	-94.9		" "
0850	3	11.802	7.01	883.5	0.52	0.15	-95.6		" "
0855	4	11.95	7.01	883.7	0.48	0.13	-95.8		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8105PS	0855	8-11-17	8260, 8011, TM, Mer, CYC, CGT, Chl, ALK	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 mL before parameters & sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-8209P Date: 8-2-17 Sampler: AL

Weather: Clear ~ 85 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: Pump Top Depth:

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling:

Low Flow: Calculated Purge Volume: ___ (Tubing Leng. (ft)) X ___ (Tubing Dia. Factor) + ___ (Pump Volume) X 2 = ___ (Purge Volume (ml)) = ___ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method: Calculated Purge Volume: ___ (TD (ft)) - ___ (DTW (ft)) = ___ (Water Column (ft)) - ___ (Scr. Long. (ft) Casing Leng.) X ___ (Casing Factor) X 3 = ___ (Casing Vol.) + (___ (Scr. Leng. (ft)) X ___ (Scr. Factor)) = ___ (Purge Volume (gal) (0.0))

Casing Volume Above Screen; Screen Volume

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Cell #2 Pond 90% Recharge Level: ___ ft Sampling Flow Rate ≤ 100 ml/min? ___

Time	Purge Volume specify ml or gal	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1250	0								Clear/odorless
1255	1	14.184	7.37	3506.8	4.25	7.11	192.8		" "
1300	2	14.005	7.15	3490.8	4.47	6.95	182.6		" "
1305	3	14.085	7.13	3489.9	4.46	6.97	181.7		" "
1310	4	14.085	7.14	3489.4	4.57	6.96	181.4		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-8209P	1310	8-2-17	8260, 8011, HEK, CL, C/C, Met, CCT, Nes	9
Duplicate					
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 GAL before sampling

FORT HALL MINE LANDFILL
Groundwater Sampling Log

Revised

Project No: 1615 Monitoring Point: RW-824/9P Date: 8-16-17 Sampler: AL

Weather: Clear 80 Visitors: -

Boring Dia. - Casing Dia. - DTW: - TD: - Pump Intake Depth: _____ Pump Top Depth: _____

Purge/Sampling Method: Sample Port Vial pH: 2.0 Depth to Water @Sampling: _____

Low Flow:
Calculated Purge Volume _____ (Tubing Leng. (ft)) X _____ (Tubing Dia. Factor) + _____ (Pump Volume) X 2 = _____ (Purge Volume (ml)) = _____ (Rounded Purge Volume (Rounded up to nearest 100 ml))

Tubing Diameter Factors: 3/8"= 13 ml/ft 1/2"= 20 ml/ft

Standard Method:
Calculated Purge Volume _____ (TD (ft)) - _____ (DTW (ft)) = _____ (Water Column (ft)) - _____ (Scr. Leng. (ft)) = _____ (Casing Leng.) X _____ (Casing Factor) X 3 = _____ (Casing Vol.) + Screen Volume (_____ (Scr. Leng. (ft)) X _____ (Scr. Factor)) = _____ (Purge Volume (gal) (0.0))

Casing Volume Factors (gal/ft): 2"= 0.17; 4"=0.66; 5"=0.95 Screen Interval Volume Factors (Cas.Dia/Bor.Dia.)(in): 2"/8"= 2.15 gal/ft; 4"/10"= 2.93 gal/ft; 4"/12"= 4.55 gal/ft; 5"/10"=2.54 gal/ft

Water Quality Instrument: YSI EXO Disposition of Purge Water: Left on GW 90% Recharge Level: _____ ft Sampling Flow Rate ≤ 100 ml/min? ____

Time	Purge Volume specify ml or (gal)	Temp (C) (0.0) +/- 1°C	pH (0.0) +/- 0.2	Specific Cond. (mS/cm) +/- 10%	Turbidity (NTU) (0.0) <5 NTU	DO (mg/l) (0.0) +/- 0.2	ORP (mV) (0.0) +/- 10 mV	GW Level (ft below MP)	Comments (Color/Odor)
1130	0								Clear/odorless
1135	1	16.130	7.20	836.2	7.91	6.78	197.1		" "
1140	2	16.338	7.19	839.0	4.71	6.68	190.1		" "
1145	3	16.494	7.18	840.5	3.93	6.66	189.5		" "
1150	4	16.603	7.17	839.6	3.69	6.65	190.1		" "
Field parameters stable?		(Y) N	(Y) N	(Y) N	(Y) N	(Y) N	(Y) N		

	Sample ID	Time	Date	Analyses	Number of Bottles
Normal	RW-824/9P	1150	8-16-17	8260, 8011, TM, Mn, Cr, Cu, Ni, Sul, Alk	9
Duplicate	RW-816A	1220	8-16-17	" " " " " " " " "	9
MS/SD					
Trip Blank					
Equipment Blank					
Field Blank					

General Notes: Purged 200 Gal before Parameters & Samples

Sub-Appendix A-3
Chain-of-Custody Forms

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: ID

Phone: 801-908-5447
Fax:

Client Project # 1615-01 500-005

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andre Nuñez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk,Cl,SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB,DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB,DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury SW 7470A	Pres Chk
TB-20170712	HA	GW		7.12.17	1200	2					*	X	X		
MW-7498P	S	GW		7.12.17	1230	9	X	X	X	X	X			X	
RW-7498P	S	GW		7.12.17	1250	9	X	X	X	X	X			X	
RW-7492P	S	GW		7.12.17	1400	9	X	X	X	X	X			X	
RW-0712A	S	GW		7.12.17	1435	9	X	X	X	X	X			X	
RW-7505P	S	GW		7.13.17	1010	9	X	X	X	X	X			X	
RW-7586P	S	GW		7.13.17	1125	9	X	X	X	X	X			X	
RW-7310P	S	GW		7.13.17	1350	9	X	X	X	X	X			X	
RW-7588P	S	GW		7.13.17	1450	9	X	X	X	X	X			X	
		GW													

Chain of Custody Page 1 of 1

ESC

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L#

Table #

Acctnum: AMECONSLCUT

Template: T125387

Prelogin: P609142

TSR: 110 - Brian Ford

PB:

Shipped Via:

Remarks	Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__UPS __FedEx __Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Andre Nuñez	7.13.17	1600		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: D

Phone: 801-908-5447
Fax:

Client Project # 1615-01 500-005

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Megan Lopez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature): MLopez

Quote #

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40ml Amb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip BlkVOCs 8260AP2 40ml Amb-HCl-Blk	Mercury SW 7470A			Remarks	Sample # (lab only)
TB20170714	AQ	GW		7-14-17	0800	2						X	X					
RW-7549P	S	GW		7-14-17	0950	9	X	X	X	X	X	X	X					
RW-7588P	S	GW		7-14-17	1100	9	X	X	X	X	X							
RW-7288P	S	GW		7-14-17	1215	9	X	X	X	X	X		X					
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																

Chain of Custody Page ___ of ___

ESC LAB SCIENCES
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L #
Table #
Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: ___ UPS ___ FedEx X Courier ___ Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ___NP ___Y ___N
COC Signed/Accurate: ___Y ___N
Bottles arrive intact: ___Y ___N
Correct bottles used: ___Y ___N
Sufficient volume sent: ___Y ___N
If Applicable
VOA Zero Headspace: ___Y ___N
Preservation Correct/Checked: ___Y ___N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
MLopez	7-14-17	1600			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: Condition: NCF / OK

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Pres Chk

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: POCATELLO/ID

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lotz

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LAB SCIENCES
a subsidiary of Accutest

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 927145

G006

Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury 7470A	Remarks	Sample # (lab only)
TB-20170801	AP2	GW		8-1-17	0800	2						X	X	X (AP)		-01
RW-8035P	G	GW		8-1-17	1030	9	X	X	X	X	X			X		-02
RW-8030P	G	GW		8-1-17	1155	9	X	X	X	X	X			X		-03
RW-2076F	G	GW		8-2-17	0950	9	X	X	X	X	X			X		-04
RW-7077P	G	GW		8-2-17	1120	9	X	X	X	X	X			X		-05
RW-8209P	G	GW		8-2-17	1310	9	X	X	X	X	X			X		-06
RW-2213F	G	GW		8-2-17	1520	9	X	X	X	X	X			X		-07
RW-0802A	G	GW		8-2-17	1615	9	X	X	X	X	X			X		-08
RW-2172F	G	GW		8-2-17	1635	9	X	X	X	X	X			X		-09
		GW					X	X	X (AP)							

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Andrew Lotz	8-3-17	1600		2
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.1°C Bottles Received: 40ml 66
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8-4-17 Time: 845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Pres Chk

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: Pocatello ID

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lopez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature): Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury SW7470A			Remarks	Sample # (lab only)
TB-20170803	AP2	GW		8-3-17	0800	2						X	X					01
RW-223H	G	GW		8-3-17	0950	9	X	X	X	X	X			X				02
RW-801P	G	GW		8-3-17	1110	27	X	X	X	X	X			X			MS/MSD	03
RW-803A	G	GW		8-3-17	1215	9	X	X	X	X	X			X				04
RW-800013	G	GW		8-3-17	1400	9	X	X	X	X	X			X				05
RW-7350P	G	GW		8-3-17	1515	27	X	X	X	X	X			X			MS/MSD	06
		GW																
		GW																
		GW																
		GW																

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LABORATORIES
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 977187
G248
T
Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS X FedEx __ Courier __ _____
Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP X Y __N
COC Signed/Accurate: X Y __N
Bottles arrive intact: X Y __N
Correct bottles used: X Y __N
Sufficient volume sent: X Y __N
If Applicable
VOA Zero Headspace: X Y __N
Preservation Correct/Checked: X Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Andrew Lopez	8-3-17	1600		2
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.6 °C Bottles Received: 81
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8/4/17 Time: 08:45

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Pres Chk

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: Pocatello ID

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lokz

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature): [signature]

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury/SW 7470A			Remarks	Sample # (lab only)
TB-20170808	AQ	GW		8-8-17	0800	2						X	X					-01
RW-7776P	G	GW		8-8-17	0920	9	X	X	X	X	X			X				-02
RW-7244P	G	GW		8-8-17	1040	9	X	X	X	X	X			X				-03
RW-2172H	G	GW		8-8-17	1405	9	X	X	X	X	X			X				-04
RW-08087	G	GW		8-8-17	1510	9	X	X	X	X	X			X				-05
RW-7688P	G	GW		8-8-17	1520	9	X	X	X	X	X			X				-06
RW-08083	G	GW		8-8-17	1630	9	X	X	X	X	X			X				-07
MW-103S	G	GW		8-9-17	1102	9	X	X	X	X	X			X				-08
SB-20170809	AQ	GW		8-9-17	1200	6						X	X					-09
MW-103D	G	GW		8-9-17	1300	9	X	X	X	X	X			X				-10

Analysis/ Container / Preservative

Chain of Custody Page 1 of 2

ESC LAB SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 1928991

B090

Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 7283 8330 1641

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
[signature]	8-10-17	0700	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			[signature]

Trip Blank Received: Yes / No
2 HCL / MeoH TBR

Temp: 3.9 °C Bottles Received: 120

Date: 8-11-17 Time: 0845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: Pocatello ID

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lopez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature): ALopez

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	X Mercuri / SW7470A			Remarks	Sample # (lab only)
RW-767P	G	GW		8.9.17	1435	27	X	X	X	X	X			X			MS/MSD	-11
RW-2203H	G	GW		8.9.17	1750	9	X	X	X	X	X			X				-12
EB-20170809	A2	GW		8.9.17	1832	6						X	X					-13
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																

Chain of Custody Page 2 of 2

ESC LAB SCIENCES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L928991

Table #

Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:

Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y / N
COC Signed/Accurate:		Y / N
Bottles arrive intact:		Y / N
Correct bottles used:		Y / N
Sufficient volume sent:		Y / N
If Applicable		
VOA Zero Headspace:		Y / N
Preservation Correct/Checked:		Y / N

Relinquished by : (Signature)	Date: 8-10-17	Time: 0700	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.9 °C Bottles Received: 120
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8-11-17 Time: 0845

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

American Consultants - UT
3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Report to: Rebecca Brown
Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli
City/State Collected: Pocatello ID

Phone: 801-908-5447
Fax:
Client Project #
Lab Project # AMECONSLCUT-IDAHO
Collected by (print): Andrew Lotz
Site/Facility ID # POCATELLO, ID
P.O. #
Collected by (signature):
Immediately Packed on Ice N ___ Y X
Rush? (Lab MUST Be Notified) ___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day
Quote #
Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LAB SCIENCES
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L929120

A118

Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury/SW7470A	Remarks	Sample # (lab only)
TB-20170810	AP2	GW		8-10-17	0730	2						X	X			
PA-4	G	GW		8-10-17	0955	9	X	X	X	X	X			X		-01
PA-3	G	GW		8-10-17	1130	9	X	X	X	X	X			X		-02
PA-1	G	GW		8-10-17	1325	9	X	X	X	X	X			X		-03
CW-2-EXT	G	GW		8-10-17	1600	9	X	X	X	X	X			X		-04
EB-20170810	AP2	GW		8-10-17	1625 GB				X		X	X	X	X		-05
RW-8105PS	G	GW		8-11-17	0855	9	X	X	X	X	X			X		-06
RW-8105PN	G	GW		8-11-17	0940	9	X	X	X	X	X			X		-07
RW-2879M	G	GW		8-11-17	1045	9	X	X	X	X	X			X		-08
		GW												X		-09

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier __ _____
Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP X Y __N
COC Signed/Accurate: X Y __N
Bottles arrive intact: X Y __N
Correct bottles used: X Y __N
Sufficient volume sent: X Y __N
If Applicable
VOA Zero Headspace: X Y __N
Preservation Correct/Checked: __Y __N

	Date:	Time:		
Relinquished by : (Signature)	8-11-17	1600	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeOH TBR
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.2 °C Bottles Received: 10 69
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8-12-17 Time: 845

If preservation required by Login: Date/Time
Hold:
Condition: NCF / OK

Chain of Custody Page 1 of 1

ESC LAB SCIENCES
a subsidiary of Pace Analytical
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L929552

H076

Acctnum: AMECONSLCUT

Template: T125387

Prelogin: P609142

TSR: 110 - Brian Ford

PB:

Shipped Via:

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Pres Chk

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected: Pocatello ID

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lopez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury/SW7470A			Remarks	Sample # (lab only)
TB-20170811	AQ	GW		8-11-17	1145	2						X	X					-01
RW-2140H	G	GW		8-11-17	1255	9	X	X	X	X	X			X				02
MW-116S	G	GW		8-11-17	1425	9	X	X	X	X	X			X				03
MW-116D	G	GW		8-11-17	1606	9	X	X	X	X	X			X				04
EB-20170811	AQ	GW		8-11-17	1630	6			X		X							05
		GW																
		GW																
		GW																
		GW																
		GW																

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: ___ UPS X FedEx ___ Courier _____

Tracking # 7061 6677 4472

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N

	Date:	Time:	
Relinquished by: (Signature)	8-11-17	1715	Received by: (Signature)
Relinquished by: (Signature)	8-14-17	1618	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: (Yes) / No
HCL / MeoH
TBR

Temp: .9 °C Bottles Received: 33

Date: 8-15-17 Time: 8:45

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Pres Chk

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected:

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lopez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature): Andrew Lopez

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury/SW 7470A			Remarks	Sample # (lab only)
TB-20170815	HQ	GW		8-15-17	0830	2						X	X					01
MW-106S	G	GW		8-15-17	1040	9	X	X	X	X	X			X				02
MW-106D	G	GW		8-15-17	1205	9	X	X	X	X	X			X				03
RW-7773P	G	GW		8-15-17	1410	9	X	X	X	X	X			X				04
MW-115S	G	GW		8-15-17	1601	9	X	X	X	X	X			X				05
MW-115D	G	GW		8-15-17	1745	9	X	X	X	X	X			X				06
FB-20170815	HQ	GW		8-15-17	815	6			X		X							07
RW-32593	G	GW		8-16-17	1030	27	X	X	X	X	X			X			MS/MSD	08
RW-8249P	G	GW		8-16-17	1150	9	X	X	X	X	X			X				09
RW-0816A	G	GW		8-16-17	1220	9	X	X	X	X	X			X				10

Analysis / Container / Preservative

Chain of Custody Page 1 of 2

ESC LABORATORIES

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 930223
Tab G094
Acctnum: AMECONSLCUT
Template: T125387
Prelogin: P609142
TSR: 110 - Brian Ford
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS X FedEx __ Courier __ _____

Tracking # 682711885548

Sample Receipt Checklist
COC Seal Present/Intact: __NP X Y __N
COC Signed/Accurate: X Y __N
Bottles arrive intact: X Y __N
Correct bottles used: X Y __N
Sufficient volume sent: X Y __N
If Applicable
VOA Zero Headspace: ___ Y ___ N
Preservation Correct/Checked: X Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Andrew Lopez	8-16-17	1600		2	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.7 °C Bottles Received: 123	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8/17/17 Time: 0840	Hold: / Condition: NCF / OK

Chain of Custody Page 1 of 1

ESC LAB SCIENCES
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 930223

Table #

Acctnum: AMECONSLCUT

Template: T125387

Prelogin: P609142

TSR: 110 - Brian Ford

PB:

Shipped Via:

American Consultants - UT

3489 West 2100 South
Suite 150
Salt Lake City, UT 84119

Billing Information:
Ellen Parmer
3489 W. 2100 S., Ste. 150
Salt Lake City, UT 84119

Pres Chk

Report to: Rebecca Brown

Email To: rbrown@americanconsultants.com; jdebarmore@americanconsultants.com

Project Description: Fort Hall Mine Landfill Quarterly Sampli

City/State Collected:

Phone: 801-908-5447
Fax:

Client Project #

Lab Project # AMECONSLCUT-IDAHO

Collected by (print): Andrew Lopez

Site/Facility ID # POCATELLO, ID

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alk, Cl, SO4 250mlHDPE-NoPres	Cyanide 250mlHDPEAmb-NaOH	EDB DBCP 8011 40mlClr-NaThio	Tot. Metal&Cations 250mlHDPE-HNO3	VOCs 8260AP2 40mlAmb-HCl	trip EDB DBCP 8011 40mlClr-NaThio-Blk	trip blkVOCs 8260AP2 40mlAmb-HCl-Blk	Mercury/SW7470A			Remarks	Sample # (lab only)
RW-7953P	G	GW		8-16-17	1305	27	X	X	X	X	X			X			MS/MSD	11
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																
		GW																

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Tot. Metals=AP2 metals by 6020 (includes Hg)
Cations=Ca,Fe,K,Mg,Mn,Na by 6020

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP X Y __N
COC Signed/Accurate: X Y __N
Bottles arrive intact: X Y __N
Correct bottles used: X Y __N
Sufficient volume sent: X Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: X Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Andrew Lopez	8-16-17	1600		2	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.7 °C Bottles Received: 123	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8/17/17 Time: 0845	Hold: Condition: NCF / OK

American Consultants **Salt Lake City, UT**	Billing Information: **American Consultants** **Salt Lake City, UT**	Pres Chk
Report to: **Rebecca Brown**	Email To: **rbrown@americanconsultants.com;**	
Project Description: **Fort Hall Mine Landfill Quarterly Sampling**	City/State Collected: **Pocatello, ID**	
Phone: Fax:	Client Project # **1615-02 500-001**	Lab Project # **AMECONSLCUT-IDAHO**
Collected by (print): Andrew Hoyt	Site/Facility ID # FHML/1615	P.O. #
Collected by (signature): Hoyt	*Rush?* (Lab MUST Be Notified) ___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day	Quote # Date Results Needed
Immediately Packed on Ice N ___ Y X		

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	V8260AP2 VOCs	8270AP2 SVOCs (specify 1 or 2)*	SV8011 EDB DBCP	8081 OC Pest	M6020AP2 Total Metals (no Hg)	HG Total Mercury	CN Cyanide	Sulfide	Cations by 6020	Sulfate, Chloride, Alkalinity	Remarks	Sample # (lab only)
TB-20171116	AQ	WQ		11-16-17	1030	2	X		X		X	X	X		X	X		-01
RW-2151H	S	GW		11-16-17	1340	9	X		X		X	X	X		X	X		02

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LABORATORY SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L951790
F176

Acctnum: AMECONSLCUT
Template:
Prelogin:
TSR:
PB:
Shipped Via:

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:
QC4. Cations=Ca,Fe,K,Mg,Mn,Na by 6020. *write 1 for list 1 , or 2 for list 2.
Login:8270 list 1=AMECONSLCUT-IDAHOSH1,list 2=AMECONSLCUT-IDAHOSH2

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 4094 8308 3712

Sample Receipt Checklist
COC Seal Present/Intact: __NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Hoyt	11-16-17	1600	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			DJB 834

Trip Blank Received: Yes / No
2 HCL / MeoH
TBR

Temp: 1.3 °C Bottles Received: 9
+011

Date: 11-17-17 Time: 0845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Appendix B
2017 Offsite Groundwater Monitoring Sampling Summary

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APPENDIX B INDEX

Table	Title
B-1	Monitoring Location and Analytical Method Summary
B-2	Field Parameter Summary
B-3	Monitoring Location-Specific Sampling Variances
B-4	Groundwater Elevation Measurement Summary

Unit	Definition
°C	Degree Celsius
ft amsl	feet above mean sea level
ft	feet
L	liter
mg	milligram
µS/cm	microSiemen per centimeter
mV	millivolt
NTU	nephelometric turbity unit

Acronym	Definition
DO	dissolved oxygen
DTW	depth to water
DU	laboratory duplicate
EB	equipment blank
ESC	ESC Lab Sciences
FD	field duplicate
G	grab sample
ID	identification
LF	low flow sampling method
LOCID	location identification
MS	matrix spike
MSD	matrix spike duplicate
MW	monitoring well
N	normal sample
NA	not available
ORP	oxidation-reduction potential
RW	residential well
S	spigot sample method
TB	trip blank
WG	groundwater
WQ	water quality control matrix
YSI EXO	As measured by the YSI EXO water quality sensor

TABLE B-1

Monitoring Location and Analytical Method Summary

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Field Sample ID	ESC Lab Sample ID	Date Sampled	Sample Type	Matrix	SW8260B	SW8011	SW6020 (Total Metals)	SW7470A	4500CN E-2011	SW6020 (Cations)	SW9056A	SM 2320B
CW-2-EXT	210	CW-2-EXT	L929120-05	8/10/2017	N	WG	X	X	X	X	X	X	X	X
MW-103D	20	MW-103D	L928991-10	8/9/2017	N	WG	X	X	X	X	X	X	X	X
MW-103D	20	MW-103DDUP	R3242161-3	8/9/2017	DU	WG		X						
MW-103S	20	MW-103S	L928991-08	8/9/2017	N	WG	X	X	X	X	X	X	X	X
MW-103S	20	MW-103SDUP	R3241912-4	8/9/2017	DU	WG					X			
MW-106D	100	MW-106D	L930223-03	8/15/2017	N	WG	X	X	X	X	X	X	X	X
MW-106S	100	MW-106S	L930223-02	8/15/2017	N	WG	X	X	X	X	X	X	X	X
MW-106S	100	MW-106SDUP	R3244147-2	8/15/2017	DU	WG								X
MW-115D	46	MW-115D	L930223-06	8/15/2017	N	WG	X	X	X	X	X	X	X	X
MW-115S	46	MW-115S	L930223-05	8/15/2017	N	WG	X	X	X	X	X	X	X	X
MW-116D	5	MW-116D	L929552-04	8/11/2017	N	WG	X	X	X	X	X	X	X	X
MW-116D	5	MW-116DDUP	R3241970-4	8/11/2017	DU	WG					X			X
MW-116S	5	MW-116S	L929552-03	8/11/2017	N	WG	X	X	X	X	X	X	X	X
PA-1	81	PA-1	L929120-04	8/10/2017	N	WG	X	X	X	X	X	X	X	X
PA-1	81	PA-1DUP	R3241518-5	8/10/2017	DU	WG					X			
PA-3	81	PA-3	L929120-03	8/10/2017	N	WG	X	X	X	X	X	X	X	X
PA-4	81	PA-4	L929120-02	8/10/2017	N	WG	X	X	X	X	X	X	X	X
RW-2076F	21	RW-2076F	L927145-04	8/2/2017	N	WG	X	X	X	X	X	X	X	X
RW-2140H	6	RW-2140H	L929552-02	8/11/2017	N	WG	X	X	X	X	X	X	X	X
RW-2151H	9	RW-2151H	L951790-2	11/16/2017	N	WG	X	X	X	X	X	X	X	X
RW-2172F	29	RW-2172F	L927145-09	8/2/2017	N	WG	X	X	X	X	X	X	X	X
RW-2172F	29	RW-2172FDUP	R3238922-4	8/2/2017	DU	WG					X			X
RW-2172H	4	RW-2172H	L928991-04	8/8/2017	N	WG	X	X	X	X	X	X	X	X
RW-2172H	4	RW-0808A	L928991-05	8/8/2017	FD	WG	X	X	X	X	X	X	X	X
RW-2203H	7	RW-2203H	L928991-12	8/9/2017	N	WG	X	X	X	X	X	X	X	X
RW-2213F	26	RW-2213F	L927145-07	8/2/2017	N	WG	X	X	X	X	X	X	X	X
RW-2213F	26	RW-0802A	L927145-08	8/2/2017	FD	WG	X	X	X	X	X	X	X	X
RW-2237H	101	RW-2237H	L927108-02	8/3/2017	N	WG	X	X	X	X	X	X	X	X
RW-2237H	101	RW-2237HDUP	R3239403-3	8/3/2017	DU	WG		X						
RW-2879M	202	RW-2879M	L929120-09	8/11/2017	N	WG	X	X	X	X	X	X	X	X
RW-3259B	51	RW-3259B	L930223-08	8/16/2017	N	WG	X	X	X	X	X	X	X	X
RW-3259B	51	RW-3259BMS	R3242666-6	8/16/2017	MS	WG	X	X	X	X	X	X	X	
RW-3259B	51	RW-3259BMSD	R3242666-7	8/16/2017	MSD	WG	X		X	X	X	X	X	

TABLE B-1

Monitoring Location and Analytical Method Summary

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Field Sample ID	ESC Lab Sample ID	Date Sampled	Sample Type	Matrix	SW8260B	SW8011	SW6020 (Total Metals)	SW7470A	4500CN E-2011	SW6020 (Cations)	SW9056A	SM 2320B
RW-7077P	31	RW-7077P	L927145-05	8/2/2017	N	WG	X	X	X	X	X	X	X	X
RW-7244P	12	RW-7244P	L928991-03	8/8/2017	N	WG	X	X	X	X	X	X	X	X
RW-7288P	13	RW-7288P	L922695-04	7/14/2017	N	WG	X	X	X	X	X	X	X	X
RW-7310P	14	RW-7310P	L922572-07	7/13/2017	N	WG	X	X	X	X	X	X	X	X
RW-7350P	15	RW-7350P	L927108-06	8/3/2017	N	WG	X	X	X	X	X	X	X	X
RW-7350P	15	RW-7350PMS	R3239175-5	8/3/2017	MS	WG	X	X	X	X	X	X	X	
RW-7350P	15	RW-7350PMSD	R3239175-6	8/3/2017	MSD	WG	X		X	X	X	X	X	
RW-7350P	15	RW-7350PDUP	R3238921-7	8/3/2017	DU	WG							X	X
RW-7492P	18	RW-7492P	L922572-03	7/12/2017	N	WG	X	X	X	X	X	X	X	X
RW-7492P	18	RW-0712A	L922572-04	7/12/2017	FD	WG	X	X	X	X	X	X	X	X
RW-7492P	18	RW-0712ADUP	R3234731-5	7/12/2017	DU	WG								X
RW-7498P	19	RW-7498P	L922572-02	7/12/2017	N	WG	X	X	X	X	X	X	X	X
RW-7505P	3	RW-7505P	L922572-05	7/13/2017	N	WG	X	X	X	X	X	X	X	X
RW-7505P	3	RW-7505PDUP	R3234732-2	7/13/2017	DU	WG								X
RW-7549P	103	RW-7549P	L922695-02	7/14/2017	N	WG	X	X	X	X	X	X	X	X
RW-7586P	98	RW-7586P	L922572-06	7/13/2017	N	WG	X	X	X	X	X	X	X	X
RW-7588P	10	RW-7588P	L922695-03	7/14/2017	N	WG	X	X	X	X	X	X	X	X
RW-7588P	10	RW-7588PDUP	R3235182-3	7/14/2017	DU	WG		X						
RW-7677P	99	RW-7677P	L928991-11	8/9/2017	N	WG	X	X	X	X	X	X	X	X
RW-7677P	99	RW-7677PMS	R3241158-4	8/9/2017	MS	WG	X	X	X	X	X	X	X	
RW-7677P	99	RW-7677PMSD	R3241158-5	8/9/2017	MSD	WG	X		X	X	X	X	X	
RW-7688P	97	RW-7688P	L928991-06	8/8/2017	N	WG	X	X	X	X	X	X	X	X
RW-7688P	97	RW-0808B	L928991-07	8/8/2017	FD	WG	X	X	X	X	X	X	X	X
RW-7773P	100	RW-7773P	L930223-04	8/15/2017	N	WG	X	X	X	X	X	X	X	X
RW-7773P	100	RW-7773PDUP	R3242666-5	8/15/2017	DU	WG							X	
RW-7776P	95	RW-7776P	L928991-02	8/8/2017	N	WG	X	X	X	X	X	X	X	X
RW-7953P	214	RW-7953P	L930223-11	8/16/2017	N	WG	X	X	X	X	X	X	X	X
RW-7953P	214	RW-7953PMS	R3242666-8	8/16/2017	MS	WG	X	X	X	X	X	X	X	
RW-7953P	214	RW-7953PMSD	R3242666-9	8/16/2017	MSD	WG	X		X	X	X	X	X	
RW-7953P	214	RW-7953PDUP	R3243078-4	8/16/2017	DU	WG							X	
RW-8000B	115	RW-8000B	L927108-05	8/3/2017	N	WG	X	X	X	X	X	X	X	X
RW-8000B	115	RW-8000BDUP	R3239429-6	8/3/2017	DU	WG					X			
RW-8012P	206	RW-8012P	L927108-03	8/3/2017	N	WG	X	X	X	X	X	X	X	X

TABLE B-1

Monitoring Location and Analytical Method Summary

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Field Sample ID	ESC Lab Sample ID	Date Sampled	Sample Type	Matrix	SW8260B	SW8011	SW6020 (Total Metals)	SW7470A	4500CN E-2011	SW6020 (Cations)	SW9056A	SM 2320B
RW-8012P	206	RW-0803A	L927108-04	8/3/2017	FD	WG	X	X	X	X	X	X	X	X
RW-8012P	206	RW-8012PMS	R3239201-7	8/3/2017	MS	WG	X	X	X	X	X	X	X	
RW-8012P	206	RW-8012PMSD	R3239201-8	8/3/2017	MSD	WG	X		X	X	X	X	X	
RW-8030P	205	RW-8030P	L927145-03	8/1/2017	N	WG	X	X	X	X	X	X	X	X
RW-8030P	205	RW-8030PDUP	R3239096-6	8/1/2017	DU	WG							X	
RW-8035P	60	RW-8035P	L927145-02	8/1/2017	N	WG	X	X	X	X	X	X	X	X
RW-8105PN	225	RW-8105PN	L929120-08	8/11/2017	N	WG	X	X	X	X	X	X	X	X
RW-8105PN	225	RW-8105PNDUP	R3242162-3	8/11/2017	DU	WG		X						
RW-8105PS	225	RW-8105PS	L929120-07	8/11/2017	N	WG	X	X	X	X	X	X	X	X
RW-8209P	198	RW-8209P	L927145-06	8/2/2017	N	WG	X	X	X	X	X	X	X	X
RW-8249P	199	RW-8249P	L930223-09	8/16/2017	N	WG	X	X	X	X	X	X	X	X
RW-8249P	199	RW-0816A	L930223-10	8/16/2017	FD	WG	X	X	X	X	X	X	X	X
FIELDQC	NA	TB-20170712	L922572-01	7/12/2017	TB	WQ	X	X						
FIELDQC	NA	TB-20170714	L922695-01	7/14/2017	TB	WQ	X	X						
FIELDQC	NA	TB-20170801	L927145-01	8/1/2017	TB	WQ	X	X						
FIELDQC	NA	TB-20170803	L927108-01	8/3/2017	TB	WQ	X	X						
FIELDQC	NA	TB-20170808	L928991-01	8/8/2017	TB	WQ	X	X						
FIELDQC	NA	EB-20170809	L928991-13	8/9/2017	EB	WQ	X	X						
FIELDQC	NA	SB-20170809	L928991-09	8/9/2017	SB	WQ	X	X						
FIELDQC	NA	EB-20170810	L929120-06	8/10/2017	EB	WQ	X	X						
FIELDQC	NA	TB-20170810	L929120-01	8/10/2017	TB	WQ	X							
FIELDQC	NA	EB-20170811	L929552-05	8/11/2017	EB	WQ	X	X						
FIELDQC	NA	TB-20170811	L929552-01	8/11/2017	TB	WQ	X	X						
FIELDQC	NA	EB-20170815	L930223-07	8/15/2017	EB	WQ	X	X						
FIELDQC	NA	TB-20170815	L930223-01	8/15/2017	TB	WQ	X	X						
FIELDQC	NA	TB-20171116	L951790-01	11/16/2017	TB	WQ	X	X						

TABLE B-2

Field Parameter Summary

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Date	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Comments
CW-2-EXT	210	8/10/2017	20.080	7.06	830.3	2.21	5.86	160.9	CLEAR/ODORLESS
MW-103D	20	8/9/2017	23.683	7.86	738.9	4.27	4.92	142.8	CLEAR/ODORLESS
MW-103S	20	8/9/2017	14.873	7.06	768.5	3.96	6.27	155.9	CLEAR/ODORLESS
MW-106D	100	8/15/2017	20.021	7.17	787.2	2.91	6.16	162.6	CLEAR/ODORLESS
MW-106S	100	8/15/2017	14.107	7.04	798.0	2.62	6.71	173.6	CLEAR/ODORLESS
MW-115D	46	8/15/2017	19.712	7.13	929.9	3.72	7.62	167.5	CLEAR/ODORLESS
MW-115S	46	8/15/2017	19.092	7.16	1106.9	2.97	9.01	171.2	CLEAR/ODORLESS
MW-116D	5	8/11/2017	17.305	6.97	371.2	1.31	0.79	-89.3	CLEAR/ODORLESS
MW-116S	5	8/11/2017	13.998	6.92	1096.5	4.19	6.76	187.0	CLEAR/ODORLESS
PA-1	81	8/10/2017	18.190	7.13	789.4	3.77	6.13	180.2	CLEAR/ODORLESS
PA-3	81	8/10/2017	16.750	7.13	824.0	4.12	7.13	200.1	CLEAR/ODORLESS
PA-4	81	8/10/2017	16.239	7.11	825.0	2.47	6.67	203.3	CLEAR/ODORLESS
RW-2076F	21	8/2/2017	15.525	7.26	721.0	2.02	5.34	201.0	CLEAR/ODORLESS
RW-2140H	6	8/11/2017	12.731	7.01	1240.2	0.26	6.20	156.4	CLEAR/ODORLESS
RW-2151H	9	11/16/2017	10.573	6.97	1528.3	2.39	5.53	-9.8	CLEAR/ODORLESS
RW-2172F	29	8/2/2017	16.656	7.27	717.0	2.59	6.53	182.3	CLEAR/ODORLESS
RW-2172H	4	8/8/2017	12.486	6.96	1187.0	2.02	6.14	153.4	CLEAR/ODORLESS
RW-2203H	7	8/9/2017	15.895	7.34	979.7	106.25	0.06	-224.1	LIGHT YELLOW/ODORLESS. TURBIDITY > 5 NTU BUT STABLE. TWO EXTRA PURGE VOLUMES REMOVED
RW-2213F	26	8/2/2017	12.234	7.39	692.0	0.70	6.46	153.8	CLEAR/ODORLESS
RW-2237H	101	8/3/2017	15.456	7.02	1245.7	4.82	5.75	161.3	CLEAR/ODORLESS
RW-2879M	202	8/11/2017	16.280	6.96	1580.2	1.62	5.30	29.9	CLEAR/ODORLESS
RW-3259B	51	8/16/2017	15.927	7.21	433.5	2.73	7.23	186.0	CLEAR/ODORLESS
RW-7077P	31	8/2/2017	12.765	7.35	703.1	1.97	6.19	164.1	CLEAR/ODORLESS
RW-7244P	12	8/8/2017	12.018	7.22	708.3	1.88	6.38	173.9	CLEAR/ODORLESS
RW-7288P	13	7/14/2017	13.202	7.26	691.0	1.39	6.37	171.9	CLEAR/ODORLESS
RW-7310P	14	7/13/2017	13.739	7.15	665.1	1.30	6.21	144.0	CLEAR/ODORLESS
RW-7350P	15	8/3/2017	17.554	7.35	710.8	2.48	6.31	195.9	CLEAR/ODORLESS
RW-7492P	18	7/12/2017	13.782	7.36	640.1	2.60	6.41	187.6	CLEAR/ODORLESS
RW-7498P	19	7/12/2017	14.184	7.11	643.4	4.04	6.33	175.8	CLEAR/ODORLESS
RW-7505P	3	7/13/2017	12.299	6.93	701.0	0.62	6.48	170.9	CLEAR/ODORLESS
RW-7549P	103	7/14/2017	15.677	7.01	777.9	74.70	7.20	213.9	CLEAR/ODORLESS
RW-7586P	98	7/13/2017	15.105	7.29	767.9	0.99	6.49	178.7	CLEAR/ODORLESS
RW-7588P	10	7/14/2017	13.804	7.23	704.1	1.32	6.56	207.7	CLEAR/ODORLESS
RW-7677P	99	8/9/2017	12.412	7.16	1105.1	2.94	7.15	125.1	CLEAR/ODORLESS
RW-7688P	97	8/8/2017	13.981	7.27	710.0	3.66	7.15	185.0	CLEAR/ODORLESS
RW-7773P	100	8/15/2017	13.876	7.20	787.2	2.56	6.27	61.0	CLEAR/ODORLESS
RW-7776P	95	8/8/2017	12.812	7.22	716.0	1.26	7.10	162.7	CLEAR/ODORLESS
RW-7953P	214	8/16/2017	12.842	7.03	1020.9	1.75	8.97	191.4	CLEAR/ODORLESS
RW-8000B	115	8/3/2017	12.408	7.29	839.5	2.13	7.20	180.6	CLEAR/ODORLESS
RW-8012P	206	8/3/2017	12.663	7.27	819.0	2.38	7.25	185.5	CLEAR/ODORLESS
RW-8030P	205	8/1/2017	13.978	7.09	949.1	3.91	4.89	168.8	CLEAR/ODORLESS
RW-8035P	60	8/1/2017	15.780	7.38	680.5	2.15	4.49	178.2	CLEAR/ODORLESS
RW-8105PN	225	8/11/2017	13.110	6.83	1538.1	2.72	2.73	94.7	CLEAR/ODORLESS
RW-8105PS	225	8/11/2017	11.955	7.01	883.7	0.48	0.13	-95.8	CLEAR/ODORLESS
RW-8209P	198	8/2/2017	14.085	7.14	3489.4	4.57	6.96	181.4	CLEAR/ODORLESS
RW-8249P	199	8/16/2017	16.803	7.17	839.6	3.69	6.65	190.1	CLEAR/ODORLESS

TABLE B-3

Monitoring Location-Specific Sampling Variances

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Date Sampled	Sampling Method	Flow Rate (mL/min)	Required Purge Volume Removed?	Groundwater Level Drawdown (ft)	Drawdown Stabilization at Sampling?	Field Parameter Stabilization?	Field Parameter Frequency per QAPP?	Required Analysis Performed?	Meter Calibration	Comments
City Monitoring Well A	210	NA	NA	See Comments.								Requirement was to sample at least two wells from the parcel. Four wells were sampled, CW-2-EXT from the city extraction wells and PA-1, PA-3, and PA-4 from the city monitoring wells.
City Monitoring Well B	210	NA	NA	See Comments.								Requirement was to sample at least two wells from the parcel. Four wells were sampled, CW-2-EXT from the city extraction wells and PA-1, PA-3, and PA-4 from the city monitoring wells.
CW-1-EXT	210	NA	NA	See Comments.								Requirement was to sample at least two wells from the parcel. Four wells were sampled, CW-2-EXT from the city extraction wells and PA-1, PA-3, and PA-4 from the city monitoring wells.
CW-2-EXT	210	8/10/2017	LF	95	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/10/2017	
MW-103D	20	8/9/2017	LF	93	YES	2.25	YES	YES	YES	YES	YSI EXO: 8/9/2017	
MW-103S	20	8/9/2017	LF	90	YES	0.04	YES	YES	YES	YES	YSI EXO: 8/9/2017	
MW-106D	100	8/15/2017	LF	100	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/15/2017	
MW-106S	100	8/15/2017	LF	97	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/15/2017	
MW-107D	88	NA	NA	See Comments.								Consent for sampling was not given by resident.
MW-107S	88	NA	NA	See Comments.								Consent for sampling was not given by resident.
MW-108D	24	NA	NA	See Comments.								Consent for sampling was not given by resident.
MW-108S	24	NA	NA	See Comments.								Consent for sampling was not given by resident.
MW-115D	46	8/15/2017	LF	98	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/15/2017	
MW-115S	46	8/15/2017	LF	73	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/15/2017	
MW-116D	5	8/11/2017	LF	100	YES	18.85	YES	YES	YES	YES	YSI EXO: 8/11/2017	
MW-116S	5	8/11/2017	LF	91	YES	0.05	YES	YES	YES	YES	YSI EXO: 8/11/2017	
PA-1	81	8/10/2017	LF	94	YES	0.05	YES	YES	YES	YES	YSI EXO: 8/10/2017	
PA-3	81	8/10/2017	LF	87	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/10/2017	
PA-4	81	8/10/2017	LF	94	YES	0.02	YES	YES	YES	YES	YSI EXO: 8/10/2017	
RW-2076F	21	8/2/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/2/2017	
RW-2140H	6	8/11/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/11/2017	
RW-2151H	9	11/16/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 11/16/2017	
RW-2172F	29	8/2/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/2/2017	
RW-2172H	4	8/8/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/8/2017	
RW-2203H	7	8/9/2017	LF	97	YES	0.03	YES	YES	YES	YES	YSI EXO: 8/9/2017	NTU>5, but stable. Purged 2 extra volumes.
RW-2213F	26	8/2/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/2/2017	
RW-2237H	101	8/3/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/3/2017	
RW-2879M	202	8/11/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/11/2017	
RW-3259B	51	8/16/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/16/2017	
RW-7070B	157	NA	NA	See Comments.								Consent for sampling was not given by resident.
RW-7077P	31	8/2/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/2/2017	

TABLE B-3

Monitoring Location-Specific Sampling Variances

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Date Sampled	Sampling Method	Flow Rate (mL/min)	Required Purge Volume Removed?	Groundwater Level Drawdown (ft)	Drawdown Stabilization at Sampling?	Field Parameter Stabilization?	Field Parameter Frequency per QAPP?	Required Analysis Performed?	Meter Calibration	Comments
RW-7091R	143	NA	NA	See Comments.								Consent for sampling was not given by resident.
RW-7201P	24	NA	NA	See Comments.								Consent for sampling was not given by resident.
RW-7244P	12	8/8/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/8/2017	
RW-7288P	13	7/14/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/14/2017	
RW-7310P	14	7/13/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/13/2017	
RW-7350P	15	8/3/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/3/2017	
RW-7455P	88	NA	NA	See Comments.								Consent for sampling was not given by resident.
RW-7474P	17	NA	NA	See Comments.								Consent for sampling was not given by resident.
RW-7492P	18	7/12/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/12/2017	
RW-7498P	19	7/12/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/12/2017	
RW-7505P	3	7/13/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/13/2017	
RW-7549P	103	7/14/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/14/2017	
RW-7586P	98	7/13/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/13/2017	
RW-7588P	10	7/14/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 7/14/2017	
RW-7677P	99	8/9/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/9/2017	
RW-7688P	97	8/8/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/8/2017	
RW-7773P	100	8/15/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/15/2017	
RW-7776P	95	8/8/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/8/2017	
RW-7953P	214	8/16/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/16/2017	
RW-8000B	115	8/3/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/3/2017	
RW-8012P	206	8/3/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/3/2017	
RW-8030P	205	8/1/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/1/2017	
RW-8035P	60	8/1/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/1/2017	
RW-8048P	220	NA	NA	See Comments.								Consent to sample domestic well was received after system was already winterized. Location will be included in the 2018 SAP.
RW-8105PN	225	8/11/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/11/2017	
RW-8105PS	225	8/11/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/11/2017	
RW-8170P	227	NA	NA	See Comments.								No well found on the property.
RW-8209P	198	8/2/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/2/2017	
RW-8249P	199	8/16/2017	S	NA	NA	NA	NA	NA	YES	YES	YSI EXO: 8/16/2017	

TABLE B-4

Groundwater Elevation Measurement Summary

2017 Offsite Groundwater Monitoring Sampling Summary

LOCID	Map Key	Date	Time	DTW (ft)	MP ELEV (ft amsl)[a]	GW ELEV (ft amsl)[a]
CW-2-EXT	210	8/10/2017	1600	40.60	4503.87	4463.27
MW-103D	20	8/9/2017	1300	92.65	4560.10	4467.45
MW-103S	20	8/9/2017	1102	90.00	4559.79	4469.79
MW-106D	100	8/15/2017	1205	49.35	4516.12	4466.77
MW-106S	100	8/15/2017	1040	50.10	4516.90	4466.80
MW-115D	46	8/15/2017	1745	71.84	4538.81	4466.97
MW-115S	46	8/15/2017	1601	71.85	4538.74	4466.89
MW-116D	5	8/11/2017	1606	75.85	4535.66	4459.81
MW-116S	5	8/11/2017	1425	66.95	4535.81	4468.86
PA-1	81	8/10/2017	1325	41.90	4504.76	4462.86
PA-3	81	8/10/2017	1130	42.45	4505.18	4462.73
PA-4	81	8/10/2017	0955	57.80	4520.60	4462.80

NOTES:

[a]Elevations measured in National Geodetic Vertical Datum of 1929.

Appendix C
2017 Offsite Groundwater Monitoring Data Validation

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APPENDIX C INDEX

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C-11	Laboratory Control Sample/Laboratory Control Sample Duplicate Relative Percent Difference Exceedances and Qualified Data

Unit	Definition
µg/L	microgram per liter
%	percent

Qualifier	Definition
B	Analyte is detected in an associated blank
J	Estimated result
R	Rejected
UB	Presence or absence cannot be determined due to blank contamination
UJ	Non-detected estimated

Acronym	Definition
DU	laboratory duplicate
EB	equipment blank
FD	field duplicate
LOCID	location identification
min	minimum
MS	matrix spike
MSD	matrix spike duplicate
N	normal sample
NA	not applicable
RL	reporting limit
RPD	relative percent difference
SB	source blank
TB	trip blank
#.#	Ratio or RPD above acceptance criteria

APPENDIX C

DATA VALIDATION REPORT
2017 OFFSITE
Fort Hall Mine Landfill
IDAHO

14 March 2018

Prepared for:
Bannock County Public Works
5500 South Fifth Avenue
Pocatello, Idaho 83204

Contract/Task Order No.: 1615-01 500-005

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ABBREVIATIONS AND ACRONYMS

AEEC ..... American Environmental and Engineering Consultants, LLC
B ..... Sample Concentration above Associated Blank Action Level
COC ..... Chain of Custody
°C ..... degrees Celsius
EB ..... Equipment Blank
ESC ..... ESC Lab Sciences
EPA ..... Environmental Protection Agency
J ..... Estimated
FHML ..... Fort Hall Mine Landfill
LCS ..... Laboratory Control Sample
LCSD ..... Laboratory Control Sample Duplicate
LOD ..... Limits of Detection
MB ..... Method Blank
MDL ..... Method Detection Limit
MS ..... Matrix Spike
MSD ..... Matrix Spike Duplicate
PARCCS ..... Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity
% ..... Percent
%R ..... Percent Recovery
QAPP ..... Fort Hall Mine Landfill Environmental Program Quality Assurance Program Plan
QC ..... Quality Control
R ..... Rejected
RL ..... Reporting Limit
RPD ..... Relative Percent Difference
SAP ..... Sampling and Analysis Plan
SVOC ..... Semi-volatile Organic Compound
TB ..... Trip Blank
U ..... Non-detected
UB ..... Analyte Cannot Be Detected at the Indicated Concentration due to Blank Contamination
UJ ..... Non-detected Estimated
VOC ..... Volatile Organic Compound
WP ..... Fort Hall Mine Landfill Offsite Groundwater Work Plan

C. FHML Data Validation Report, 2017 Off-Site Monitoring Report

C.1 Introduction

This data validation report by American Environmental and Engineering Consultants, LLC (AEEC) assesses the data quality for 100 percent (%) of the analytical data associated with the offsite groundwater monitoring conducted during 2017 at Fort Hall Mine Landfill (FHML) as detailed in the Final Fort Hall Mine Landfill Offsite Groundwater Work Plan (WP) Sampling and Analysis Plan (SAP) (AEEC, 2017a).

The WP and FHML Environmental Program Quality Assurance Program Plan (QAPP) (AEEC, 2017b) detail a program designed to produce data of sufficient quality to meet the project data quality objectives. For this project, analyses are conducted by ESC Lab Sciences (ESC) in Mt. Juliet, Tennessee. The data packages prepared by ESC comply with the reporting requirements for the project and contain sufficient information for independent data validation.

As stated in QAPP worksheet #36, the validation criteria that are used to evaluate the data, in the order applied, include the QAPP, Environmental Protection Agency (EPA) National Functional Guidelines (EPA 2008, 2010) and method criteria. The data were evaluated based on the Quality Control (QC) results reported in the data packages and qualified using a 100% modified Tier III review as specified in QAPP worksheet #36.

The cumulative effect of the non-compliant definitive data results for the project samples are discussed in terms of precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS) criteria in the appropriate PARCCS sections of this Data Evaluation Report.

The QC samples used for definitive data validation are listed in QAPP worksheet #36. Table 36-5 of the QAPP defines how the QC sample data will be used to assess the PARCCS parameters. The criteria used to assess data quality are described in Table 36-2 of the QAPP. Deviations from the field and laboratory QC sample frequencies are specified in the completeness section of this report.

Data qualifiers used for the independent validation are referenced in QAPP worksheet #36. One final qualifier is assigned for data that are qualified due to multiple non-compliant results. For each sample, only one result is reported per analyte for each method. For samples requiring dilutions, only compounds within the calibration range are reported in the initial run and only compounds that exceeded the initial calibration range in the undiluted run are reported in subsequent dilution runs.

The hierarchy for the qualifiers is "R" is greater than "J" or "UJ", and "J" or "UJ" is greater than "B" or "UB". Note that when there is significant non-compliance with performance criteria, the data evaluation may recommend the rejection of data (R), but the final rejection of data and their use is a decision reserved specifically for the project team.

Data that are qualified as estimated (J) due to detected concentrations between the method detection limit (MDL) and reporting limit (RL) indicate quantitative uncertainties inherent in measurements in this range. This qualification does not indicate a non-compliant QC result and is discussed in the sensitivity section of the data evaluation.

The data packages contain the offsite 2017 groundwater samples as detailed in the WP, with exceptions presented in Appendix B, Table B-3. All sample analyses requested on the Chain of Custody (COC) forms were reported by the laboratory, with the exception of those listed in Table A-1. The sample results and all qualifiers assigned during the validation process are presented in the tables in Appendix D.

The tables in Appendix D also provide the results of all field duplicate, trip blank, equipment blank, source water blank, matrix spike (MS)/matrix spike duplicate (MSD), laboratory duplicate, and laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) QC samples analyzed for the 2017 offsite groundwater sampling.

The required field and laboratory QC sample frequencies are specified in the QAPP and are presented on Table C-1. Deviations from the QC frequency are discussed in the completeness section C.6. Quality control samples were collected at the required frequency.

AEEC reviewed 100% of the submitted analytical data for this field event. The data review process provides information on the analytical limitations of the laboratory sample data based on the results of the laboratory QC measurements. No systemic problems were detected with the analyses during validation.

The majority of the field sample results did not require qualification due to non-compliant QC results. There were 4,732 primary and field duplicate sample results validated for this round of data. All field sample results except those qualified as rejected (R) are suitable for their end use with the attached qualifiers summarized in Tables C-4 through C-11.

Two results were qualified as rejected (R). Completeness is 99.96% for the project.

The greater than 95% completeness goal for the project are met.

C.2 Precision

Precision is a measure of reproducibility and is expressed in terms of relative percent difference (RPD). Precision was evaluated from LCS/LCSD together with project-specific MS/MSD, laboratory duplicate and field duplicate results. Precision assessment criteria are established in the QAPP.

The RPD from LCS/LCSD are evaluated to assess laboratory precision. The LCS/LCSDs contain the entire target analyte list in the spike, unless otherwise specified in the QAPP. For all analyses, all samples in the affected batch are qualified if LCS/LCSD results are non-compliant. LCSDs are not required for batches that contain project-specific MS/MSDs. Where MS/MSDs are not applicable to the method, a project-specific laboratory duplicate is acceptable.

All field sample results that were qualified due to precision criteria for LCS/LCSDs not being met are presented in Table C-11.

The project requirement of LCS/LCSDs in the absence of project-specific MS/MSD exceeds method requirements. Using professional judgment, field sample results are not qualified due to the absence of LCSDs when sufficient data are available for interpretation of the data quality. Precision in the sample matrix is evaluated from field duplicate results, and analytical precision is evaluated from existing LCS/LCSD results.

For this round, a LCSD analysis was not performed for the batches listed below. In all cases, an LCS analysis is required for QC purposes.

Summary of Laboratory Batches Lacking LCSD

Analysis	Package	Batch	Associated samples
SW8260B	L929552	WG1010969	EB-20170811, MW-116D, MW-116S, RW-2140H, TB-20170811

SW8260B	L930223	WG1011346	EB-20170815, MW-106D, MW-106S, MW-115D, MW-115S, RW-3259B, RW-7773P, RW-7953P, RW-8249P, TB-20170815

Project-specific MS/MSD samples were collected and analyzed to evaluate precision in the sample matrix. The MS/MSDs contain the entire target analyte list in the spike unless otherwise specified in the QAPP. As specified in the QAPP, only samples requested for this project were used for MS/MSD evaluation and for all analyses only the primary sample and field duplicate result are qualified as a result of non-compliant MS/MSD results. Project-specific MS/MSD samples are indicated on the COCs. MS/MSDs are not applicable to the analytical method for alkalinity (SM2320B) and 1,2-dibromoethane/1,2-dibromo-3-chloroethane (SW8011), and for these methods laboratory duplicates are analyzed instead of MSDs.

All field sample results qualified due to precision criteria for MS/MSDs not being met are presented in Table C-9.

All laboratory duplicate results evaluated for project samples are presented on Table C-3. All reported results met the precision criteria for laboratory duplicates.

Blind field duplicate samples were collected and analyzed to evaluate sample homogeneity and precision in the sample matrix. Acceptance criteria for field duplicates are consistent with QAPP worksheet #12 which states that field duplicate acceptance criterion for aqueous results is less than or equal to 30%. Field duplicate criterion for results less than 5 times the RL is ± 2 times the RL for aqueous samples. Positive results for the primary and field duplicate are flagged as estimated (J) and non-detected results are qualified as non-detected estimated (UJ) when field duplicate acceptance criteria are not met.

All field sample and field duplicate detected results are presented on Table C-2; results that did not meet precision criteria for field duplicates are highlighted.

C.3 Accuracy

Accuracy is a measure of bias from the true value and is expressed in terms of percent recovery (%R) for this project. Accuracy was evaluated from site-specific MS, site-specific MSD, LCS, and LCSD results and from surrogate recoveries for applicable organic analyses. Accuracy assessment criteria for the investigation methods are established in the QAPP.

Non-detected results associated with MS, MSD, LCS, LCSD, or surrogate recoveries of less than 10 percent for organics or less than 30 percent for inorganic parameters are qualified as rejected (R). As established in the QAPP, non-detected results associated with MS, MSD, LCS, LCSD, and surrogate recoveries below the lower control limit and above the limit for rejection are qualified as non-detected estimated (UJ).

As established in the QAPP, volatile organic compound (VOC) results are qualified by the validator if two or more surrogates exceed acceptance criteria. Semi-volatile organic compound (SVOC) results are qualified by the validator if two or more surrogates in an acid or base/neutral fraction exceed acceptance criteria. For all analyses, only results in the individual sample are qualified if surrogate recoveries are non-compliant. For SVOC results, only analytes in the affected fraction are qualified.

Surrogates were analyzed as required by the analytical methods. Thirteen results for primary and field duplicate samples were qualified this round due to surrogate acceptance criteria that were not met. No additional field sample results are qualified due to the surrogate recoveries. Affected samples are RW-

0802A, RW-0808A, RW-2076F, RW-2172F, RW-2213F, RW-2237H, RW-7077P, RW-7350P, RW-8000B, RW-8012P, RW-8030P, RW-8035P and RW-8209P.

Site-specific MS/MSD samples were collected and analyzed to evaluate accuracy in the sample matrix. The MS/MSDs contain the entire target analyte list in the spike unless otherwise specified in the QAPP. Only samples requested for this project are used for MS/MSD evaluation, and for all analyses only the primary sample and field duplicate result are qualified as a result of non-compliant MS/MSD results.

Where MS or MSD recoveries are below acceptance criteria there is the potential for low bias and false negative, or non-detected results. Positive sample results are qualified as estimated (J) and non-detected results are qualified as non-detected estimated (UJ). Where MS or MSD recoveries are above acceptance criteria there is the potential for high bias and false positive results. Positive sample results are qualified as estimated (J) and non-detected results are not qualified. When the parent sample concentration is greater than 4 times the spike concentration the recoveries for MS/MSDs are not used to qualify the samples, but the deviations are noted. The laboratory data packages indicate this with a "V" qualifier.

For this report the field sample results affected by the 4 times concentration exception include the following parameters and samples:

Analysis	Compound	Affected samples
SW6020	calcium, total	RW-2140H, RW-3259B, RW-7350P, RW-7677P, RW-7492P, RW-7953P, RW-8012P
SW6020	magnesium	RW-7677P
SW6020	sodium	RW-2140H, RW-7677P

All field sample results that are qualified due to the accuracy criteria for MS/MSDs not being met are presented in Table C-8 of this report.

The laboratory is scoped to analyze a LCS/LCSD when project-specific MS/MSDs are not part of the data batches. The recoveries from LCS and LCSD are evaluated to assess laboratory accuracy. The LCS and LCSD contain the entire target analyte list in the spike unless otherwise specified in the QAPP. For all analyses, all samples in the affected batch are qualified if LCS or LCSD results are non-compliant.

All field sample results that are qualified due to accuracy criteria for LCS/LCSD not being met are presented in Table C-10 of this report.

Sample results that are above the calibration range are considered estimated and qualified as "J"; the samples should be diluted and re-analyzed where possible. No samples results were reported above the calibration range for this round.

C.4 Representativeness

Representativeness is a qualitative expression of the degree to which sample data accurately and precisely represent "true" site conditions. The QAPP defines the strategy for ensuring that representativeness is achieved by appropriate program design, with consideration of proper sample locations and sampling procedures, and through the use of the standard field, sampling, and analytical procedures.

The samples collected and analyses reported are compliant with the QAPP.

C.5 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one data set may be compared to another. Comparability is achieved through the use of standardized methods for sample collection and analysis, the use of standardized units of measure, normalizing results to standard conditions, and the use of standard and comprehensive reporting formats. The QAPP defines the methods of sample collection and analysis to ensure that comparability criteria are met.

Comparability for the project was addressed by the QAPP. The samples are compliant with the QAPP as collected and analyses are compliant as reported.

C.6 Completeness

Completeness is the percentage of valid data relative to the total number of measurements planned.

The data packages contain the 2017 offsite groundwater sampling as detailed in the WP, with exceptions presented in Appendix B, Table B-3. All analyses requested on the COCs were reported by the laboratory, with the exception of those listed in Table A-1. AEEC reviewed 100% of the submitted analytical data for this field event.

Project-specific MS/MSDs are collected for this project. As referenced in the QAPP, the MS/MSD frequency is specified as one set per 20 samples collected for FHML. All project MS/MSDs requested on the COCs were analyzed. The MS/MSD frequency criteria are met for all analyses, as presented on Table C-1.

Blind field duplicates are collected for this project. The QAPP specifies the field duplicate frequency as 10% of the field samples, per matrix and method. All field duplicates requested on the COCs were analyzed. The field duplicate frequency criteria are met for all analyses, as presented on Table C-1.

The overall completeness goal for the project is greater than 95%. There were 4,732 primary and field duplicate sample results validated for this round of data. Two results were qualified as rejected (R).

Completeness is 99.96% for the project. The project completeness goal is met.

Completeness is provided per parameter and matrix for informational purposes. Of the 3,224 primary and field duplicate sample results analyzed for SW8260B, two were rejected (R) due to MS/MSD recoveries of less than 10%. Completeness is 99.94% for the SW8260B analyses. No additional sample results were rejected during validation. Completeness is 100% for the all remaining analyses.

Trip blanks (TB) and equipment blanks (EB) are analyzed to assess the potential impact due to contamination of samples during collection. The QAPP specifies a requirement of one trip blank in every cooler for each VOC method. There was a trip blank in every cooler for each VOC method, as presented on Table C-1.

C.7 Sensitivity

Sensitivity of analytical measurements relates to the amount that can be reliably detected or quantified and is defined by the RL. Sensitivity is evaluated by review of the standard laboratory RLs, Limits of Detection (LODs), MDLs, sample dilutions, blank contamination, holding times, and sample preservation. The list of reported analytes and associated laboratory RLs, LODs and MDLs are included in the QAPP. ESC met the project requirements.

Non-detected sample results are reported down to RLs, as indicated for the respective method and target analyte. Sample concentrations detected between the MDL and the RL are flagged by the laboratory to indicate quantitative uncertainties inherent in measurements in this range. The flag assigned during data validation is "J". This qualification does not indicate a non-compliant QC result.

Of the 5,626 target analyte results reported for field normal, field duplicate, trip blank, equipment blank and source water blank samples, 383 results were detected by the laboratory at concentrations between the MDL and RL. The results are qualified as estimated "J" by the laboratory due to the low level of sample detection. Ultimately these results may be qualified as "UB" due to blank contamination or "UJ" due to blank contamination in combination with QC non-compliance. Two hundred and seventy-nine of the results for this round were qualified as "UB" or "UJ" due to blank contamination.

The source water blank sample SB-20170809 was collected and reported at the required frequency. Samples MW-103D, MW-103S, RW-2172H, RW-2203H, RW-7244P, RW-7677P, RW-7688P, and RW-7776P are associated with the source water blank. No field sample results are qualified due to the source water blank sample results (Table C-7).

Blank action levels are 5 times the concentration detected in the blank or 10 times for common laboratory contaminants. Field sample results that are detected at concentrations above the blank action levels are qualified as "B" at the reported concentration to indicate the presence of the affected compound in the blank. Results that are qualified "B" should be considered as detected. Field sample results that are detected at concentrations below the blank action level and above the laboratory RL are qualified as "UB" at the reported concentration. Field sample results that are detected at concentrations below the blank action level and below the laboratory RL are qualified as "UB" at the laboratory RL. The presence or absence of compounds qualified as "UB" cannot be determined below the concentration of the "UB" qualified result. The hierarchy of sample qualifiers may cause some "UB" and "B" qualified data to ultimately be qualified as "UJ" and "J" or as "R".

The method blanks (MB) were reported at the required frequency of 1 per analytical preparation batch. All field sample results that are qualified due to method blank results are presented in Table C-6. The cis-1,2-dichloroethene detection level for sample RW-8030P and the toluene detection levels for samples RW-0802A and RW-2213F were elevated above the laboratory RLs due to method blank contamination. The method blank contamination did not elevate the detection levels above the laboratory RLs for any additional field sample results. The data are usable as qualified.

Trip blanks were collected and reported at the required frequency of 1 per method per cooler with the exception of one trip blank in which there was no reportable data for method SW8011 due to possible cross contamination. The samples associated with the unreportable trip blank data for this method are CW-2-EXT, EB-20170810, PA-1, PA-3, PA-4, RW-2879M, RW-8105PN, and RW-8105PS and therefore may be biased high because no assessment can be made based on potential laboratory cross contamination with another sample during sample preparation. The trip blank contamination did not elevate the detection levels above the laboratory RLs for any field sample results (Table C-4). The data are usable as qualified.

Equipment blanks were collected and reported at the required frequency. No field sample results are qualified due to the equipment blank results (Table C-5).

No reported results were qualified due to holding time exceedance.

No reported results were qualified due to sample preservation.

C.8 References

AEEC, 2017a. *Fort Hall Mine Landfill Offsite Groundwater Monitoring Work Plan,* Bannock County, Idaho. July.

AEEC, 2017b. *Fort Hall Mine Landfill Environmental Program Quality Assurance Program Plan, Final,* Bannock County, Idaho. July.

TABLE C-1

Quality Control Samples Type and Frequency

2017 Offsite Groundwater Monitoring Data Validation

Method	N (Count)	FD (Count)	% FD (min 10%)	MS (Count)	% MS (min 5%)	MSD (Count)	% MSD (min 5%)	DU (Count)	% DU (min 5%)	SB (Count)	EB (Count)	TB (Count)	Coolers	TB/Cooler (≥ 1)
SM 2320B	46	6	13.0%	NA	NA	NA	NA	6	13.0%	NA	NA	NA	NA	NA
SM 4500-CN	46	6	13.0%	5	10.9%	5	10.9%	5	10.9%	NA	NA	NA	NA	NA
SW 6020	46	6	13.0%	10	21.7%	10	21.7%	NA	NA	NA	NA	NA	NA	NA
SW 7470A	46	6	13.0%	5	10.9%	5	10.9%	NA	NA	NA	NA	NA	NA	NA
SW 8011	46	6	13.0%	4	8.7%	NA	NA	5	10.9%	1	4	9	9	1
SW 8260B	46	6	13.0%	5	10.9%	5	10.9%	NA	NA	1	4	9	9	1
SW 9056A	46	6	13.0%	7	15.2%	6	13.0%	5	NA	NA	NA	NA	NA	NA

TABLE C-2

Normal and Field Duplicate Detected Results Comparison

2017 Offsite Groundwater Monitoring Data Validation

LOCID	Method	Analyte	Units	N RL	N Result	FD RL	FD Result	RPD	RATIO
RW-2172H	SM 2320B	Alkalinity	ug/l	20000	358000 B	20000	360000 B	0.6	NA
RW-2172H	SW 6020	Arsenic, total	ug/l	2	1.14 J	2	1.12 J	NA	0.01
RW-2172H	SW 6020	Barium, total	ug/l	5	161	5	163	1.2	NA
RW-2172H	SW 6020	Calcium, total	ug/l	1000	115000	1000	116000	0.9	NA
RW-2172H	SW 6020	Copper, total	ug/l	5	1.61 J	5	1.75 J	NA	0.028
RW-2172H	SW 6020	Iron, total	ug/l	100	63.9 J	100	71.4 J	NA	0.075
RW-2172H	SW 6020	Lead, total	ug/l	2	0.51 J	2	0.554 J	NA	0.022
RW-2172H	SW 6020	Magnesium, total	ug/l	1000	42400	1000	42900	1.2	NA
RW-2172H	SW 6020	Manganese, total	ug/l	5	3.07 J	5	3.82 J	NA	0.15
RW-2172H	SW 6020	Nickel, total	ug/l	2	0.805 J	2	1.11 J	NA	0.153
RW-2172H	SW 6020	Potassium, total	ug/l	1000	5600	1000	5680	1.4	NA
RW-2172H	SW 6020	Selenium, total	ug/l	2	0.554 J	2	0.533 J	NA	0.011
RW-2172H	SW 6020	Sodium, total	ug/l	1000	72500	1000	72500	0	NA
RW-2172H	SW 6020	Vanadium, total	ug/l	5	1.12 J	5	1.05 J	NA	0.014
RW-2172H	SW 6020	Zinc, total	ug/l	25	133	25	136	2.2	NA
RW-2172H	SW 8260B	Cis-1,2-Dichloroethene	ug/l	1	2.15	1	2.52	NA	0.37
RW-2172H	SW 8260B	Tetrachloroethene	ug/l	1	6.69	1	6.68	0.1	NA
RW-2172H	SW 8260B	Trichloroethene	ug/l	1	37.7	1	37.2	1.3	NA
RW-2172H	SW 9056A	Chloride	ug/l	5000	131000 B	5000	129000 B	1.5	NA
RW-2172H	SW 9056A	Sulfate	ug/l	5000	83300	5000	83100	0.2	NA
RW-7492P	SM 2320B	Alkalinity	ug/l	20000	283000 B	20000	286000 B	1.1	NA
RW-7492P	SW 6020	Arsenic, total	ug/l	2	1.78 J	2	1.54 J	NA	0.12
RW-7492P	SW 6020	Barium, total	ug/l	5	113	5	110	2.7	NA
RW-7492P	SW 6020	Calcium, total	ug/l	1000	68200	1000	68200 J	0	NA
RW-7492P	SW 6020	Chromium, total	ug/l	2	0.632 J	2	0.592 J	NA	0.02
RW-7492P	SW 6020	Copper, total	ug/l	5	22.7	5	36.3	NA	2.72
RW-7492P	SW 6020	Lead, total	ug/l	2	1.26 J	2	1.01 J	NA	0.125
RW-7492P	SW 6020	Magnesium, total	ug/l	1000	25600	1000	25600	0	NA
RW-7492P	SW 6020	Manganese, total	ug/l	5	0.745 J	5	0.352 J	NA	0.079
RW-7492P	SW 6020	Potassium, total	ug/l	1000	5620	1000	5560	1.1	NA
RW-7492P	SW 6020	Selenium, total	ug/l	2	0.498 J	2	0.619 J	NA	0.06
RW-7492P	SW 6020	Sodium, total	ug/l	1000	30000	1000	29600	1.3	NA
RW-7492P	SW 6020	Vanadium, total	ug/l	5	1.31 J	5	1.18 J	NA	0.026
RW-7492P	SW 6020	Zinc, total	ug/l	25	143	25	133	7.2	NA
RW-7492P	SW 9056A	Chloride	ug/l	1000	45300 B	1000	45500 B	0.4	NA
RW-7492P	SW 9056A	Sulfate	ug/l	5000	34800	5000	34900	0.3	NA
RW-2213F	SM 2320B	Alkalinity	ug/l	20000	268000 B	20000	264000	1.5	NA

TABLE C-2

Normal and Field Duplicate Detected Results Comparison

2017 Offsite Groundwater Monitoring Data Validation

LOCID	Method	Analyte	Units	N RL	N Result	FD RL	FD Result	RPD	RATIO
RW-2213F	SW 6020	Arsenic, total	ug/l	2	1.88 J	2	1.73 J	NA	0.075
RW-2213F	SW 6020	Barium, total	ug/l	5	98.9 B	5	98.2 B	0.7	NA
RW-2213F	SW 6020	Calcium, total	ug/l	1000	69700 B	1000	69000 B	1	NA
RW-2213F	SW 6020	Chromium, total	ug/l	2	0.645 J	2	0.646 J	NA	0.001
RW-2213F	SW 6020	Copper, total	ug/l	5	3.45 J	5	3.56 J	NA	0.022
RW-2213F	SW 6020	Magnesium, total	ug/l	1000	27000	1000	26800	0.7	NA
RW-2213F	SW 6020	Potassium, total	ug/l	1000	5770	1000	5750	0.3	NA
RW-2213F	SW 6020	Selenium, total	ug/l	2	0.382 J	2	0.5 J	NA	0.059
RW-2213F	SW 6020	Sodium, total	ug/l	1000	31800	1000	31700	0.3	NA
RW-2213F	SW 6020	Vanadium, total	ug/l	5	1.43 J	5	1.34 J	NA	0.018
RW-2213F	SW 9056A	Chloride	ug/l	1000	45200	1000	45200	0	NA
RW-2213F	SW 9056A	Sulfate	ug/l	5000	36100	5000	36000	0.3	NA
RW-7688P	SM 2320B	Alkalinity	ug/l	20000	271000 B	20000	274000 B	1.1	NA
RW-7688P	SW 6020	Arsenic, total	ug/l	2	1.86 J	2	1.93 J	NA	0.035
RW-7688P	SW 6020	Barium, total	ug/l	5	108	5	108	0	NA
RW-7688P	SW 6020	Calcium, total	ug/l	1000	72000	1000	71400	0.8	NA
RW-7688P	SW 6020	Copper, total	ug/l	5	7.69	5	8.63	NA	0.188
RW-7688P	SW 6020	Magnesium, total	ug/l	1000	28100	1000	27900	0.7	NA
RW-7688P	SW 6020	Potassium, total	ug/l	1000	6030	1000	6040	0.2	NA
RW-7688P	SW 6020	Selenium, total	ug/l	2	0.539 J	2	0.484 J	NA	0.028
RW-7688P	SW 6020	Sodium, total	ug/l	1000	34900	1000	34800	0.3	NA
RW-7688P	SW 6020	Vanadium, total	ug/l	5	1.51 J	5	1.49 J	NA	0.004
RW-7688P	SW 9056A	Chloride	ug/l	1000	45500 B	1000	45500 B	0	NA
RW-7688P	SW 9056A	Sulfate	ug/l	5000	35800	5000	35800	0	NA
RW-8249P	SM 2320B	Alkalinity	ug/l	20000	189000 B	20000	187000 B	1.1	NA
RW-8249P	SW 6020	Barium, total	ug/l	5	128	5	130	1.6	NA
RW-8249P	SW 6020	Calcium, total	ug/l	1000	68600	1000	69000	0.6	NA
RW-8249P	SW 6020	Copper, total	ug/l	5	3.26 J	5	3 J	NA	0.052
RW-8249P	SW 6020	Lead, total	ug/l	2	0.285 J	2	0.257 J	NA	0.014
RW-8249P	SW 6020	Magnesium, total	ug/l	1000	27900	1000	27700	0.7	NA
RW-8249P	SW 6020	Manganese, total	ug/l	5	0.63 J	5	0.615 J	NA	0.003
RW-8249P	SW 6020	Potassium, total	ug/l	1000	1200	1000	1150	NA	0.05
RW-8249P	SW 6020	Selenium, total	ug/l	2	0.838 J	2	0.78 J	NA	0.029
RW-8249P	SW 6020	Sodium, total	ug/l	1000	30400	1000	30300	0.3	NA
RW-8249P	SW 6020	Zinc, total	ug/l	25	25.5	25	26.1	NA	0.024
RW-8249P	SW 9056A	Chloride	ug/l	5000	113000 B	5000	113000 B	0	NA
RW-8249P	SW 9056A	Sulfate	ug/l	5000	22000	5000	21800	NA	0.04

TABLE C-2

Normal and Field Duplicate Detected Results Comparison

2017 Offsite Groundwater Monitoring Data Validation

LOCID	Method	Analyte	Units	N RL	N Result	FD RL	FD Result	RPD	RATIO
RW-8012P	SM 2320B	Alkalinity	ug/l	20000	297000 B	20000	296000 B	0.3	NA
RW-8012P	SW 6020	Arsenic, total	ug/l	2	1.79 J	2	1.88 J	NA	0.045
RW-8012P	SW 6020	Barium, total	ug/l	5	121 B	5	113 B	6.8	NA
RW-8012P	SW 6020	Calcium, total	ug/l	1000	78900 J	1000	77500 B	1.8	NA
RW-8012P	SW 6020	Chromium, total	ug/l	2	0.943 J	2	0.921 J	NA	0.011
RW-8012P	SW 6020	Copper, total	ug/l	5	4.09 J	5	3.07 J	NA	0.204
RW-8012P	SW 6020	Lead, total	ug/l	2	0.418 J	2	0.371 J	NA	0.023
RW-8012P	SW 6020	Magnesium, total	ug/l	1000	29800	1000	30000	0.7	NA
RW-8012P	SW 6020	Potassium, total	ug/l	1000	6320	1000	6240	1.3	NA
RW-8012P	SW 6020	Selenium, total	ug/l	2	0.492 J	2	0.588 J	NA	0.048
RW-8012P	SW 6020	Sodium, total	ug/l	1000	39800	1000	40100	0.8	NA
RW-8012P	SW 6020	Vanadium, total	ug/l	5	1.48 J	5	1.41 J	NA	0.014
RW-8012P	SW 6020	Zinc, total	ug/l	25	49.5 B	25	46.1 B	NA	0.136
RW-8012P	SW 8260B	Tetrachloroethene	ug/l	1	0.381 J	1	0.47 J	NA	0.089
RW-8012P	SW 8260B	Trichloroethene	ug/l	1	2.08	1	2.03	NA	0.05
RW-8012P	SW 9056A	Chloride	ug/l	1000	59900	1000	60000	0.2	NA
RW-8012P	SW 9056A	Sulfate	ug/l	5000	41200 B	5000	41300 B	0.2	NA

NOTES:

The RPD applies where the normal and field duplicate results are greater than or equal to five times the reporting limit. The Ratio ((Absolute Value|[Normal Result-Field Duplicate Result]|)/(Normal Reporting Limit)) applies where the normal or field duplicate result is less than five times the limit of quantitation.

Non-detects are reported as less than the reported detection limit.

TABLE C-3

Normal and Laboratory Duplicate Detected Results Comparison

2017 Offsite Groundwater Monitoring Data Validation

Location	Method	Analyte	Units	N RL	N Result	DU RL	DU Result	RPD
RW-7505P	SM 2320B	Alkalinity	ug/l	20000	315000 B	20000	285000	10
MW-116D	SM 2320B	Alkalinity	ug/l	20000	180000 B	20000	178000	1.1
RW-2151H	9056A	Sulfate	ug/l	5000	31200	5000	31200	0
RW-7350P	SM 2320B	Alkalinity	ug/l	20000	271000 B	20000	270000	0.4
RW-7350P	SW 9056A	Sulfate	ug/l	5000	34600	5000	34600	0
RW-7350P	SW 9056A	Chloride	ug/l	1000	45800	1000	45900	0.2
RW-2172F	SM 2320B	Alkalinity	ug/l	20000	279000	20000	280000	0.4
MW-106S	SM 2320B	Alkalinity	ug/l	20000	269000 B	20000	272000	1.1
RW-7773P	SW 9056A	Chloride	ug/l	1000	46800 B	1000	47000	0.4
RW-8030P	SW 9056A	Sulfate	ug/l	5000	48500	5000	48500	0
RW-8030P	SW 9056A	Chloride	ug/l	1000	90600	1000	91100	0.6
RW-7953P	SW 9056A	Sulfate	ug/l	5000	48400 J	5000	48200	0.4

TABLE C-4

Trip Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

TB Sample ID	Method	Analyte	Units	TB RL	TB Result	Sample ID	RL	Result
None								

TABLE C-5

Equipment Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

EB Sample ID	Method	Analyte	Units	EB RL	EB Result	Sample ID	RL	Result
None								

TABLE C-6

Method Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Units	MB RL	MB Result	Sample ID	RL	Result
R3234289-1	SM 2320B	Alkalinity	ug/l	20000	3200	RW-7492P	20000	283000 B
R3234289-1	SM 2320B	Alkalinity	ug/l	20000	3200	RW-7498P	20000	290000 B
R3234632-1	SW 6020	Iron, total	ug/l	100	18.5	RW-7288P	100	100 UB
R3234632-1	SW 6020	Manganese, total	ug/l	5	0.419	RW-7288P	5	2.26 J
R3234632-1	SW 6020	Manganese, total	ug/l	5	0.419	RW-7549P	5	5 UB
R3234731-1	SM 2320B	Alkalinity	ug/l	20000	3350	RW-0712A	20000	286000 B
R3234732-1	SM 2320B	Alkalinity	ug/l	20000	2950	RW-7288P	20000	284000 B
R3234732-1	SM 2320B	Alkalinity	ug/l	20000	2950	RW-7310P	20000	284000 B
R3234732-1	SM 2320B	Alkalinity	ug/l	20000	2950	RW-7505P	20000	315000 B
R3234732-1	SM 2320B	Alkalinity	ug/l	20000	2950	RW-7549P	20000	306000 B
R3234732-1	SM 2320B	Alkalinity	ug/l	20000	2950	RW-7586P	20000	287000 B
R3234732-1	SM 2320B	Alkalinity	ug/l	20000	2950	RW-7588P	20000	286000 B
R3235020-1	SW 6020	Tin, total	ug/l	2	0.438	RW-0712A	2	2 UB
R3235020-1	SW 6020	Tin, total	ug/l	2	0.438	RW-7492P	2	2 UB
R3235020-1	SW 6020	Tin, total	ug/l	2	0.438	RW-7498P	2	2 UB
R3235020-1	SW 6020	Tin, total	ug/l	2	0.438	RW-7505P	2	2 UB
R3235020-1	SW 6020	Tin, total	ug/l	2	0.438	RW-7586P	2	2 UB
R3235081-1	SW 9056A	Chloride	ug/l	1000	160	RW-0712A	1000	45500 B
R3235081-1	SW 9056A	Chloride	ug/l	1000	160	RW-7310P	1000	44800 B
R3235081-1	SW 9056A	Chloride	ug/l	1000	160	RW-7492P	1000	45300 B
R3235081-1	SW 9056A	Chloride	ug/l	1000	160	RW-7498P	1000	45600 B
R3235081-1	SW 9056A	Chloride	ug/l	1000	160	RW-7505P	1000	45600 B
R3235081-1	SW 9056A	Chloride	ug/l	1000	160	RW-7586P	1000	45100 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-0803A	20000	296000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-2076F	20000	280000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-2213F	20000	268000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-2237H	20000	371000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-7077P	20000	274000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-7350P	20000	271000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-8000B	20000	287000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-8012P	20000	297000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-8030P	20000	311000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-8035P	20000	221000 B
R3238921-1	SM 2320B	Alkalinity	ug/l	20000	3050	RW-8209P	20000	165000 B
R3239201-1	SW 9056A	Sulfate	ug/l	5000	88.8	RW-0803A	5000	41300 B
R3239201-1	SW 9056A	Sulfate	ug/l	5000	88.8	RW-2237H	5000	82300 B
R3239201-1	SW 9056A	Sulfate	ug/l	5000	88.8	RW-8000B	5000	44200 B
R3239201-1	SW 9056A	Sulfate	ug/l	5000	88.8	RW-8012P	5000	41200 B
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-0802A	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-0803A	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-2076F	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-2172F	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-2213F	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-2237H	1	3.18 B
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-7077P	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-8000B	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-8012P	1	1 UJ

TABLE C-6

Method Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Units	MB RL	MB Result	Sample ID	RL	Result
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-8030P	1	1.16 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-8035P	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	RW-8209P	1	1 UB
R3240003-4	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.44	TB-20170803	1	1 UB
R3240003-4	SW 8260B	Toluene	ug/l	1	0.436	RW-0802A	1	1.16 UB
R3240003-4	SW 8260B	Toluene	ug/l	1	0.436	RW-2213F	1	1.16 UB
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-0802A	5	98.2 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-0803A	5	113 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-2076F	5	97.6 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-2172F	5	85 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-2213F	5	98.9 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-2237H	5	184 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-7077P	5	83.7 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-7350P	5	101 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-8000B	5	125 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-8012P	5	121 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-8030P	5	136 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-8035P	5	134 B
R3240420-1	SW 6020	Barium, total	ug/l	5	0.781	RW-8209P	5	107 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-0802A	1000	69000 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-0803A	1000	77500 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-2076F	1000	74800 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-2172F	1000	72800 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-2213F	1000	69700 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-2237H	1000	120000 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-7077P	1000	70900 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-7350P	1000	70000 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-8000B	1000	80500 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-8012P	1000	78900 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-8030P	1000	92400 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-8035P	1000	54300 B
R3240420-1	SW 6020	Calcium, total	ug/l	1000	168	RW-8209P	1000	293000 B
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-0802A	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-0803A	5	1.55 J
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-2076F	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-2172F	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-2213F	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-2237H	5	1.62 J
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-7077P	5	1.71 J
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-7350P	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-8000B	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-8012P	5	5 UB
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-8030P	5	1.74 J
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-8035P	5	2.74 J
R3240420-1	SW 6020	Manganese, total	ug/l	5	0.275	RW-8209P	5	5 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-0802A	2	2 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-0803A	2	2 UB

TABLE C-6

Method Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Units	MB RL	MB Result	Sample ID	RL	Result
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-2237H	2	2 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-7077P	2	2 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-8012P	2	2 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-8030P	2	2 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-8035P	2	2 UB
R3240420-1	SW 6020	Tin, total	ug/l	2	0.322	RW-8209P	2	2 UB
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-0802A	25	25 UB
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-0803A	25	46.1 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-2076F	25	52.3 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-2172F	25	171 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-2213F	25	25 UB
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-2237H	25	30.3 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-7077P	25	162 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-7350P	25	138 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-8000B	25	25 UB
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-8012P	25	49.5 B
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-8030P	25	25 UB
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-8035P	25	22.5 J
R3240420-1	SW 6020	Zinc, total	ug/l	25	2.59	RW-8209P	25	86.5 B
R3241509-1	SW 9056A	Chloride	ug/l	1000	121	RW-0808A	5000	129000 B
R3241509-1	SW 9056A	Chloride	ug/l	1000	121	RW-0808B	1000	45500 B
R3241509-1	SW 9056A	Chloride	ug/l	1000	121	RW-2172H	5000	131000 B
R3241509-1	SW 9056A	Chloride	ug/l	1000	121	RW-7244P	1000	46000 B
R3241509-1	SW 9056A	Chloride	ug/l	1000	121	RW-7688P	1000	45500 B
R3241509-1	SW 9056A	Chloride	ug/l	1000	121	RW-7776P	1000	48200 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	MW-103D	20000	264000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	MW-103S	20000	285000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	PA-1	20000	283000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	PA-3	20000	286000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	PA-4	20000	282000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-0808A	20000	360000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-0808B	20000	274000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-2172H	20000	358000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-2203H	20000	201000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-7244P	20000	272000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-7677P	20000	355000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-7688P	20000	271000 B
R3241633-1	SM 2320B	Alkalinity	ug/l	20000	3310	RW-7776P	20000	265000 B
R3241970-1	SM 2320B	Alkalinity	ug/l	20000	3210	MW-116D	20000	180000 B
R3241970-1	SM 2320B	Alkalinity	ug/l	20000	3210	MW-116S	20000	341000 B
R3241970-1	SM 2320B	Alkalinity	ug/l	20000	3210	RW-2140H	20000	350000 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	MW-106D	1000	47900 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	MW-106S	1000	48900 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	MW-115D	1000	62800 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	MW-115S	1000	90900 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	RW-0816A	5000	113000 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	RW-3259B	1000	16400 B

TABLE C-6

Method Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Units	MB RL	MB Result	Sample ID	RL	Result
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	RW-7773P	1000	46800 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	RW-7953P	1000	82000 B
R3242666-1	SW 9056A	Chloride	ug/l	1000	86.2	RW-8249P	5000	113000 B
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	MW-103D	5	90.4 B
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	MW-103S	5	5 UB
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-0808A	5	3.82 J
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-0808B	5	2.43 J
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-2172H	5	3.07 J
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-2203H	5	933 B
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-7244P	5	4.15 J
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-7688P	5	5 UB
R3242895-1	SW 6020	Manganese, total	ug/l	5	0.298	RW-7776P	5	5 UB
R3242965-1	SW 6020	Tin, total	ug/l	2	0.506	MW-116D	2	2 UB
R3242965-1	SW 6020	Tin, total	ug/l	2	0.506	MW-116S	2	2 UB
R3242965-1	SW 6020	Tin, total	ug/l	2	0.506	RW-2140H	2	2 UB
R3243357-3	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.357	MW-115D	1	1 UB
R3243357-3	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.357	MW-115S	1	1 UB
R3243357-3	SW 8260B	cis-1,2-Dichloroethene	ug/l	1	0.357	RW-7953P	1	1 UB
R3243486-1	SW 9056A	Chloride	ug/l	1000	51.9	RW-7677P	5000	123000 B
R3243495-1	SW 6020	Calcium, total	ug/l	1000	70.1	RW-7677P	1000	110000 B
R3243495-1	SW 6020	Manganese, total	ug/l	5	0.768	RW-7677P	5	5 UB
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	MW-106D	20000	272000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	MW-106S	20000	269000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	MW-115D	20000	311000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	MW-115S	20000	341000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	RW-0816A	20000	187000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	RW-3259B	20000	181000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	RW-7773P	20000	276000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	RW-7953P	20000	315000 B
R3244147-1	SM 2320B	Alkalinity	ug/l	20000	4070	RW-8249P	20000	189000 B
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	MW-106D	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	MW-106S	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	MW-115D	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	MW-115S	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	RW-0816A	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	RW-3259B	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	RW-7773P	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	RW-7953P	2	2 UB
R3244261-1	SW 6020	Tin, total	ug/l	2	0.313	RW-8249P	2	2 UB
R3267438-7	SW 6020	Calcium, total	ug/l	1000	554	RW-2151H	1000	72000 B
R3267438-7	SW 6020	Manganese, total	ug/l	5	0.789	RW-2151H	5	27.6 B
R3267438-7	SW 6020	Sodium, total	ug/l	1000	167	RW-2151H	1000	39400 B
R3267438-7	SW 6020	Tin, total	ug/l	2	0.48	RW-2151H	2	2 UB
R3267438-7	SW 6020	Zinc, total	ug/l	25	7.38	RW-2151H	25	265 B

TABLE C-7

Source Blank Contamination and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

SB Sample ID	Method	Analyte	Units	SB RL	SB Result	Sample ID	RL	Result
None								

TABLE C-8

Matrix Spike/Matrix Spike Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

MS/MSD Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
RW-3259BMS	SW 6020	Calcium, total	74	75	125	RW-3259B	51400	ug/l
RW-3259BMSD	SW 6020	Calcium, total	63	75	125	RW-3259B	51400	ug/l
RW-7350PMS	SW 6020	Calcium, total	67	75	125	RW-7350P	70000 B	ug/l
RW-7350PMS	SW 8260B	1,1,1,2-Tetrachloroethane	59.8	70.5	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,1,1-Trichloroethane	53.4	58.7	134	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,1,2,2-Tetrachloroethane	47.7	64.9	145	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,1,2-Trichloroethane	57.4	74.1	130	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,1-Dichloroethane	51.5	64	134	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,1-Dichloropropene	56.4	61.5	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,2,3-Trichloropropane	50.1	71.5	134	RW-7350P	< 2.5 UJ	ug/l
RW-7350PMS	SW 8260B	1,2,4-Trichlorobenzene	56.3	67	146	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,2-Dibromo-3-Chloropropane	54	63.9	142	RW-7350P	< 5 UJ	ug/l
RW-7350PMS	SW 8260B	1,2-Dibromoethane	58.1	73.8	131	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,2-Dichlorobenzene	58.2	77.4	127	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,2-Dichloroethane	55.5	60.7	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,2-Dichloropropane	56.6	69.7	130	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,3-Dichlorobenzene	55.6	67.9	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,3-Dichloropropane	60.7	74.3	123	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	1,4-Dichlorobenzene	55.9	74.4	123	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	2,2-Dichloropropane	50.7	54.9	142	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Acrylonitrile	51.8	55.9	161	RW-7350P	< 10 UJ	ug/l
RW-7350PMS	SW 8260B	Benzene	50.9	58.6	133	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Bromochloromethane	55.1	74.4	128	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Bromodichloromethane	53.1	69.2	127	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Bromoform	41.1	66.3	140	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Carbon tetrachloride	54.1	60.6	139	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Chlorobenzene	61.8	70.1	130	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Chlorodibromomethane	57.8	71.6	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Chloroform	50.9	66.1	133	RW-7350P	< 5 UJ	ug/l
RW-7350PMS	SW 8260B	Cis-1,2-Dichloroethene	51	60.6	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Cis-1,3-Dichloropropene	60.3	71.1	129	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Dibromomethane	56.7	72.8	127	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Ethylbenzene	60.4	62.7	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Methylene Chloride	48.4	61.5	125	RW-7350P	< 5 UJ	ug/l
RW-7350PMS	SW 8260B	Styrene	47.8	68.2	133	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Toluene	60.5	67.8	124	RW-7350P	< 1 UJ	ug/l

TABLE C-8

Matrix Spike/Matrix Spike Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

MS/MSD Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
RW-7350PMS	SW 8260B	Trans-1,2-Dichloroethene	51.5	61	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Trans-1,3-Dichloropropene	57.5	66.3	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMS	SW 8260B	Trans-1,4-Dichloro-2-Butene	6.53	57.6	136	RW-7350P	R	ug/l
RW-7350PMS	SW 8260B	Xylenes, total	59.2	65.6	133	RW-7350P	< 3 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1,1,2-Tetrachloroethane	51.5	70.5	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1,1-Trichloroethane	46	58.7	134	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1,2,2-Tetrachloroethane	40	64.9	145	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1,2-Trichloroethane	49.3	74.1	130	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1-Dichloroethane	45.3	64	134	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1-Dichloroethene	45.1	48.8	144	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,1-Dichloropropene	47.6	61.5	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2,3-Trichloropropane	42.6	71.5	134	RW-7350P	< 2.5 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2,4-Trichlorobenzene	45.8	67	146	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2-Dibromo-3-Chloropropane	45.9	63.9	142	RW-7350P	< 5 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2-Dibromoethane	50.3	73.8	131	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2-Dichlorobenzene	48.1	77.4	127	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2-Dichloroethane	47.5	60.7	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,2-Dichloropropane	47.1	69.7	130	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,3-Dichlorobenzene	46.7	67.9	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,3-Dichloropropane	51.9	74.3	123	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	1,4-Dichlorobenzene	48.8	74.4	123	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	2,2-Dichloropropane	42.7	54.9	142	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	2-Hexanone	53.7	59.4	154	RW-7350P	< 10 UJ	ug/l
RW-7350PMSD	SW 8260B	4-Methyl-2-Pentanone (Mibk)	53.2	60.7	150	RW-7350P	< 10 UJ	ug/l
RW-7350PMSD	SW 8260B	Acrylonitrile	45.3	55.9	161	RW-7350P	< 10 UJ	ug/l
RW-7350PMSD	SW 8260B	Allyl Chloride	43.5	50	150	RW-7350P	< 5 UJ	ug/l
RW-7350PMSD	SW 8260B	Benzene	43.4	58.6	133	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Bromochloromethane	46.8	74.4	128	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Bromodichloromethane	45.4	69.2	127	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Bromoform	33.9	66.3	140	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Carbon Tetrachloride	46	60.6	139	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Chlorobenzene	53.8	70.1	130	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Chlorodibromomethane	50.1	71.6	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Chloroform	43.4	66.1	133	RW-7350P	< 5 UJ	ug/l
RW-7350PMSD	SW 8260B	Cis-1,2-Dichloroethene	44.1	60.6	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Cis-1,3-Dichloropropene	52.6	71.1	129	RW-7350P	< 1 UJ	ug/l

TABLE C-8

Matrix Spike/Matrix Spike Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

MS/MSD Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
RW-7350PMSD	SW 8260B	Dibromomethane	48.3	72.8	127	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Ethylbenzene	51.9	62.7	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Iodomethane	49.2	55.2	140	RW-7350P	< 10 UJ	ug/l
RW-7350PMSD	SW 8260B	Methylene Chloride	42.4	61.5	125	RW-7350P	< 5 UJ	ug/l
RW-7350PMSD	SW 8260B	Styrene	40.1	68.2	133	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Tetrachloroethene	56.1	57.4	141	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Toluene	52.5	67.8	124	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Trans-1,2-Dichloroethene	44.3	61	132	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Trans-1,3-Dichloropropene	49.3	66.3	136	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Trans-1,4-Dichloro-2-Butene	6.05	57.6	136	RW-7350P	R	ug/l
RW-7350PMSD	SW 8260B	Xylenes, total	51.7	65.6	133	RW-7350P	< 3 UJ	ug/l
RW-7677PMS	SW 6020	Calcium, total	60	75	125	RW-7677P	110000 B	ug/l
RW-7677PMS	SW 6020	Sodium, total	71	75	125	RW-7677P	43500	ug/l
RW-7677PMSD	SW 6020	Calcium, total	60	75	125	RW-7677P	110000 B	ug/l
RW-7677PMSD	SW 6020	Magnesium, total	71	75	125	RW-7677P	38600	ug/l
RW-7677PMSD	SW 6020	Sodium, total	71	75	125	RW-7677P	43500	ug/l
RW-7953PMS	SW 6020	Calcium, total	135	75	125	RW-7953P	84700	ug/l
RW-7953PMS	SW 9056A	Sulfate	77	80	120	RW-7953P	48400 J	ug/l
RW-8012PMS	SW 6020	Calcium, total	54	75	125	RW-8012P	78900 B	ug/l
RW-8012PMS	SW 8260B	1,1,1,2-Tetrachloroethane	56.7	70.5	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,1,1-Trichloroethane	51	58.7	134	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,1,2,2-Tetrachloroethane	43.1	64.9	145	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,1,2-Trichloroethane	55	74.1	130	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,1-Dichloroethane	48.8	64	134	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,1-Dichloropropene	51.8	61.5	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,2,3-Trichloropropane	47.3	71.5	134	RW-8012P	< 2.5 UJ	ug/l
RW-8012PMS	SW 8260B	1,2,4-Trichlorobenzene	52.3	67	146	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,2-Dibromo-3-Chloropropane	46.7	63.9	142	RW-8012P	< 5 UJ	ug/l
RW-8012PMS	SW 8260B	1,2-Dibromoethane	53.9	73.8	131	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,2-Dichlorobenzene	53.2	77.4	127	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,2-Dichloroethane	52.8	60.7	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,2-Dichloropropane	50.2	69.7	130	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,3-Dichlorobenzene	52.4	67.9	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,3-Dichloropropane	57.3	74.3	123	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	1,4-Dichlorobenzene	51.9	74.4	123	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	2,2-Dichloropropane	47	54.9	142	RW-8012P	< 1 UJ	ug/l

TABLE C-8

Matrix Spike/Matrix Spike Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

MS/MSD Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
RW-8012PMS	SW 8260B	2-Hexanone	57.3	59.4	154	RW-8012P	< 10 UJ	ug/l
RW-8012PMS	SW 8260B	4-Methyl-2-Pentanone (Mibk)	57.6	60.7	150	RW-8012P	< 10 UJ	ug/l
RW-8012PMS	SW 8260B	Acrylonitrile	45.5	55.9	161	RW-8012P	< 10 UJ	ug/l
RW-8012PMS	SW 8260B	Allyl Chloride	46.8	50	150	RW-8012P	< 5 UJ	ug/l
RW-8012PMS	SW 8260B	Benzene	47.5	58.6	133	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Bromochloromethane	51.2	74.4	128	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Bromodichloromethane	49.5	69.2	127	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Bromoform	38	66.3	140	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Carbon Tetrachloride	50.8	60.6	139	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Chlorobenzene	59.7	70.1	130	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Chlorodibromomethane	52.5	71.6	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Chloroform	47.6	66.1	133	RW-8012P	< 5 UJ	ug/l
RW-8012PMS	SW 8260B	Cis-1,2-Dichloroethene	46.2	60.6	136	RW-8012P	1 UJ	ug/l
RW-8012PMS	SW 8260B	Cis-1,3-Dichloropropene	58.4	71.1	129	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Dibromomethane	51.8	72.8	127	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Ethylbenzene	57.9	62.7	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Iodomethane	54.1	55.2	140	RW-8012P	< 10 UJ	ug/l
RW-8012PMS	SW 8260B	Methylene Chloride	45.6	61.5	125	RW-8012P	< 5 UJ	ug/l
RW-8012PMS	SW 8260B	Styrene	42.8	68.2	133	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Toluene	57.4	67.8	124	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Trans-1,2-Dichloroethene	47.7	61	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Trans-1,3-Dichloropropene	54.9	66.3	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMS	SW 8260B	Trans-1,4-Dichloro-2-Butene	8.16	57.6	136	RW-8012P	R	ug/l
RW-8012PMS	SW 8260B	Xylenes, total	56.1	65.6	133	RW-8012P	< 3 UJ	ug/l
RW-8012PMSD	SW 6020	Calcium, total	74	75	125	RW-8012P	78900 B	ug/l
RW-8012PMSD	SW 8260B	1,1,1,2-Tetrachloroethane	52.6	70.5	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,1,1-Trichloroethane	47.9	58.7	134	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,1,2,2-Tetrachloroethane	41.2	64.9	145	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,1,2-Trichloroethane	52	74.1	130	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,1-Dichloroethane	47.8	64	134	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,1-Dichloroethene	48	48.8	144	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,1-Dichloropropene	50.5	61.5	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,2,3-Trichloropropane	43	71.5	134	RW-8012P	< 2.5 UJ	ug/l
RW-8012PMSD	SW 8260B	1,2,4-Trichlorobenzene	47.8	67	146	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,2-Dibromo-3-Chloropropane	46.1	63.9	142	RW-8012P	< 5 UJ	ug/l
RW-8012PMSD	SW 8260B	1,2-Dibromoethane	51.7	73.8	131	RW-8012P	< 1 UJ	ug/l

TABLE C-8

Matrix Spike/Matrix Spike Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

MS/MSD Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
RW-8012PMSD	SW 8260B	1,2-Dichlorobenzene	50	77.4	127	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,2-Dichloroethane	50.4	60.7	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,2-Dichloropropane	48.3	69.7	130	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,3-Dichlorobenzene	48.1	67.9	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,3-Dichloropropane	53.6	74.3	123	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	1,4-Dichlorobenzene	50.4	74.4	123	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	2,2-Dichloropropane	46.1	54.9	142	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	2-Hexanone	58.4	59.4	154	RW-8012P	< 10 UJ	ug/l
RW-8012PMSD	SW 8260B	4-Methyl-2-Pentanone (Mibk)	57.5	60.7	150	RW-8012P	< 10 UJ	ug/l
RW-8012PMSD	SW 8260B	Acrylonitrile	47.7	55.9	161	RW-8012P	< 10 UJ	ug/l
RW-8012PMSD	SW 8260B	Allyl Chloride	46.3	50	150	RW-8012P	< 5 UJ	ug/l
RW-8012PMSD	SW 8260B	Benzene	45.5	58.6	133	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Bromochloromethane	49.8	74.4	128	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Bromodichloromethane	47.6	69.2	127	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Bromoform	34.9	66.3	140	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Carbon Tetrachloride	49.1	60.6	139	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Chlorobenzene	54.7	70.1	130	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Chlorodibromomethane	51	71.6	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Chloroform	46	66.1	133	RW-8012P	< 5 UJ	ug/l
RW-8012PMSD	SW 8260B	Cis-1,2-Dichloroethene	43.2	60.6	136	RW-8012P	1 UJ	ug/l
RW-8012PMSD	SW 8260B	Cis-1,3-Dichloropropene	54.2	71.1	129	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Dibromomethane	49.3	72.8	127	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Ethylbenzene	52.8	62.7	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Iodomethane	52	55.2	140	RW-8012P	< 10 UJ	ug/l
RW-8012PMSD	SW 8260B	Methylene chloride	44.6	61.5	125	RW-8012P	< 5 UJ	ug/l
RW-8012PMSD	SW 8260B	Styrene	40.8	68.2	133	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Toluene	53.5	67.8	124	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Trans-1,2-Dichloroethene	46	61	132	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Trans-1,3-Dichloropropene	51.6	66.3	136	RW-8012P	< 1 UJ	ug/l
RW-8012PMSD	SW 8260B	Trans-1,4-Dichloro-2-Butene	7	57.6	136	RW-8012P	R	ug/l
RW-8012PMSD	SW 8260B	Xylenes, total	52.3	65.6	133	RW-8012P	< 3 UJ	ug/l

NOTES:

Qualified non-detects are reported as less than the reported detection limit.

TABLE C-9

Matrix Spike/Matrix Spike Duplicate Relative Percent Difference Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

MS/MSD Sample ID	Method	Analyte	RPD	Allowable Limit	Sample ID	Result	Units
RW-7350PMSD	SW 8260B	1,2,4-Trichlorobenzene	20.7	20	RW-7350P	< 1 UJ	ug/l
RW-7350PMSD	SW 8260B	Acrolein	25.3	21.5	RW-7350P	< 50 UJ	ug/l
RW-7677PMSD	SW 8260B	1,1-Dichloroethane	23.1	20	RW-7677P	< 1 UJ	ug/l
RW-7677PMSD	SW 8260B	2-Butanone (Mek)	21.9	20.8	RW-7677P	< 10 UJ	ug/l
RW-7677PMSD	SW 8260B	Acetone	30.4	21.5	RW-7677P	< 50 UJ	ug/l
RW-7677PMSD	SW 8260B	Acrolein	27.2	21.5	RW-7677P	< 50 UJ	ug/l
RW-7677PMSD	SW 8260B	Acrylonitrile	21	20	RW-7677P	< 10 UJ	ug/l
RW-7677PMSD	SW 8260B	Vinyl acetate	28.9	20	RW-7677P	< 10 UJ	ug/l
RW-8012PMSD	SM 4500-CN	Cyanide	24	20	RW-8012P	< 5 UJ	ug/l

TABLE C-10

Laboratory Control Sample/Laboratory Control Sample Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
R3239593-1	SW 8260B	Iodomethane	53.3	64.6	137	TB-20170801	< 10 UJ	ug/l
R3239593-2	SW 8260B	Iodomethane	55.2	64.6	137	TB-20170801	< 10 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-8035P	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-2172F	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-2076F	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-8209P	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-8030P	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-2213F	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-0803A	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-8000B	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	TB-20170803	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-8012P	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-2237H	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-7077P	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-7350P	< 1 UJ	ug/l
R3240003-2	SW 8260B	1,1,2,2-Tetrachloroethane	78.7	79.3	123	RW-0802A	< 1 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-7244P	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-2172H	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-0808B	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	MW-103D	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	MW-103S	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-7776P	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	TB-20170808	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-7688P	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-2203H	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-0808A	< 10 UJ	ug/l
R3241750-1	SW 8260B	Iodomethane	59.6	64.6	137	RW-7677P	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-2172H	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-2203H	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-7244P	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	TB-20170808	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-7776P	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-7688P	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	MW-103S	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-7677P	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-0808B	< 10 UJ	ug/l

TABLE C-10

Laboratory Control Sample/Laboratory Control Sample Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	RW-0808A	< 10 UJ	ug/l
R3241750-2	SW 8260B	Iodomethane	62.3	64.6	137	MW-103D	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	RW-2879M	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	PA-3	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	PA-4	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	RW-8105PS	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	RW-8105PN	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	CW-2-EXT	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	TB-20170810	< 10 UJ	ug/l
R3242743-1	SW 8260B	Iodomethane	61.6	64.6	137	PA-1	< 10 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	RW-8105PS	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	PA-4	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	PA-3	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	TB-20170810	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	RW-8105PN	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	CW-2-EXT	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	PA-1	< 2.5 UJ	ug/l
R3242743-1	SW 8260B	trans-1,4-Dichloro-2-Butene	52.5	58.3	129	RW-2879M	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	PA-1	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	RW-2879M	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	PA-3	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	RW-8105PS	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	TB-20170810	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	CW-2-EXT	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	RW-8105PN	< 2.5 UJ	ug/l
R3242743-2	SW 8260B	trans-1,4-Dichloro-2-Butene	52.8	58.3	129	PA-4	< 2.5 UJ	ug/l
R3242967-1	SW 8260B	trans-1,4-Dichloro-2-Butene	50.3	58.3	129	RW-2140H	< 2.5 UJ	ug/l
R3242967-1	SW 8260B	trans-1,4-Dichloro-2-Butene	50.3	58.3	129	TB-20170811	< 2.5 UJ	ug/l
R3242967-1	SW 8260B	trans-1,4-Dichloro-2-Butene	50.3	58.3	129	MW-116D	< 2.5 UJ	ug/l
R3242967-1	SW 8260B	trans-1,4-Dichloro-2-Butene	50.3	58.3	129	MW-116S	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	MW-115D	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	RW-0816A	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	MW-106S	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	MW-115S	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	RW-8249P	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	RW-3259B	< 50 UJ	ug/l

TABLE C-10

Laboratory Control Sample/Laboratory Control Sample Duplicate Percent Recovery Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	Recovery (%)	Lower Limit (%)	Upper Limit (%)	Sample ID	Result	Units
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	RW-7953P	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	RW-7773P	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	TB-20170815	< 50 UJ	ug/l
R3243357-1	SW 8260B	Acrolein	19.1	40.4	172	MW-106D	< 50 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	RW-8249P	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	RW-0816A	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	MW-106S	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	MW-106D	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	MW-115S	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	TB-20170815	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	RW-3259B	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	RW-7953P	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	RW-7773P	< 2.5 UJ	ug/l
R3243357-1	SW 8260B	trans-1,4-Dichloro-2-Butene	55.2	58.3	129	MW-115D	< 2.5 UJ	ug/l
R3267864-1	SW 8260B	Iodomethane	44.1	64.6	137	TB-20171116	< 10 UJ	ug/l
R3267864-1	SW 8260B	Iodomethane	44.1	64.6	137	RW-2151H	< 10 UJ	ug/l
R3267864-2	SW 8260B	Iodomethane	57.1	64.6	137	RW-2151H	< 10 UJ	ug/l
R3267864-2	SW 8260B	Iodomethane	57.1	64.6	137	TB-20171116	< 10 UJ	ug/l

TABLE C-11

Laboratory Control Sample/Laboratory Control Sample Duplicate Relative Percent Difference Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	RPD	Allowable Limit	Sample ID	Result	Units
R3239593-2	SW 8260B	2-Butanone (MEK)	24.5	20	TB-20170801	< 10 UJ	ug/l
R3239593-2	SW 8260B	Acetone	47.8	20.9	TB-20170801	17.9 J	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-8012P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-8000B	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-0803A	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-7350P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	TB-20170803	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-7077P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-2213F	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-8030P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-2076F	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-0802A	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-2172F	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-8035P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-8209P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acetone	21.8	20.9	RW-2237H	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-7077P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-2213F	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-8035P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-8209P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-2172F	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-0802A	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-2076F	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-8012P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-2237H	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	TB-20170803	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-7350P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-0803A	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-8000B	< 50 UJ	ug/l
R3240003-2	SW 8260B	Acrolein	53	20	RW-8030P	< 50 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-2172F	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-0803A	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-7350P	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-8000B	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	TB-20170803	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-2237H	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-8012P	< 5 UJ	ug/l

TABLE C-11

Laboratory Control Sample/Laboratory Control Sample Duplicate Relative Percent Difference Exceedances and Qualified Data

2017 Offsite Groundwater Monitoring Data Validation

Laboratory Sample ID	Method	Analyte	RPD	Allowable Limit	Sample ID	Result	Units
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-2213F	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-8030P	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-0802A	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-2076F	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-8035P	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-8209P	< 5 UJ	ug/l
R3240003-2	SW 8260B	Bromomethane	30.1	20	RW-7077P	< 5 UJ	ug/l
R3267864-2	SW 8260B	Iodomethane	25.7	20	RW-2151H	< 10 UJ	ug/l
R3267864-2	SW 8260B	Iodomethane	25.7	20	TB-20171116	< 10 UJ	ug/l

Appendix D
2017 Offsite Groundwater Monitoring Analytical Data

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APPENDIX D INDEX

Table	Title
D-1	Normal Sample Analytical Results – VOCs
D-2	Normal Sample Analytical Results – Miscellaneous
D-3	Field Duplicate Sample Analytical Results – VOCs
D-4	Field Duplicate Sample Analytical Results – Miscellaneous
D-5	Laboratory Duplicate Sample Analytical Results – VOCs
D-6	Laboratory Duplicate Sample Analytical Results – Miscellaneous
D-7	Trip Blank Sample Analytical Results – VOCs
D-8	Equipment Blank Sample Analytical Results – VOCs
D-9	Source Blank Sample Analytical Results – VOCs
D-10	Matrix Spike/Matrix Spike Duplicate Sample Summary Results – VOCs
D-11	Matrix Spike/Matrix Spike Duplicate Sample Summary Results – Miscellaneous
D-12	Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs
D-13	Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

Unit	Definition
µg/L	microgram per liter
%	percent

Qualifier	Definition
J	Estimated result
R	Rejected
UB	Presence or absence cannot be determined due to blank contamination
UJ	Non-detected estimated

Acronym	Definition
DUP	laboratory replicate (duplicate)
EB	equipment blank
ID	identification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LCSRECLOW	laboratory control spike recovery lower limit
LCSRECUPP	laboratory control spike recovery upper limit
LCSRPD	laboratory control spike relative percent difference
LOCID	location identification
MS	matrix spike
MSD	matrix spike duplicate
MSRECLOW	matrix spike recovery lower limit
MSRECUPP	matrix spike recovery upper limit
MSRPD	matrix spike relative percent difference
NA	not applicable
RPD	relative percent difference
SB	source blank
TB	trip blank
VOCs	volatile organic compounds
#.#	Detected Compound
#	% Recovery or RPD above upper limit or below lower limit

TABLE D-1
Normal Sample Analytical Results – VOCs
2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	City Extraction Well #2	MW-103D	MW-103S	MW-106D	MW-106S	MW-115D	MW-115S	MW-116D	MW-116S	PA-1	PA-3	PA-4	RW-2076F	RW-2140H	RW-2151H	RW-2172F	RW-2172H	RW-2203H
			Map Key:	210	20	20	100	100	46	46	5	5	81	81	81	21	6	9	29	4	7
			Sample ID:	CW-2-EXT	MW-103D	MW-103S	MW-106D	MW-106S	MW-115D	MW-115S	MW-116D	MW-116S	PA-1	PA-3	PA-4	RW-2076F	RW-2140H	RW-2151H	RW-2172F	RW-2172H	RW-2203H
Method	**Analyte**	**Units**	**Date:**	8/10/2017	8/9/2017	8/9/2017	8/15/2017	8/15/2017	8/15/2017	8/15/2017	8/11/2017	8/11/2017	8/10/2017	8/10/2017	8/10/2017	8/2/2017	8/11/2017	11/16/2017	8/2/2017	8/8/2017	8/9/2017
	VOCs - SW 8260																				
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1 UJ	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.284 J	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50	< 50	< 50 UJ	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50	< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50	< 50	< 50 UJ	< 50	< 50
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5 UJ	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	1 UB	1 UB	< 1	1.11	< 1	< 1	< 1	< 1	1 UB	1.89	3.85	1 UB	2.15	2.1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10 UJ	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10 UJ	< 10 UJ	< 10	< 10	< 10 UJ	< 10	< 10 UJ	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50 UJ	< 50 UJ	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		0.381 J	< 1	0.471 J	< 1	< 1	< 1	1.44	< 1	2.93	< 1	< 1	< 1	< 1	< 1	5.68	4.66	< 1	6.69	2.5
SW 8260B	Toluene	µg/L		0.493 J	0.972 J	< 1	< 1	< 1	< 1	< 1	0.502 J	< 1	< 1	< 1	< 1	0.513 J	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5 UJ	< 2.5	< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ	< 2.5	< 2.5 UJ	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Trichloroethene	µg/L		2.94	< 1	1.72	< 1	< 1	2.17	11.6	< 1	21.6	2.12	1.66	2.18	0.588 J	33.9	34.4	< 1	37.7	27.5
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
	Surrogates																					
SW 8260B	4-Bromofluorobenzene	%		105	103	99.1	109	109	107	109	107	106	105	107	105	78.6 J	104	96.9	75.6 J	102	114
SW 8260B	a,a,a-Trifluorotoluene	%		108	103	102	107	107	110	108	108	109	107	108	107	104	109	102	104	101	92.4
SW 8260B	Dibromofluoromethane	%		93	92.3	92.8	95.1	93.3	93.8	95.7	92.3	94.8	94.5	94.2	93.6	90.6	93.4	99.5	89.8	91.9	105
SW 8260B	Toluene-D8	%		110	107	108	105	103	103	104	110	110	111	108	109	108	109	107	110	107	101
	VOCs - SW 8011																					
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:
Non-detects are reported as less than the reported detection limit.

TABLE D-1
Normal Sample Analytical Results – VOCs
2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	RW-2213F	RW-2237H	RW-2879M	RW-3259B	RW-7077P	RW-7244P	RW-7288P	RW-7310P	RW-7350P	RW-7492P	RW-7498P	RW-7505P	RW-7549P	RW-7586P	RW-7588P	RW-7677P	RW-7688P	RW-7773P
			Map Key:	26	101	202	51	31	12	13	14	15	18	19	3	103	98	10	99	97	100
			Sample ID:	RW-2213F	RW-2237H	RW-2879M	RW-3259B	RW-7077P	RW-7244P	RW-7288P	RW-7310P	RW-7350P	RW-7492P	RW-7498P	RW-7505P	RW-7549P	RW-7586P	RW-7588P	RW-7677P	RW-7688P	RW-7773P
Method	**Analyte**	**Units**	**Date:**	8/2/2017	8/3/2017	8/11/2017	8/16/2017	8/2/2017	8/8/2017	7/14/2017	7/13/2017	8/3/2017	7/12/2017	7/12/2017	7/13/2017	7/14/2017	7/13/2017	7/14/2017	8/9/2017	8/8/2017	8/15/2017
	VOCs - SW 8260																				
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1 UJ	< 1 UJ	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5 UJ	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50 UJ	< 50 UJ	< 50	< 50	< 50 UJ	< 50	< 50	< 50	< 50 UJ	< 50	< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50 UJ	< 50 UJ	< 50	< 50 UJ	< 50 UJ	< 50	< 50	< 50	< 50 UJ	< 50	< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5 UJ	< 5 UJ	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		1 UB	3.18 B	< 1	< 1	1 UB	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	0.266 J	< 1	< 1	2.34	< 1	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10	< 10 UJ	< 10	< 10	< 10 UJ	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10 UJ	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50 UJ	< 50 UJ	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	7.84	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	0.822 J	< 1	< 1	5.45	< 1	< 1
SW 8260B	Toluene	µg/L		1.16 UB	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5	< 2.5	< 2.5	< 2.5	R	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		< 1	44.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	5.5	< 1	< 1	33.8	< 1	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 UJ	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3 UJ	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
	Surrogates																				
SW 8260B	4-Bromofluorobenzene	%		76.4 J	79.4 J	104	107	78.5 J	104	104	102	73.3 J	105	104	105	105	104	106	101	100	109
SW 8260B	a,a,a-Trifluorotoluene	%		105	104	108	106	104	104	104	104	105	104	105	105	104	104	104	101	100	108
SW 8260B	Dibromofluoromethane	%		89.7	92.3	95.6	92.9	90.5	90.6	94.7	95.7	90.6	94	94.5	94.2	94.8	94	94.8	89.4	90.9	95.1
SW 8260B	Toluene-D8	%		106	108	111	105	107	104	105	105	107	105	104	105	104	103	103	109	106	106
	VOCs - SW 8011																				
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.00614 J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:
Non-detects are reported as less than the reported detection limit.

TABLE D-1
Normal Sample Analytical Results – VOCs
2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	RW-7776P	RW-7953P	RW-8000B	RW-8012P	RW-8030P	RW-8035P	RW-8105PN	RW-8105PS	RW-8209P	RW-8249P
			Map Key:	95	214	115	206	205	60	225	225	198	199
			Sample ID:	RW-7776P	RW-7953P	RW-8000B	RW-8012P	RW-8030P	RW-8035P	RW-8105PN	RW-8105PS	RW-8209P	RW-8249P
Method	**Analyte**	**Units**	**Date:**	8/8/2017	8/16/2017	8/3/2017	8/3/2017	8/1/2017	8/1/2017	8/11/2017	8/11/2017	8/2/2017	8/16/2017
	VOCs - SW 8260												
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1	< 1	< 1 UJ	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5 UJ	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50	< 50	< 50 UJ	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50 UJ	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10 UJ	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5	< 5	< 5 UJ	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	1 UB	1 UB	1 UJ	1.16 UB	1 UB	< 1	< 1	1 UB	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10	< 10	< 10 UJ	< 10	< 10	< 10 UJ	< 10 UJ	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50 UJ	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	0.764 J	0.786 J	0.381 J	2.67	< 1	< 1	< 1	< 1	< 1
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5 UJ	< 2.5	R	< 2.5	< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		< 1	5.61	4.65	2.08	16.4	< 1	< 1	< 1	< 1	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3 UJ	< 3	< 3	< 3	< 3	< 3	< 3
	Surrogates												
SW 8260B	4-Bromofluorobenzene	%		99.7	105	80 J	75 J	76.1 J	76.9 J	105	105	77.5 J	107
SW 8260B	a,a,a-Trifluorotoluene	%		103	110	104	104	104	105	107	107	104	108
SW 8260B	Dibromofluoromethane	%		91.3	92.8	90.1	90.7	92.3	89	94.8	94.5	89.3	94.5
SW 8260B	Toluene-D8	%		109	105	107	109	109	110	109	109	110	105
	VOCs - SW 8011												
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:
Non-detects are reported as less than the reported detection limit.

TABLE D-2

Normal Sample Analytical Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	Units	LOCID:	City Extraction Well #2	MW-103D	MW-103S	MW-106D	MW-106S	MW-115D	MW-115S	MW-116D	MW-116S	PA-1	PA-3	PA-4	RW-2076F	RW-2140H	RW-2151H	RW-2172F
			Map Key:	210	20	20	100	100	46	46	5	5	81	81	81	21	6	9	29
			Sample ID:	CW-2-EXT	MW-103D	MW-103S	MW-106D	MW-106S	MW-115D	MW-115S	MW-116D	MW-116S	PA-1	PA-3	PA-4	RW-2076F	RW-2140H	RW-2151H	RW-2172F
			Date:	8/10/2017	8/9/2017	8/9/2017	8/15/2017	8/15/2017	8/15/2017	8/15/2017	8/11/2017	8/11/2017	8/10/2017	8/10/2017	8/10/2017	8/2/2017	8/11/2017	11/16/2017	8/2/2017
	Alkalinity																		
SM 2320B	Alkalinity, Total as $CaCO_3$	µg/L		283000	264000 B	285000 B	272000 B	269000 B	311000 B	341000 B	180000 B	341000 B	283000 B	286000 B	282000 B	280000 B	350000 B	238000	279000
	Cyanide																		
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	2.82 J	< 5	< 5	< 5	< 5	< 5	< 5	< 5
	Metals, Totals																		
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.61 J	0.399 J	2.03	1.77 J	1.76 J	2.05	2.31	12.1	1.28 J	1.72 J	1.66 J	1.62 J	1.93 J	1.06 J	0.476 J	1.84 J
SW 6020	Barium, Total	µg/L		128	59.6	106	99	98.1	116	152	142	140	127	131	132	97.6 B	143	198	85 B
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	0.231 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Calcium, Total	µg/L		72500	32500	75300	67600	68700	73600	77900	45000	96100	71100	74600	73400	74800 B	105000	72000 B	72800 B
SW 6020	Chromium, Total	µg/L		4.85	< 2	1.22 J	0.899 J	0.979 J	1.13 J	1.39 J	0.808 J	0.908 J	0.866 J	0.947 J	0.802 J	0.722 J	< 2	0.562 J	0.629 J
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	0.301 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		< 5	2.3 J	< 5	< 5	0.566 J	0.595 J	0.849 J	1.65 J	1.13 J	< 5	0.706 J	0.713 J	17.6	2.3 J	13.1	17.5
SW 6020	Iron, Total	µg/L		90.6 J	458	< 100	32.8 J	< 100	< 100	< 100	1580	16.2 J	< 100	27.6 J	< 100	< 100	< 100	1090	24.4 J
SW 6020	Lead, Total	µg/L		< 2	0.805 J	< 2	< 2	< 2	< 2	< 2	0.519 J	< 2	< 2	< 2	< 2	0.473 J	< 2	5.99	1.75 J
SW 6020	Magnesium, Total	µg/L		27700	21500	29500	25600	26600	29500	33500	20500	35300	27500	28800	28100	28800	38600	33800	28700
SW 6020	Manganese, Total	µg/L		1.56 J	90.4 B	5 UB	0.706 J	0.414 J	1.74 J	0.374 J	543	1.39 J	0.362 J	0.583 J	< 5	5 UB	1.09 J	27.6 B	5 UB
SW 6020	Nickel, Total	µg/L		< 2	0.678 J	< 2	< 2	< 2	< 2	< 2	0.956 J	0.649 J	< 2	< 2	< 2	< 2	0.449 J	1.06 J	< 2
SW 6020	Potassium, Total	µg/L		5420	5780	5870	5360	5570	6850	8340	7290	4850	5630	5750	5630	6030	4830	1890	6460
SW 6020	Selenium, Total	µg/L		0.516 J	< 2	0.555 J	0.432 J	0.396 J	0.665 J	0.644 J	< 2	0.399 J	0.654 J	0.814 J	0.676 J	0.525 J	0.559 J	< 2	0.458 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Sodium, Total	µg/L		35900	99900	36300	31400	32400	44400	65600	33000	60100	32900	34600	36500	34600	68700	39400 B	34300
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		< 2	0.853 J	< 2	2 UB	2 UB	2 UB	2 UB	2 UB	2 UB	0.331 J	0.761 J	< 2	< 2	2 UB	2 UB	< 2
SW 6020	Vanadium, Total	µg/L		1.53 J	0.242 J	1.47 J	1.45 J	1.39 J	1.53 J	1.84 J	0.877 J	1.2 J	1.48 J	1.7 J	1.5 J	1.3 J	1.03 J	0.516 J	1.23 J
SW 6020	Zinc, Total	µg/L		< 25	37.9	< 25	< 25	< 25	< 25	< 25	8.08 J	< 25	< 25	< 25	< 25	52.3 B	59.6	265 B	171 B
	Mercury																		
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Inorganic Anions																		
SW 9056A	Chloride	µg/L		58300	61900	49800	47900 B	48900 B	62800 B	90900 B	81400	99800	52700	56800	57700	47400	124000	95300	45800
SW 9056A	Sulfate	µg/L		39500	36800	38500	36600	37800	42400	51300	4950 J	69200	37400	40400	39800	37400	84400	31200	37700

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-2

Normal Sample Analytical Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	RW-2172H	RW-2203H	RW-2213F	RW-2237H	RW-2879M	RW-3259B	RW-7077P	RW-7244P	RW-7288P	RW-7310P	RW-7350P	RW-7492P	RW-7498P	RW-7505P	RW-7549P
			Map Key:	4	7	26	101	202	51	31	12	13	14	15	18	19	3	103
			Sample ID:	RW-2172H	RW-2203H	RW-2213F	RW-2237H	RW-2879M	RW-3259B	RW-7077P	RW-7244P	RW-7288P	RW-7310P	RW-7350P	RW-7492P	RW-7498P	RW-7505P	RW-7549P
Method	**Analyte**	**Units**	**Date:**	8/8/2017	8/9/2017	8/2/2017	8/3/2017	8/11/2017	8/16/2017	8/2/2017	8/8/2017	7/14/2017	7/13/2017	8/3/2017	7/12/2017	7/12/2017	7/13/2017	7/14/2017
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	µg/L		358000 B	201000 B	268000 B	371000 B	230000	181000 B	274000 B	272000 B	284000 B	284000 B	271000 B	283000 B	290000 B	315000 B	306000 B
	Cyanide																	
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
	Metals, Totals																	
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.14 J	0.303 J	1.88 J	1.42 J	< 2	1.44 J	1.94 J	1.89 J	1.52 J	1.8 J	1.82 J	1.78 J	1.67 J	1.71 J	1.67 J
SW 6020	Barium, Total	µg/L		161	45.3	98.9 B	184 B	229	39.6	83.7 B	111	111	106	101 B	113	115	118	131
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Calcium, Total	µg/L		115000	80500	69700 B	120000 B	132000	51400	70900 B	72300	67600	68900	70000 B	68200	70200	70700	75300
SW 6020	Chromium, Total	µg/L		< 2	< 2	0.645 J	0.623 J	1.29 J	1.11 J	< 2	0.627 J	0.644 J	0.776 J	0.795 J	0.632 J	0.9 J	0.612 J	0.781 J
SW 6020	Cobalt, Total	µg/L		< 2	1.77 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		1.61 J	4.39 J	3.45 J	19.4	4.79 J	114	8.29	1.83 J	2.76 J	31.1	8.67	22.7	2.52 J	5.88	77.2
SW 6020	Iron, Total	µg/L		63.9 J	23600	< 100	34.1 J	650	1050	60.3 J	< 100	100 UB	< 100	15.8 J	< 100	< 100	< 100	< 100
SW 6020	Lead, Total	µg/L		0.51 J	1.41 J	< 2	< 2	5.05	12.9	0.766 J	< 2	< 2	0.378 J	0.667 J	1.26 J	0.349 J	0.294 J	19.8
SW 6020	Magnesium, Total	µg/L		42400	36900	27000	45300	55500	7550	27700	27900	25200	25900	27200	25600	26400	26400	28300
SW 6020	Manganese, Total	µg/L		3.07 J	933 B	5 UB	1.62 J	20.5	8.01	1.71 J	4.15 J	2.26 J	0.432 J	5 UB	0.745 J	1.48 J	0.295 J	5 UB
SW 6020	Nickel, Total	µg/L		0.805 J	2.73	< 2	0.876 J	2.13	0.575 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	0.357 J
SW 6020	Potassium, Total	µg/L		5600	5960	5770	7710	1690	558 J	6130	6100	5320	5740	5790	5620	5640	5680	5910
SW 6020	Selenium, Total	µg/L		0.554 J	< 2	0.382 J	< 2	3.73	< 2	< 2	0.661 J	0.536 J	0.429 J	< 2	0.498 J	< 2	0.444 J	0.447 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Sodium, Total	µg/L		72500	64100	31800	65800	74400	15500	32000	33300	29700	30100	32300	30000	30400	30700	34100
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		< 2	< 2	< 2	2 UB	< 2	2 UB	2 UB	0.514 J	< 2	< 2	< 2	2 UB	2 UB	2 UB	2.92
SW 6020	Vanadium, Total	µg/L		1.12 J	0.26 J	1.43 J	1.27 J	0.353 J	1.41 J	1.13 J	1.52 J	1.35 J	1.32 J	1.43 J	1.31 J	1.29 J	1.18 J	1.45 J
SW 6020	Zinc, Total	µg/L		133	448	25 UB	30.3 B	1440	301	162 B	51.8	15.6 J	202	138 B	143	92.9	34	403
	Mercury																	
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Inorganic Anions																	
SW 9056A	Chloride	µg/L		131000 B	141000	45200	139000	294000	16400 B	44600	46000 B	46500	44800 B	45800	45300 B	45600 B	45600 B	59900
SW 9056A	Sulfate	µg/L		83300	113000	36100	82300 B	66100	6890	37100	35400	35900	34900	34600	34800	34800	36200	41800

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-2

Normal Sample Analytical Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	RW-7586P	RW-7588P	RW-7677P	RW-7688P	RW-7773P	RW-7776P	RW-7953P	RW-8000B	RW-8012P	RW-8030P	RW-8035P	RW-8105PN	RW-8105PS	RW-8209P	RW-8249P
			Map Key:	98	10	99	97	100	95	214	115	206	205	60	225	225	198	199
			Sample ID:	RW-7586P	RW-7588P	RW-7677P	RW-7688P	RW-7773P	RW-7776P	RW-7953P	RW-8000B	RW-8012P	RW-8030P	RW-8035P	RW-8105PN	RW-8105PS	RW-8209P	RW-8249P
Method	**Analyte**	**Units**	**Date:**	7/13/2017	7/14/2017	8/9/2017	8/8/2017	8/15/2017	8/8/2017	8/16/2017	8/3/2017	8/3/2017	8/1/2017	8/1/2017	8/11/2017	8/11/2017	8/2/2017	8/16/2017
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	µg/L		287000 B	286000 B	355000 B	271000 B	276000 B	265000 B	315000 B	287000 B	297000 B	311000 B	221000 B	325000	298000	165000 B	189000 B
	Cyanide																	
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 UJ	< 5	< 5	< 5	< 5	< 5	< 5
	Metals, Totals																	
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.76 J	1.67 J	1.58 J	1.86 J	1.79 J	1.68 J	1.69 J	1.6 J	1.79 J	1.49 J	0.261 J	1.11 J	2.24	< 2	< 2
SW 6020	Barium, Total	µg/L		112	107	187	108	98	117	133	125 B	121 B	136 B	134 B	207	155	107 B	128
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Calcium, Total	µg/L		69200	69000	110000 B	72000	67300	72500	84700	80500 B	78900 B	92400 B	54300 B	126000	91200	293000 B	68600
SW 6020	Chromium, Total	µg/L		0.641 J	0.71 J	< 2	0.577 J	0.673 J	0.797 J	1.41 J	0.766 J	0.943 J	0.911 J	< 2	< 2	< 2	< 2	< 2
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		2.54 J	5.39	1.42 J	7.69	2.49 J	1.63 J	1.26 J	1.85 J	4.09 J	5.95	10.9	13.9	< 5	267	3.26 J
SW 6020	Iron, Total	µg/L		35.5 J	< 100	< 100	< 100	131	16 J	< 100	< 100	< 100	42.2 J	23 J	61.1 J	2080	81.4 J	< 100
SW 6020	Lead, Total	µg/L		< 2	0.433 J	0.252 J	< 2	0.626 J	< 2	< 2	0.485 J	0.418 J	0.527 J	0.318 J	0.944 J	0.255 J	12	0.285 J
SW 6020	Magnesium, Total	µg/L		26200	25700	38600	28100	26200	27200	33800	30600	29800	35900	32000	43200	24800	145000	27900
SW 6020	Manganese, Total	µg/L		0.856 J	< 5	5 UB	5 UB	4.27 J	5 UB	0.272 J	5 UB	5 UB	1.74 J	2.74 J	3.16 J	196	5 UB	0.63 J
SW 6020	Nickel, Total	µg/L		< 2	< 2	0.485 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	1.39 J	0.385 J	< 2	< 2
SW 6020	Potassium, Total	µg/L		5740	5390	7920	6030	5610	5550	6310	5680	6320	6450	1270	2300	1750	2800	1200
SW 6020	Selenium, Total	µg/L		0.495 J	0.546 J	0.418 J	0.539 J	0.52 J	0.686 J	0.683 J	0.77 J	0.492 J	< 2	0.5 J	2.52	< 2	6.1	0.838 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Sodium, Total	µg/L		30900	30400	43500	34900	32100	31900	43400	41000	39800	44000	31300	97300	34300	164000	30400
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		2 UB	< 2	< 2	< 2	2 UB	0.404 J	2 UB	< 2	2 UB	2 UB	2 UB	< 2	< 2	2 UB	2 UB
SW 6020	Vanadium, Total	µg/L		1.3 J	1.46 J	1.22 J	1.51 J	1.34 J	1.59 J	1.47 J	1.37 J	1.48 J	1.4 J	0.186 J	2.34 J	0.352 J	< 5	< 5
SW 6020	Zinc, Total	µg/L		9.59 J	47.8	37.5	< 25	111	11.3 J	< 25	25 UB	49.5 B	25 UB	22.5 J	338	348	86.5 B	25.5
	Mercury																	
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Inorganic Anions																	
SW 9056A	Chloride	µg/L		45100 B	47600	123000 B	45500 B	46800 B	48200 B	82000 B	69900	59900	90600	66200	221000	77200	840000	113000 B
SW 9056A	Sulfate	µg/L		34900	38000	61700	35800	35700	37200	48400 J	44200 B	41200 B	48500	24800	88600	34900	214000	22000

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-3

Field Duplicate Sample Analytical Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	RW-2172H	RW-2213F	RW-7492P	RW-7688P	RW-8012P	RW-8249P
			Map Key:	4	26	18	97	206	199
			Sample ID:	RW-0808A	RW-0802A	RW-0712A	RW-0808B	RW-0803A	RW-0816A
Method	**Analyte**	**Units**	**Date:**	8/8/2017	8/2/2017	7/12/2017	8/8/2017	8/3/2017	8/16/2017
	VOCs SW 8260B								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1 UJ	< 1	< 1	< 1 UJ	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50 UJ	< 50	< 50	< 50 UJ	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50 UJ	< 50	< 50	< 50 UJ	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5 UJ	< 5	< 5	< 5 UJ	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		2.52	1 UB	< 1	< 1	1 UB	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10	< 10	< 10 UJ	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50 UJ	< 50	< 50	< 50 UJ	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		6.68	< 1	< 1	< 1	0.47 J	< 1
SW 8260B	Toluene	µg/L		< 1	1.16 UB	< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		37.2	< 1	< 1	< 1	2.03	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	Surrogates								
SW 8260B	4-Bromofluorobenzene	%		102	75.7 J	104	100	80.6	105
SW 8260B	a,a,a-Trifluorotoluene	%		94	103	105	102	106	109
SW 8260B	Dibromofluoromethane	%		109	90	95.7	91.5	89.7	95.2
SW 8260B	Toluene-D8	%		125 J	109	106	107	110	107
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-4

Field Duplicate Sample Analytical Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	RW-2172H	RW-2213F	RW-7492P	RW-7688P	RW-8012P	RW-8249P
			Map Key:	4	26	18	97	206	199
			Sample ID:	RW-0808A	RW-0802A	RW-0712A	RW-0808B	RW-0803A	RW-0816A
Method	**Analyte**	**Units**	**Date:**	8/8/2017	8/2/2017	7/12/2017	8/8/2017	8/3/2017	8/16/2017
SM 2320B	Alkalinity, Total as $CaCO_3$	µg/L		360000 B	264000	286000 B	274000 B	296000 B	187000 B
	Cyanide								
SM 4500CN E-2011	Cyanide	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
	Metals, Totals								
SW 6020	Antimony, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Arsenic, Total	µg/L		1.12 J	1.73 J	1.54 J	1.93 J	1.88 J	< 2
SW 6020	Barium, Total	µg/L		163	98.2 B	110	108	113 B	130
SW 6020	Beryllium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Cadmium, Total	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 6020	Calcium, Total	µg/L		116000	69000 B	68200	71400	77500 B	69000
SW 6020	Chromium, Total	µg/L		0.65 J	0.646 J	0.592 J	< 2	0.921 J	< 2
SW 6020	Cobalt, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Copper, Total	µg/L		1.75 J	3.56 J	36.3 J	8.63	3.07 J	3 J
SW 6020	Iron, Total	µg/L		71.4 J	< 100	< 100	24.5 J	< 100	< 100
SW 6020	Lead, Total	µg/L		0.554 J	0.3 J	1.01 J	0.413 J	0.371 J	0.257 J
SW 6020	Magnesium, Total	µg/L		42900	26800	25600	27900	30000	27700
SW 6020	Manganese, Total	µg/L		3.82 J	5 UB	0.352 J	2.43 J	1.55 J	0.615 J
SW 6020	Nickel, Total	µg/L		1.11 J	< 2	< 2	< 2	< 2	< 2
SW 6020	Potassium, Total	µg/L		5680	5750	5560	6040	6240	1150
SW 6020	Selenium, Total	µg/L		0.533 J	0.5 J	0.619 J	0.484 J	0.588 J	0.78 J
SW 6020	Silver, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Sodium, Total	µg/L		72500	31700	29600	34800	40100	30300
SW 6020	Thallium, Total	µg/L		< 2	< 2	< 2	< 2	< 2	< 2
SW 6020	Tin, Total	µg/L		< 2	2 UB	2 UB	0.415 J	2 UB	2 UB
SW 6020	Vanadium, Total	µg/L		1.05 J	1.34 J	1.18 J	1.49 J	1.41 J	< 5
SW 6020	Zinc, Total	µg/L		136	25 UB	133	2.68 J	46.1 B	26.1
	Mercury								
SW 7470A	Mercury, Total	µg/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Inorganic Anions								
SW 9056A	Chloride	µg/L		129000 B	45200	45500 B	45500 B	60000	113000 B
SW 9056A	Sulfate	µg/L		83100	36000	34900	35800	41300 B	21800

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-5

Laboratory Duplicate Sample Analytical Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	MW-103D	RW-2237H	RW-7588P	RW-8105PN
			Map Key:	20	101	10	225
			Sample ID:	MW-103DDUP	RW-0712A	RW-7588PDUP	RW-8105PNDUP
Method	**Analyte**	**Units**	**Date:**	8/9/2017	8/3/2017	7/14/2017	8/11/2017
	VOCs - SW 8011						
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-6

Laboratory Duplicate Sample Analytical Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

			LOCID:	MW-103S	MW-106S	MW-116D	PA-1	RW-2151H	RW-2172F	RW-7350P	RW-7492P	RW-7505P	RW-7773P	RW-7953P	RW-8000B	RW-8030P
			Map Key:	20	5	5	81	9	29	15	18	3	100	214	115	205
			Sample ID:	MW-103SDUP	MW-106SDUP	MW-116DDUP	PA-1DUP	RW-2151HDUP	RW-2172FDUP	RW-7350PDUP	RW-0712ADUP	RW-7505PDUP	RW-7773PDUP	RW-7953PDUP	RW-8000BDUP	RW-8030PDUP
Method	**Analyte**	**Units**	**Date:**	8/9/2017	8/11/2017	8/11/2017	8/10/2017	11/16/2017	8/2/2017	8/3/2017	7/12/2017	7/13/2017	8/15/2017	8/16/2017	8/3/2017	8/1/2017
	Alkalinity															
SM 2320B	Alkalinity, Total	µg/L			272000	178000			280000	270000	284000	285000				
	Cyanide															
SM 4500CN E-2011	Cyanide	µg/L		< 5		< 5	< 5		< 5						< 5	
	Inorganic Anions															
SW 9056A	Chloride	µg/L								45900			47000			91100
SW 9056A	Sulfate	µg/L						31200		34600				48200		48500

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-7

Trip Blank Sample Analytical Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	Units	Sample ID:	TB-20170712	TB-20170714	TB-20170801	TB-20170803	TB-20170808	TB-20170810
			Date:	7/12/2017	7/14/2017	8/1/2017	8/3/2017	8/8/2017	8/10/2017
	VOCs - SW 8260								
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1 UJ	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10 UJ	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		10.8 J	10.2 J	17.9 J	< 50 UJ	< 50	11.6 J
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50 UJ	< 50	< 50
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5 UJ	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	1 UB	< 1	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10	< 10 UJ	< 10	< 10 UJ	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50	< 50	< 50 UJ	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Toluene	µg/L		0.499 J	0.472 J	0.443 J	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3	< 3	< 3
	Surrogates								
SW 8260B	4-Bromofluorobenzene	%		104	104	101	80.3	104	106
SW 8260B	a,a,a-Trifluorotoluene	%		105	104	102	104	102	108
SW 8260B	Dibromofluoromethane	%		94.6	93.7	88.2	88.5	89.7	94.5
SW 8260B	Toluene-D8	%		106	105	108	109	108	109
	VOCs - SW 8011								
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NR
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NR

NOTES:

Non-detects are reported as less than the reported detection limit.

NR indicates no reportable data due to possible cross contamination.

TABLE D-7

Trip Blank Sample Analytical Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

			Sample ID:	TB-20170811	TB-20170815	TB-20171116
Method	**Analyte**	**Units**	**Date:**	8/11/2017	8/15/2017	11/16/2017
	VOCs - SW 8260					
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50 UJ	< 50
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	< 1	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10	< 10	< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	< 1
SW 8260B	Toluene	µg/L		< 1	0.414 J	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5 UJ	< 2.5 UJ	< 2.5
SW 8260B	Trichloroethene	µg/L		< 1	< 1	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3
	Surrogates					
SW 8260B	4-Bromofluorobenzene	%		106	105	98.5
SW 8260B	a,a,a-Trifluorotoluene	%		108	109	103
SW 8260B	Dibromofluoromethane	%		94.1	91.7	98.2
SW 8260B	Toluene-D8	%		110	107	104
	VOCs - SW 8011					
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01

NOTES:

Non-detects are reported as less than the reported detection limit.

NR indicates no reportable data due to possible cross contamination.

TABLE D-8

Equipment Blank Sample Analytical Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

			Sample ID:	EB-20170809	EB-20170810	EB-20170811	EB-20170815
Method	**Analyte**	**Units**	**Date:**	8/9/2017	8/10/2017	8/11/2017	8/15/2017
	VOCs - SW 8260						
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10	< 10	< 10	< 10
SW 8260B	2-Hexanone	µg/L		< 10	< 10	< 10	< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10	< 10	< 10	< 10
SW 8260B	Acetone	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Acetonitrile	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Acrolein	µg/L		< 50	< 50	< 50	< 50 UJ
SW 8260B	Acrylonitrile	µg/L		< 10	< 10	< 10	< 10
SW 8260B	Allyl Chloride	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Benzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromochloromethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromodichloromethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromoform	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Bromomethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Carbon Disulfide	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Chlorobenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Chloroethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Chloroform	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Chloromethane	µg/L		< 2.5	< 2.5	< 2.5	< 2.5
SW 8260B	Chloroprene	µg/L		< 50	< 50	< 50	< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Dibromomethane	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Ethylbenzene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ	< 10 UJ	< 10	< 10
SW 8260B	Isobutanol	µg/L		< 100	< 100	< 100	< 100
SW 8260B	Methacrylonitrile	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Methyl methacrylate	µg/L		< 50 UJ	< 50	< 50	< 50
SW 8260B	Methylene chloride	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Propionitrile	µg/L		< 50	< 50	< 50	< 50
SW 8260B	Styrene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Tetrachloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Toluene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ
SW 8260B	Trichloroethene	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5	< 5	< 5	< 5
SW 8260B	Vinyl Acetate	µg/L		< 10	< 10	< 10	< 10
SW 8260B	Vinyl Chloride	µg/L		< 1	< 1	< 1	< 1
SW 8260B	Xylene (Total)	µg/L		< 3	< 3	< 3	< 3
	Surrogates						
SW 8260B	4-Bromofluorobenzene	%		100	105	106	109
SW 8260B	a,a,a-Trifluorotoluene	%		103	106	108	109
SW 8260B	Dibromofluoromethane	%		87.8	93.6	92.5	93.7
SW 8260B	Toluene-D8	%		105	110	109	104
	VOCs - SW 8011						
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02	< 0.02	< 0.02	< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01	< 0.01	< 0.01	< 0.01

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-9

Source Blank Sample Analytical Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

			Sample ID:	SB-20170809
Method	**Analyte**	**Units**	**Date:**	8/9/2017
	VOCs - SW 8260			
SW 8260B	1,1,1,2-Tetrachloroethane	µg/L		< 1
SW 8260B	1,1,1-Trichloroethane	µg/L		< 1
SW 8260B	1,1,2,2-Tetrachloroethane	µg/L		< 1
SW 8260B	1,1,2-Trichloroethane	µg/L		< 1
SW 8260B	1,1-Dichloroethane	µg/L		< 1
SW 8260B	1,1-Dichloroethene	µg/L		< 1
SW 8260B	1,1-Dichloropropene	µg/L		< 1
SW 8260B	1,2,3-Trichloropropane	µg/L		< 2.5
SW 8260B	1,2,4-Trichlorobenzene	µg/L		< 1
SW 8260B	1,2-Dibromo-3-chloropropane	µg/L		< 5
SW 8260B	1,2-Dibromoethane	µg/L		< 1
SW 8260B	1,2-Dichlorobenzene	µg/L		< 1
SW 8260B	1,2-Dichloroethane	µg/L		< 1
SW 8260B	1,2-Dichloropropane	µg/L		< 1
SW 8260B	1,3-Dichlorobenzene	µg/L		< 1
SW 8260B	1,3-Dichloropropane	µg/L		< 1
SW 8260B	1,4-Dichlorobenzene	µg/L		< 1
SW 8260B	2,2-Dichloropropane	µg/L		< 1
SW 8260B	2-Butanone (MEK)	µg/L		< 10
SW 8260B	2-Hexanone	µg/L		< 10
SW 8260B	4-Methyl-2-pentanone (MIBK)	µg/L		< 10
SW 8260B	Acetone	µg/L		< 50
SW 8260B	Acetonitrile	µg/L		< 50
SW 8260B	Acrolein	µg/L		< 50
SW 8260B	Acrylonitrile	µg/L		< 10
SW 8260B	Allyl Chloride	µg/L		< 5
SW 8260B	Benzene	µg/L		< 1
SW 8260B	Bromochloromethane	µg/L		< 1
SW 8260B	Bromodichloromethane	µg/L		< 1
SW 8260B	Bromoform	µg/L		< 1
SW 8260B	Bromomethane	µg/L		< 5
SW 8260B	Carbon Disulfide	µg/L		< 1
SW 8260B	Carbon tetrachloride	µg/L		< 1
SW 8260B	Chlorobenzene	µg/L		< 1
SW 8260B	Chlorodibromomethane	µg/L		< 1
SW 8260B	Chloroethane	µg/L		< 5
SW 8260B	Chloroform	µg/L		< 5
SW 8260B	Chloromethane	µg/L		< 2.5
SW 8260B	Chloroprene	µg/L		< 50
SW 8260B	cis-1,2-Dichloroethene	µg/L		< 1
SW 8260B	cis-1,3-Dichloropropene	µg/L		< 1
SW 8260B	Dibromomethane	µg/L		< 1
SW 8260B	Dichlorodifluoromethane	µg/L		< 5
SW 8260B	Ethyl methacrylate	µg/L		< 5
SW 8260B	Ethylbenzene	µg/L		< 1
SW 8260B	Iodomethane	µg/L		< 10 UJ
SW 8260B	Isobutanol	µg/L		< 100
SW 8260B	Methacrylonitrile	µg/L		< 50
SW 8260B	Methyl methacrylate	µg/L		< 50 UJ
SW 8260B	Methylene chloride	µg/L		< 5
SW 8260B	Propionitrile	µg/L		< 50
SW 8260B	Styrene	µg/L		< 1
SW 8260B	Tetrachloroethene	µg/L		< 1
SW 8260B	Toluene	µg/L		< 1
SW 8260B	trans-1,2-Dichloroethene	µg/L		< 1
SW 8260B	trans-1,3-Dichloropropene	µg/L		< 1
SW 8260B	trans-1,4-Dichloro-2-butene	µg/L		< 2.5
SW 8260B	Trichloroethene	µg/L		< 1
SW 8260B	Trichlorofluoromethane	µg/L		< 5
SW 8260B	Vinyl Acetate	µg/L		< 10
SW 8260B	Vinyl Chloride	µg/L		< 1
SW 8260B	Xylene (Total)	µg/L		< 3
	Surrogates			
SW 8260B	4-Bromofluorobenzene	%		102
SW 8260B	a,a,a-Trifluorotoluene	%		102
SW 8260B	Dibromofluoromethane	%		90.2
SW 8260B	Toluene-D8	%		108
	VOCs - SW 8011			
SW 8011	1,2-Dibromo-3-chloropropane	µg/L		< 0.02
SW 8011	1,2-Dibromoethane	µg/L		< 0.01

NOTES:

Non-detects are reported as less than the reported detection limit.

TABLE D-10

Matrix Spike/Matrix Spike Duplicate Sample Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	MSRECLOW (%)	MSRECUPP (%)	MSRPD Limit	LOCID:	RW-3259B	RW-3259B	RW-3259B	RW-7350P	RW-7350P	RW-7350P	RW-7677P	RW-7677P
					Map Key:	51	51	51	15	15	15	99	99
					Sample ID:	RW-3259BMS	RW-3259BMSD	NA	RW-7350PMS	RW-7350PMSD	NA	RW-7677PMS	RW-7677PMSD
					Date:	8/16/2017	8/16/2017	NA	8/3/2017	8/3/2017	NA	8/9/2017	8/9/2017
					Units	% Recovery	% Recovery	MS/MSD RPD	% Recovery	% Recovery	MS/MSD RPD	% Recovery	% Recovery
	VOCs - SW 8260												
SW 8260B	1,1,1,2-Tetrachloroethane	70.5	132	20		76.2	76.9	0.93	59.8	51.5	15	128	121
SW 8260B	1,1,1-Trichloroethane	58.7	134	20		88.4	88.4	0.01	53.4	46	14.9	116	131
SW 8260B	1,1,2,2-Tetrachloroethane	64.9	145	20		90.3	91.8	1.63	47.7	40	17.6	111	109
SW 8260B	1,1,2-Trichloroethane	74.1	130	20		86.8	86.8	0.01	57.4	49.3	15.2	124	116
SW 8260B	1,1-Dichloroethane	64	134	20		91.6	90.5	1.19	51.5	45.3	13	111	140
SW 8260B	1,1-Dichloroethene	48.8	144	20		94.6	94.5	0.12	53.1	45.1	16.3	163	151
SW 8260B	1,1-Dichloropropene	61.5	136	20		92.4	92.9	0.57	56.4	47.6	16.9	117	113
SW 8260B	1,2,3-Trichloropropane	71.5	134	20		80.1	81.1	1.28	50.1	42.6	16.2	117	114
SW 8260B	1,2,4-Trichlorobenzene	67	146	20		75.6	78.4	3.55	56.3	45.8	20.7	111	110
SW 8260B	1,2-Dibromo-3-chloropropane	63.9	142	20.2		69.7	75.9	8.57	54	45.9	16.2	99.7	103
SW 8260B	1,2-Dibromoethane	73.8	131	20		84.4	83.2	1.42	58.1	50.3	14.5	120	117
SW 8260B	1,2-Dichlorobenzene	77.4	127	20		87.2	89.8	2.88	58.2	48.1	18.9	121	118
SW 8260B	1,2-Dichloroethane	60.7	132	20		86.2	86.9	0.85	55.5	47.5	15.6	106	102
SW 8260B	1,2-Dichloropropane	69.7	130	20		94.9	96	1.11	56.6	47.1	18.3	115	108
SW 8260B	1,3-Dichlorobenzene	67.9	136	20		86.9	88.1	1.33	55.6	46.7	17.3	119	114
SW 8260B	1,3-Dichloropropane	74.3	123	20		93.3	91.3	2.12	60.7	51.9	15.5	127	116
SW 8260B	1,4-Dichlorobenzene	74.4	123	20		81.6	83	1.71	55.9	48.8	13.6	115	111
SW 8260B	2,2-Dichloropropane	54.9	142	20		78.7	77.4	1.66	50.7	42.7	17.1	103	123
SW 8260B	2-Butanone (MEK)	45	156	20.8		79.4	79.3	0.22	60.3	52.3	14.2	63.3	78.9
SW 8260B	2-Hexanone	59.4	154	20.1		88.7	89.8	1.18	60.9	53.7	12.6	93.5	91.1
SW 8260B	4-Methyl-2-pentanone (MIBK)	60.7	150	20		97.3	96.1	1.22	61.3	53.2	14.1	87.9	85.4
SW 8260B	Acetone	25	156	21.5		52.1	50.8	2.51	67.5	57.6	15.8	66.6	90.5
SW 8260B	Acrolein	34	194	21.5		95.8	95.2	0.71	633	491	25.3	668	878
SW 8260B	Acrylonitrile	55.9	161	20		90.7	90.8	0.1	51.8	45.3	13.4	114	140
SW 8260B	Benzene	58.6	133	20		88.3	89.4	1.16	50.9	43.4	15.9	108	102
SW 8260B	Bromochloromethane	74.4	128	20		84.6	84.1	0.59	55.1	46.8	16.3	109	117
SW 8260B	Bromodichloromethane	69.2	127	20		86.7	87.6	1.05	53.1	45.4	15.7	114	109
SW 8260B	Bromoform	66.3	140	20		67.7	71.7	5.76	41.1	33.9	19.1	121	119
SW 8260B	Bromomethane	16.6	183	20.5		55.8	56.6	1.35	77.2	71.6	7.59	65.9	80.8
SW 8260B	Carbon Disulfide	34.9	138	20		85.5	85.7	0.21	46	38.6	17.7	155	142
SW 8260B	Carbon tetrachloride	60.6	139	20		73.2	72.9	0.38	54.1	46	16	111	128
SW 8260B	Chlorobenzene	70.1	130	20		87.1	87.8	0.79	61.8	53.8	13.8	127	121
SW 8260B	Chlorodibromomethane	71.6	132	20		76.2	78.1	2.47	57.8	50.1	14.3	124	120
SW 8260B	Chloroethane	33.3	155	20		79.4	78.9	0.63	67	61	9.35	105	128
SW 8260B	Chloroform	66.1	133	20		87.4	87.3	0.11	50.9	43.4	16	109	128
SW 8260B	Chloromethane	40.7	139	20		102	107	4.43	48.9	43	12.8	56.5	54.2
SW 8260B	cis-1,2-Dichloroethene	60.6	136	20		86.9	86.7	0.2	51	44.1	14.6	108	126
SW 8260B	cis-1,3-Dichloropropene	71.1	129	20		81	80.7	0.44	60.3	52.6	13.6	127	121
SW 8260B	Dibromomethane	72.8	127	20		82.8	84.6	2.09	56.7	48.3	16.1	110	104
SW 8260B	Dichlorodifluoromethane	42.2	146	20		88.7	88.8	0.18	64.6	53.4	19	84.8	80.4
SW 8260B	Ethylbenzene	62.7	136	20		89.1	88.5	0.66	60.4	51.9	15.1	127	121
SW 8260B	Iodomethane	55.2	140	20		64.5	71.4	10.2	57	49.2	14.7	71.1	79.5
SW 8260B	Methylene chloride	61.5	125	20		83.1	81.5	2	48.4	42.4	13.2	104	121
SW 8260B	Styrene	68.2	133	20		89.1	90.3	1.31	47.8	40.1	17.5	127	123
SW 8260B	Tetrachloroethene	57.4	141	20		88.5	89.6	1.23	66.4	56.1	16.8	132	123
SW 8260B	Toluene	67.8	124	20		91.7	92.2	0.52	60.5	52.5	14.1	122	115
SW 8260B	trans-1,2-Dichloroethene	61	132	20		90	89.4	0.72	51.5	44.3	15	108	123
SW 8260B	trans-1,3-Dichloropropene	66.3	136	20		77.8	80.5	3.41	57.5	49.3	15.4	119	113
SW 8260B	trans-1,4-Dichloro-2-butene	57.6	136	20		65.1	63.9	1.99	6.53	6.05	7.63	96.4	92.8
SW 8260B	Trichloroethene	48.9	148	20		90.2	92.5	2.53	61	52	16	128	115
SW 8260B	Trichlorofluoromethane	39.9	165	20		85.7	83.2	2.94	71.8	61.9	14.8	142	134
SW 8260B	Vinyl Acetate	42.8	181	20		102	100	1.23	58.1	49.5	15.9	90.2	121
SW 8260B	Vinyl Chloride	44.3	143	20		86.1	85	1.33	57.3	49.6	14.5	80	75
SW 8260B	Xylene (Total)	65.6	133	20		90.1	90	0.15	59.2	51.7	13.5	124	119
	VOCs - SW 8011												
SW 8011	1,2-Dibromo-3-chloropropane	63	149	20		106			120			113	
SW 8011	1,2-Dibromoethane	72	146	20		110			116			123	

TABLE D-10

Matrix Spike/Matrix Spike Duplicate Sample Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

					LOCID:	RW-7677P	RW-7953P	RW-7953P	RW-7953P	RW-8012P	RW-8012P	RW-8012P
					Map Key:	99	214	214	214	206	206	206
					Sample ID:	NA	RW-7953PMS	RW-7953PMSD	NA	RW-8012PMS	RW-8012PMSD	NA
		MSRECLOW	MSRECUPP	MSRPD	Date:	NA	8/16/2017	8/16/2017	NA	8/3/2017	8/3/2017	NA
Method	**Analyte**	**(%)**	**(%)**	**Limit**	**Units**	MS/MSD RPD	% Recovery	% Recovery	MS/MSD RPD	% Recovery	% Recovery	MS/MSD RPD
	VOCs - SW 8260											
SW 8260B	1,1,1,2-Tetrachloroethane	70.5	132	20		5.75	87.1	84.3	3.19	56.7	52.6	7.54
SW 8260B	1,1,1-Trichloroethane	58.7	134	20		12.2	97.6	95.6	2.02	51	47.9	6.33
SW 8260B	1,1,2,2-Tetrachloroethane	64.9	145	20		2.17	103	101	2.24	43.1	41.2	4.34
SW 8260B	1,1,2-Trichloroethane	74.1	130	20		6.72	96.6	97	0.4	55	52	5.57
SW 8260B	1,1-Dichloroethane	64	134	20		23.1	101	99.2	1.44	48.8	47.8	2.08
SW 8260B	1,1-Dichloroethene	48.8	144	20		7.21	103	102	0.79	50.4	48	4.9
SW 8260B	1,1-Dichloropropene	61.5	136	20		2.79	103	99.8	2.8	51.8	50.5	2.45
SW 8260B	1,2,3-Trichloropropane	71.5	134	20		2.73	93.2	90.8	2.54	47.3	43	9.67
SW 8260B	1,2,4-Trichlorobenzene	67	146	20		0.88	88.4	86.9	1.72	52.3	47.8	8.97
SW 8260B	1,2-Dibromo-3-chloropropane	63.9	142	20.2		2.92	80.5	77.1	4.32	46.7	46.1	1.36
SW 8260B	1,2-Dibromoethane	73.8	131	20		2.4	93.8	92.9	0.98	53.9	51.7	4.24
SW 8260B	1,2-Dichlorobenzene	77.4	127	20		3.17	99.7	97.8	1.88	53.2	50	6.17
SW 8260B	1,2-Dichloroethane	60.7	132	20		3.82	98.3	94.3	4.11	52.8	50.4	4.67
SW 8260B	1,2-Dichloropropane	69.7	130	20		6.02	108	106	1.59	50.2	48.3	3.7
SW 8260B	1,3-Dichlorobenzene	67.9	136	20		4.75	98.2	97.9	0.34	52.4	48.1	8.51
SW 8260B	1,3-Dichloropropane	74.3	123	20		9.35	102	102	0.48	57.3	53.6	6.56
SW 8260B	1,4-Dichlorobenzene	74.4	123	20		3.03	92.4	91.1	1.51	51.9	50.4	2.97
SW 8260B	2,2-Dichloropropane	54.9	142	20		17.8	86.4	84.6	2.09	47	46.1	1.87
SW 8260B	2-Butanone (MEK)	45	156	20.8		21.9	90.5	88.4	2.29	49	57.7	16.4
SW 8260B	2-Hexanone	59.4	154	20.1		2.68	101	97.5	3.89	57.3	58.4	1.84
SW 8260B	4-Methyl-2-pentanone (MIBK)	60.7	150	20		2.86	110	106	3.75	57.6	57.5	0.26
SW 8260B	Acetone	25	156	21.5		30.4	59.2	57.4	3	46.8	54.4	14.9
SW 8260B	Acrolein	34	194	21.5		27.2	108	107	0.91	430	393	8.9
SW 8260B	Acrylonitrile	55.9	161	20		21	107	103	4.07	45.5	47.7	4.74
SW 8260B	Benzene	58.6	133	20		5.51	100	97.6	2.55	47.5	45.5	4.26
SW 8260B	Bromochloromethane	74.4	128	20		7.14	96.3	92.5	4.02	51.2	49.8	2.86
SW 8260B	Bromodichloromethane	69.2	127	20		4.57	97.9	96.4	1.57	49.5	47.6	3.72
SW 8260B	Bromoform	66.3	140	20		1.77	80.1	79.3	1.05	38	34.9	8.49
SW 8260B	Bromomethane	16.6	183	20.5		20.3	69	68.8	0.37	94.8	94.5	0.39
SW 8260B	Carbon Disulfide	34.9	138	20		9.07	96.9	94.1	2.93	42.3	41.5	1.93
SW 8260B	Carbon tetrachloride	60.6	139	20		14.4	81.8	81.7	0.18	50.8	49.1	3.34
SW 8260B	Chlorobenzene	70.1	130	20		4.68	98	97.3	0.75	59.7	54.7	8.73
SW 8260B	Chlorodibromomethane	71.6	132	20		3.31	87	85.5	1.77	52.5	51	2.74
SW 8260B	Chloroethane	33.3	155	20		19.2	87.6	86.6	1.24	64.2	62	3.48
SW 8260B	Chloroform	66.1	133	20		15.8	98	96.5	1.62	47.6	46	3.56
SW 8260B	Chloromethane	40.7	139	20		4.25	118	116	1.75	46.7	45	3.77
SW 8260B	cis-1,2-Dichloroethene	60.6	136	20		13.6	98.9	96.4	2.53	46.2	43.2	6.54
SW 8260B	cis-1,3-Dichloropropene	71.1	129	20		4.51	91.8	90.4	1.53	58.4	54.2	7.54
SW 8260B	Dibromomethane	72.8	127	20		5.57	94.5	91	3.77	51.8	49.3	4.84
SW 8260B	Dichlorodifluoromethane	42.2	146	20		5.32	85.4	92.2	7.76	60.9	59	3.06
SW 8260B	Ethylbenzene	62.7	136	20		5.18	98.3	97.5	0.84	57.9	52.8	9.21
SW 8260B	Iodomethane	55.2	140	20		11.2	81.1	80.1	1.34	54.1	52	3.9
SW 8260B	Methylene chloride	61.5	125	20		15	91	90.5	0.49	45.6	44.6	2.18
SW 8260B	Styrene	68.2	133	20		3.34	100	98.9	1.17	42.8	40.8	4.76
SW 8260B	Tetrachloroethene	57.4	141	20		5.99	97	97.4	0.37	63.5	59.7	6.06
SW 8260B	Toluene	67.8	124	20		6.28	102	99.9	1.6	57.4	53.5	7.02
SW 8260B	trans-1,2-Dichloroethene	61	132	20		12.9	100	96.6	3.59	47.7	46	3.53
SW 8260B	trans-1,3-Dichloropropene	66.3	136	20		4.53	89.7	86	4.22	54.9	51.6	6.08
SW 8260B	trans-1,4-Dichloro-2-butene	57.6	136	20		3.73	72.5	68.5	5.7	8.16	7	15.3
SW 8260B	Trichloroethene	48.9	148	20		5.07	98.2	97.8	0.32	58.1	53.1	7.82
SW 8260B	Trichlorofluoromethane	39.9	165	20		5.84	90.4	91.6	1.27	66.2	60.6	8.76
SW 8260B	Vinyl Acetate	42.8	181	20		28.9	115	112	3.05	54.2	53.4	1.61
SW 8260B	Vinyl Chloride	44.3	143	20		6.49	94.2	93.6	0.65	53.3	52.1	2.35
SW 8260B	Xylene (Total)	65.6	133	20		4.28	99.9	98.9	0.94	56.1	52.3	7.13
	VOCs - SW 8011											
SW 8011	1,2-Dibromo-3-chloropropane	63	149	20						117		
SW 8011	1,2-Dibromoethane	72	146	20						114		

TABLE D-11

Matrix Spike/Matrix Spike Duplicate Sample Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

					LOCID:	RW-3259B	RW-3259B	RW-3259B	RW-7350P	RW-7350P	RW-7350P	RW-7677P	RW-7677P	RW-7677P
					Site:	51	51	51	15	15	15	99	99	99
					Sample ID:	RW-3259BMS	RW-3259BMSD	NA	RW-7350PMS	RW-7350PMSD	NA	RW-7677PMS	RW-7677PMSD	NA
		MSRECLOW	**MSRECUPP**	**MSRPD**	**Date:**	8/16/2017	8/16/2017	NA	8/3/2017	8/3/2017	NA	8/9/2017	8/9/2017	NA
Method	**Analyte**	**(%)**	**(%)**	**Limit**	**Units**	% Recovery	% Recovery	MS/MSD RPD	% Recovery	% Recovery	MS/MSD RPD	% Recovery	% Recovery	MS/MSD RPD
	Cyanide													
SM 4500CN E-2011	Cyanide	64	136	20		100	96	4	86	84	3	101	91	11
	Metals, Totals													
SW 6020	Antimony, Total	75	125	20		97	99	2	94	96	2	105	107	2
SW 6020	Arsenic, Total	75	125	20		96	94	3	96	98	2	96	98	2
SW 6020	Barium, Total	75	125	20		90	88	1	84	79	2	85	91	1
SW 6020	Beryllium, Total	75	125	20		96	95	1	88	91	3	83	85	2
SW 6020	Cadmium, Total	75	125	20		104	104	0	110	111	1	98	101	3
SW 6020	Calcium, Total	75	125	20		74	63	1	67	79	1	60	60	0
SW 6020	Chromium, Total	75	125	20		97	97	0	100	101	1	97	98	1
SW 6020	Cobalt, Total	75	125	20		102	101	1	103	104	1	96	97	1
SW 6020	Copper, Total	75	125	20		83	81	1	87	89	1	88	89	0
SW 6020	Iron, Total	75	125	20		99	97	1	100	101	1	95	96	1
SW 6020	Lead, Total	75	125	20		91	91	0	94	95	1	93	94	1
SW 6020	Magnesium, Total	75	125	20		93	93	0	86	86	0	75	71	0
SW 6020	Manganese, Total	75	125	20		91	90	1	90	93	3	92	91	0
SW 6020	Nickel, Total	75	125	20		99	98	1	100	102	2	95	96	1
SW 6020	Potassium, Total	75	125	20		94	93	1	90	93	2	83	81	1
SW 6020	Selenium, Total	75	125	20		95	98	3	103	103	0	95	99	5
SW 6020	Silver, Total	75	125	20		95	96	1	99	100	1	96	98	2
SW 6020	Sodium, Total	75	125	20		94	91	1	98	97	0	71	71	0
SW 6020	Thallium, Total	75	125	20		92	93	1	98	98	1	95	97	2
SW 6020	Tin, Total	75	125	20		88	89	1	88	89	1	95	95	0
SW 6020	Vanadium, Total	75	125	20		96	95	1	99	99	1	95	95	0
SW 6020	Zinc, Total	75	125	20		78	75	1	87	89	1	93	94	0
	Mercury													
SW 7470A	Mercury, Total	75	125	20		96	87	11	94	103	10	87	91	4
	Inorganic Anions													
SW 9056A	Chloride	80	120	15		95	95	1	91	91	0	89	91	1
SW 9056A	Sulfate	80	120	15		100	102	2	91	90	0	96	104	3

TABLE D-11

Matrix Spike/Matrix Spike Duplicate Sample Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

					LOCID:	RW-7953P	RW-7953P	RW-7953P	RW-8012P	RW-8012P	RW-8012P
					Site:	214	214	214	206	206	206
					Sample ID:	RW-7953PMS	RW-7953PMSD	NA	RW-8012PMS	RW-8012PMSD	NA
		MSRECLOW	**MSRECUPP**	**MSRPD**	**Date:**	8/16/2017	8/16/2017	NA	8/3/2017	8/3/2017	NA
Method	**Analyte**	**(%)**	**(%)**	**Limit**	**Units**	% Recovery	% Recovery	MS/MSD RPD	% Recovery	% Recovery	MS/MSD RPD
	Cyanide										
SM 4500CN E-2011	Cyanide	64	136	20		99	98	1	75	96	24
	Metals, Totals										
SW 6020	Antimony, Total	75	125	20		99	100	1	100	100	0
SW 6020	Arsenic, Total	75	125	20		94	94	0	100	102	1
SW 6020	Barium, Total	75	125	20		85	88	1	80	84	1
SW 6020	Beryllium, Total	75	125	20		94	97	3	86	89	3
SW 6020	Cadmium, Total	75	125	20		102	105	3	104	107	3
SW 6020	Calcium, Total	75	125	20		135	102	2	54	74	1
SW 6020	Chromium, Total	75	125	20		95	96	1	102	105	3
SW 6020	Cobalt, Total	75	125	20		98	99	1	103	104	1
SW 6020	Copper, Total	75	125	20		88	87	0	89	91	2
SW 6020	Iron, Total	75	125	20		97	98	1	101	103	2
SW 6020	Lead, Total	75	125	20		90	91	1	96	98	2
SW 6020	Magnesium, Total	75	125	20		114	97	2	83	90	1
SW 6020	Manganese, Total	75	125	20		91	91	0	93	95	2
SW 6020	Nickel, Total	75	125	20		98	97	0	102	104	2
SW 6020	Potassium, Total	75	125	20		97	92	3	92	94	1
SW 6020	Selenium, Total	75	125	20		96	99	3	102	103	1
SW 6020	Silver, Total	75	125	20		94	95	1	100	102	3
SW 6020	Sodium, Total	75	125	20		112	101	1	78	88	1
SW 6020	Thallium, Total	75	125	20		93	94	1	97	100	3
SW 6020	Tin, Total	75	125	20		90	90	0	92	92	0
SW 6020	Vanadium, Total	75	125	20		95	96	0	98	101	3
SW 6020	Zinc, Total	75	125	20		96	98	2	96	98	1
	Mercury										
SW 7470A	Mercury, Total	75	125	20		95	98	3	101	99	2
	Inorganic Anions										
SW 9056A	Chloride	80	120	15		86	83	1	88	88	0
SW 9056A	Sulfate	80	120	15		77			88	88	0

TABLE D-12

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3234492-4 % Recovery	LCSDR3234492-5 % Recovery	NA LCS/LCSD RPD	LCSR3234788-1 % Recovery	LCSDR3234788-2 % Recovery	LCSR3234788-3 % Recovery	NA LCS/LCSD RPD	LCSR3235182-4 % Recovery	LCSDR3235182-5 % Recovery	NA LCS/LCSD RPD
	VOCs - SW 8260														
SW 8260B	1,1,1,2-Tetrachloroethane	78.5	125	20					97.7	101		3.34			
SW 8260B	1,1,1-Trichloroethane	71.1	129	20					90.6	94.3		4.03			
SW 8260B	1,1,2,2-Tetrachloroethane	79.3	123	20					95.2	96.1		0.9			
SW 8260B	1,1,2-Trichloroethane	81.6	120	20					101	106		5.27			
SW 8260B	1,1-Dichloroethane	71.7	127	20					87.4	90.1		3.12			
SW 8260B	1,1-Dichloroethene	59.9	137	20					87.4	90.5		3.52			
SW 8260B	1,1-Dichloropropene	72.5	127	20					89.8	93.4		3.92			
SW 8260B	1,2,3-Trichloropropane	74.9	124	20					104	109		4.4			
SW 8260B	1,2,4-Trichlorobenzene	76.1	136	20					94.9	101		5.96			
SW 8260B	1,2-Dibromo-3-chloropropane	64.8	131	20					94.1	98.3		4.44			
SW 8260B	1,2-Dibromoethane	79.8	122	20					102	106		3.93			
SW 8260B	1,2-Dichlorobenzene	84.7	118	20					98.5	103		4.02			
SW 8260B	1,2-Dichloroethane	65.3	126	20					87.2	89.4		2.5			
SW 8260B	1,2-Dichloropropane	77.4	125	20					93.9	96.1		2.34			
SW 8260B	1,3-Dichlorobenzene	77.6	127	20					98.2	103		5.24			
SW 8260B	1,3-Dichloropropane	80.6	115	20					100	106		5.28			
SW 8260B	1,4-Dichlorobenzene	82.2	114	20					96.1	101		4.64			
SW 8260B	2,2-Dichloropropane	61.3	134	20					79.5	82.2		3.36			
SW 8260B	2-Butanone (MEK)	46.4	155	20					83.8	85.6		2.1			
SW 8260B	2-Hexanone	59.4	151	20					99.5	104		4.54			
SW 8260B	4-Methyl-2-pentanone (MIBK)	63.3	138	20					95.2	98.4		3.29			
SW 8260B	Acetone	28.7	175	20.9					76.6	78.8		2.93			
SW 8260B	Acetonitrile										98.7				
SW 8260B	Acrolein	40.4	172	20					97.6	101		2.99			
SW 8260B	Acrylonitrile	58.2	145	20					83.4	86.2		3.27			
SW 8260B	Allyl Chloride														
SW 8260B	Benzene	73	122	20					88.7	91.9		3.61			
SW 8260B	Bromochloromethane	78.9	123	20					90.8	93		2.39			
SW 8260B	Bromodichloromethane	75.5	121	20					92.1	94.1		2.16			
SW 8260B	Bromoform	71.5	131	20					98.1	102		3.69			
SW 8260B	Bromomethane	22.4	187	20					84.1	85.7		1.92			
SW 8260B	Carbon Disulfide	53	134	20					83.6	86.9		3.9			
SW 8260B	Carbon Tetrachloride	70.9	129	20					86	89.2		3.65			
SW 8260B	Chlorobenzene	79.7	122	20					98.9	104		4.68			
SW 8260B	Chlorodibromomethane	78.2	124	20					100	105		4.95			
SW 8260B	Chloroethane	41.2	153	20					79.9	83.5		4.35			
SW 8260B	Chloroform	73.2	125	20					87.6	90.4		3.1			
SW 8260B	Chloromethane	55.8	134	20					76.9	79.9		3.77			
SW 8260B	Chloroprene										101				
SW 8260B	cis-1,2-Dichloroethene	77.3	122	20					87.9	91.6		4.16			
SW 8260B	cis-1,3-Dichloropropene	77.7	124	20					95.7	99.9		4.28			
SW 8260B	Dibromomethane	79.5	118	20					94.7	98		3.48			
SW 8260B	Dichlorodifluoromethane	56	134	20					72.3	77.1		6.44			
SW 8260B	Ethyl Methacrylate										107				
SW 8260B	Ethylbenzene	80.9	121	20					100	104		3.83			
SW 8260B	Iodomethane	64.6	137	20					87.7	91.5		4.21			
SW 8260B	Isobutanol										87				
SW 8260B	Methacrylonitrile										101				
SW 8260B	Methyl methacrylate										97.3				
SW 8260B	Methylene chloride	69.5	120	20					87.4	90.1		3			
SW 8260B	Propionitrile										101				
SW 8260B	Styrene	79.9	124	20					101	106		5.01			
SW 8260B	Tetrachloroethene	73.5	130	20					99.6	103		2.93			
SW 8260B	Toluene	77.9	116	20					99.6	104		4.26			
SW 8260B	trans-1,2-Dichloroethene	72.6	125	20					90.5	93.2		2.9			
SW 8260B	trans-1,3-Dichloropropene	73.5	127	20					94.8	98.2		3.58			
SW 8260B	trans-1,4-Dichloro-2-butene	58.3	129	20					81.6	85.9		5.11			
SW 8260B	Trichloroethene	79.5	121	20					102	107		4.89			
SW 8260B	Trichlorofluoromethane	49.1	157	20					83	90.6		8.75			
SW 8260B	Vinyl Acetate	41.7	159	20					60.5	56.8		6.31			
SW 8260B	Vinyl Chloride	61.5	134	20					80	80.7		0.84			
SW 8260B	Xylene, total								101	106		4.65			
SW 8260B	*VOCs - SW 8011*														
SW 8011	1,2-Dibromo-3-chloropropane	64.8	131	20		121	117	3.09					97.2	93.6	3.83
SW 8011	1,2-Dibromoethane	79.8	122	20		114	111	3.09					101	102	1.06

TABLE D-12

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID:	LCSR3239403-4	LCSDR3239403-6	NA	LCSR3239593-1	LCSDR3239593-2	NA	LCSR3239954-1	LCSR3239996-4	LCSDR3239996-5	NA
					Units	% Recovery	% Recovery	LCS/LCSD RPD	% Recovery	% Recovery	LCS/LCSD RPD	% Recovery	% Recovery	% Recovery	LCS/LCSD RPD
	VOCs - SW 8260														
SW 8260B	1,1,1,2-Tetrachloroethane	78.5	125	20					96.2	93.9	2.41				
SW 8260B	1,1,1-Trichloroethane	71.1	129	20					84.5	87.5	3.41				
SW 8260B	1,1,2,2-Tetrachloroethane	79.3	123	20					90	94.8	5.16				
SW 8260B	1,1,2-Trichloroethane	81.6	120	20					96.5	97.3	0.83				
SW 8260B	1,1-Dichloroethane	71.7	127	20					84.7	83.8	1.05				
SW 8260B	1,1-Dichloroethene	59.9	137	20					88.8	103	14.8				
SW 8260B	1,1-Dichloropropene	72.5	127	20					86.9	86.7	0.22				
SW 8260B	1,2,3-Trichloropropane	74.9	124	20					98.2	107	8.49				
SW 8260B	1,2,4-Trichlorobenzene	76.1	136	20					78.8	83.1	5.23				
SW 8260B	1,2-Dibromo-3-chloropropane	64.8	131	20					89.3	94	5.11				
SW 8260B	1,2-Dibromoethane	79.8	122	20					99.9	104	3.78				
SW 8260B	1,2-Dichlorobenzene	84.7	118	20					93.6	94.2	0.6				
SW 8260B	1,2-Dichloroethane	65.3	126	20					82.8	85.4	3.16				
SW 8260B	1,2-Dichloropropane	77.4	125	20					89	92.4	3.74				
SW 8260B	1,3-Dichlorobenzene	77.6	127	20					91.9	94.1	2.34				
SW 8260B	1,3-Dichloropropane	80.6	115	20					99	99.4	0.46				
SW 8260B	1,4-Dichlorobenzene	82.2	114	20					89.1	90.3	1.33				
SW 8260B	2,2-Dichloropropane	61.3	134	20					82.1	82.9	0.91				
SW 8260B	2-Butanone (MEK)	46.4	155	20					77.7	99.3	24.5				
SW 8260B	2-Hexanone	59.4	151	20					101	120	17				
SW 8260B	4-Methyl-2-pentanone (MIBK)	63.3	138	20					97.2	101	4.12				
SW 8260B	Acetone	28.7	175	20.9					88.4	144	47.8				
SW 8260B	Acetonitrile											175			
SW 8260B	Acrolein	40.4	172	20					890	930	4.47				
SW 8260B	Acrylonitrile	58.2	145	20					98.6	98.5	0.03				
SW 8260B	Allyl Chloride								84.5	84.6	0.08				
SW 8260B	Benzene	73	122	20					81.5	81.4	0.02				
SW 8260B	Bromochloromethane	78.9	123	20					85.3	88.3	3.46				
SW 8260B	Bromodichloromethane	75.5	121	20					88	88	0.01				
SW 8260B	Bromoform	71.5	131	20					98.7	102	3.12				
SW 8260B	Bromomethane	22.4	187	20					69.8	72.9	4.35				
SW 8260B	Carbon Disulfide	53	134	20					95.1	96	0.92				
SW 8260B	Carbon Tetrachloride	70.9	129	20					85.6	88.3	3.14				
SW 8260B	Chlorobenzene	79.7	122	20					94.4	92.9	1.6				
SW 8260B	Chlorodibromomethane	78.2	124	20					93.3	96	2.89				
SW 8260B	Chloroethane	41.2	153	20					98.4	104	5.95				
SW 8260B	Chloroform	73.2	125	20					80.2	81.4	1.48				
SW 8260B	Chloromethane	55.8	134	20					68.9	69.9	1.45				
SW 8260B	Chloroprene											104			
SW 8260B	cis-1,2-Dichloroethene	77.3	122	20					78	81.8	4.72				
SW 8260B	cis-1,3-Dichloropropene	77.7	124	20					92.5	93.7	1.27				
SW 8260B	Dibromomethane	79.5	118	20					93.3	93.3	0.03				
SW 8260B	Dichlorodifluoromethane	56	134	20					108	109	1.04				
SW 8260B	Ethyl Methacrylate											137			
SW 8260B	Ethylbenzene	80.9	121	20					93.4	92.5	0.92				
SW 8260B	Iodomethane	64.6	137	20					53.3	55.2	3.47				
SW 8260B	Isobutanol											173			
SW 8260B	Methacrylonitrile											147			
SW 8260B	Methyl methacrylate											136			
SW 8260B	Methylene chloride	69.5	120	20					80.3	78.8	1.82				
SW 8260B	Propionitrile											168			
SW 8260B	Styrene	79.9	124	20					96	93.8	2.32				
SW 8260B	Tetrachloroethene	73.5	130	20					97.5	96.9	0.66				
SW 8260B	Toluene	77.9	116	20					92.4	91.6	0.9				
SW 8260B	trans-1,2-Dichloroethene	72.6	125	20					83.8	81.8	2.46				
SW 8260B	trans-1,3-Dichloropropene	73.5	127	20					91.5	93.8	2.5				
SW 8260B	trans-1,4-Dichloro-2-butene	58.3	129	20					72.2	76.9	6.26				
SW 8260B	Trichloroethene	79.5	121	20					93.5	93.3	0.25				
SW 8260B	Trichlorofluoromethane	49.1	157	20					113	115	1.37				
SW 8260B	Vinyl Acetate	41.7	159	20					83.7	86	2.75				
SW 8260B	Vinyl Chloride	61.5	134	20					101	86.6	15.8				
SW 8260B	Xylene, total								94.1	92.4	1.86				
SW 8260B	*VOCs - SW 8011*														
SW 8011	1,2-Dibromo-3-chloropropane	64.8	131	20		109	109	0.17					111	112	0.71
SW 8011	1,2-Dibromoethane	79.8	122	20		106	106	0.07					105	108	2.94

TABLE D-12

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3240003-1 % Recovery	LCSDR3240003-2 % Recovery	LCSR3240003-3 % Recovery	NA LCS/LCSD RPD	LCSR3240230-1 % Recovery	LCSDR3240230-2 % Recovery	NA LCS/LCSD RPD	LCSR3241750-1 % Recovery	LCSDR3241750-2 % Recovery	LCSR3241750-3 % Recovery
	VOCs - SW 8260														
SW 8260B	1,1,1,2-Tetrachloroethane	78.5	125	20		99.4	99.9		0.49				95.9	98.3	
SW 8260B	1,1,1-Trichloroethane	71.1	129	20		84.7	83.1		1.95				88.1	86.3	
SW 8260B	1,1,2,2-Tetrachloroethane	79.3	123	20		80.5	78.7		2.24				87.5	87.4	
SW 8260B	1,1,2-Trichloroethane	81.6	120	20		101	99.3		1.67				93.3	100	
SW 8260B	1,1-Dichloroethane	71.7	127	20		84.4	82.6		2.16				86	88.2	
SW 8260B	1,1-Dichloroethene	59.9	137	20		84.3	83.6		0.81				94.7	95.4	
SW 8260B	1,1-Dichloropropene	72.5	127	20		86.2	84.3		2.26				86.6	88.1	
SW 8260B	1,2,3-Trichloropropane	74.9	124	20		88.3	88.1		0.28				93.3	95.4	
SW 8260B	1,2,4-Trichlorobenzene	76.1	136	20		94.2	95.1		0.91				84.3	88.2	
SW 8260B	1,2-Dibromo-3-chloropropane	64.8	131	20		93.9	94		0.11				84.3	83.1	
SW 8260B	1,2-Dibromoethane	79.8	122	20		101	99.6		1.89				94.8	102	
SW 8260B	1,2-Dichlorobenzene	84.7	118	20		97.2	97		0.19				93.8	96.7	
SW 8260B	1,2-Dichloroethane	65.3	126	20		92.1	88.6		3.89				81.9	83.2	
SW 8260B	1,2-Dichloropropane	77.4	125	20		91.9	90.9		1.08				91	90.2	
SW 8260B	1,3-Dichlorobenzene	77.6	127	20		93.5	94.6		1.15				95.1	93.6	
SW 8260B	1,3-Dichloropropane	80.6	115	20		103	100		2.69				96.4	102	
SW 8260B	1,4-Dichlorobenzene	82.2	114	20		95.8	95.6		0.17				91	89.2	
SW 8260B	2,2-Dichloropropane	61.3	134	20		70.8	68.1		3.85				74.6	77.4	
SW 8260B	2-Butanone (MEK)	46.4	155	20		99.6	117		15.7				72.8	77.1	
SW 8260B	2-Hexanone	59.4	151	20		103	94.3		8.53				99.2	106	
SW 8260B	4-Methyl-2-pentanone (MIBK)	63.3	138	20		102	95.8		5.85				87.5	91.9	
SW 8260B	Acetone	28.7	175	20.9		104	130		21.8				102	107	
SW 8260B	Acetonitrile							79.8							77.5
SW 8260B	Acrolein	40.4	172	20		59.8	103		53				774	775	
SW 8260B	Acrylonitrile	58.2	145	20		83.4	83.4		0.05				89.1	90.4	
SW 8260B	Allyl Chloride					78.7	78.3		0.54				85.9	87.8	
SW 8260B	Benzene	73	122	20		83.3	81.7		1.96				85.8	86	
SW 8260B	Bromochloromethane	78.9	123	20		91	90		1.07				87.1	86.7	
SW 8260B	Bromodichloromethane	75.5	121	20		87.1	86.4		0.74				88.7	89	
SW 8260B	Bromoform	71.5	131	20		80.8	78.8		2.52				97.9	98.7	
SW 8260B	Bromomethane	22.4	187	20		125	92.7		30.1				71.1	84.8	
SW 8260B	Carbon Disulfide	53	134	20		82.4	80.2		2.66				100	100	
SW 8260B	Carbon Tetrachloride	70.9	129	20		86.3	83.7		3.11				82.7	87.6	
SW 8260B	Chlorobenzene	79.7	122	20		99.8	100		0.28				96.7	101	
SW 8260B	Chlorodibromomethane	78.2	124	20		97.1	95.7		1.4				92.4	97.8	
SW 8260B	Chloroethane	41.2	153	20		108	99.1		8.83				133	150	
SW 8260B	Chloroform	73.2	125	20		80.6	79.3		1.53				84.8	82.1	
SW 8260B	Chloromethane	55.8	134	20		87.4	87.9		0.55				75.1	78.6	
SW 8260B	Chloroprene							94.2							89.5
SW 8260B	cis-1,2-Dichloroethene	77.3	122	20		82.7	79.5		3.87				82.4	84.2	
SW 8260B	cis-1,3-Dichloropropene	77.7	124	20		94.6	94.3		0.26				92.5	95.5	
SW 8260B	Dibromomethane	79.5	118	20		94.2	90.5		3.93				89.9	88.3	
SW 8260B	Dichlorodifluoromethane	56	134	20		113	108		3.81				108	111	
SW 8260B	Ethyl Methacrylate							103							65.1
SW 8260B	Ethylbenzene	80.9	121	20		99	98.6		0.45				95.6	102	
SW 8260B	Iodomethane	64.6	137	20		90.5	88.2		2.56				59.6	62.3	
SW 8260B	Isobutanol							83							75.6
SW 8260B	Methacrylonitrile							95.6							54.6
SW 8260B	Methyl methacrylate							97.8							49.4
SW 8260B	Methylene chloride	69.5	120	20		80.9	78.3		3.16				83.6	83.5	
SW 8260B	Propionitrile							88.7							65.8
SW 8260B	Styrene	79.9	124	20		80.9	80.1		1				97.2	96.4	
SW 8260B	Tetrachloroethene	73.5	130	20		109	108		0.95				99.1	105	
SW 8260B	Toluene	77.9	116	20		99.7	99.3		0.31				93.5	99.5	
SW 8260B	trans-1,2-Dichloroethene	72.6	125	20		82.7	80.5		2.65				85.6	86.3	
SW 8260B	trans-1,3-Dichloropropene	73.5	127	20		94.8	94.2		0.54				87.9	92.5	
SW 8260B	trans-1,4-Dichloro-2-butene	58.3	129	20						103	112	8.88	70.4	68.9	
SW 8260B	Trichloroethene	79.5	121	20		105	100		4.11				99.5	98.4	
SW 8260B	Trichlorofluoromethane	49.1	157	20		96.3	102		6.03				135	136	
SW 8260B	Vinyl Acetate	41.7	159	20		53.5	45.3		16.5				51.3	51.4	
SW 8260B	Vinyl Chloride	61.5	134	20		95	94.1		0.96				92.4	94	
SW 8260B	Xylene, total					97.9	97.6		0.27				95.3	98.7	
SW 8260B	*VOCs - SW 8011*														
SW 8011	1,2-Dibromo-3-chloropropane	64.8	131	20											
SW 8011	1,2-Dibromoethane	79.8	122	20											

TABLE D-12

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	NA LCS/LCSD RPD	LCSR3242161-4 % Recovery	LCSDR3242161-5 % Recovery	NA LCS/LCSD RPD	LCSR3242162-4 % Recovery	LCSDR3242162-5 % Recovery	NA LCS/LCSD RPD	LCSR3242454-4 % Recovery	LCSDR3242454-5 % Recovery	NA LCS/LCSD RPD
	VOCs - SW 8260														
SW 8260B	1,1,1,2-Tetrachloroethane	78.5	125	20		2.42									
SW 8260B	1,1,1-Trichloroethane	71.1	129	20		2.17									
SW 8260B	1,1,2,2-Tetrachloroethane	79.3	123	20		0.13									
SW 8260B	1,1,2-Trichloroethane	81.6	120	20		7.4									
SW 8260B	1,1-Dichloroethane	71.7	127	20		2.56									
SW 8260B	1,1-Dichloroethene	59.9	137	20		0.79									
SW 8260B	1,1-Dichloropropene	72.5	127	20		1.62									
SW 8260B	1,2,3-Trichloropropane	74.9	124	20		2.21									
SW 8260B	1,2,4-Trichlorobenzene	76.1	136	20		4.52									
SW 8260B	1,2-Dibromo-3-chloropropane	64.8	131	20		1.41									
SW 8260B	1,2-Dibromoethane	79.8	122	20		6.94									
SW 8260B	1,2-Dichlorobenzene	84.7	118	20		2.99									
SW 8260B	1,2-Dichloroethane	65.3	126	20		1.58									
SW 8260B	1,2-Dichloropropane	77.4	125	20		0.9									
SW 8260B	1,3-Dichlorobenzene	77.6	127	20		1.61									
SW 8260B	1,3-Dichloropropane	80.6	115	20		5.61									
SW 8260B	1,4-Dichlorobenzene	82.2	114	20		2.08									
SW 8260B	2,2-Dichloropropane	61.3	134	20		3.62									
SW 8260B	2-Butanone (MEK)	46.4	155	20		5.68									
SW 8260B	2-Hexanone	59.4	151	20		6.33									
SW 8260B	4-Methyl-2-pentanone (MIBK)	63.3	138	20		4.89									
SW 8260B	Acetone	28.7	175	20.9		5.22									
SW 8260B	Acetonitrile														
SW 8260B	Acrolein	40.4	172	20		0.1									
SW 8260B	Acrylonitrile	58.2	145	20		1.38									
SW 8260B	Allyl Chloride					2.14									
SW 8260B	Benzene	73	122	20		0.24									
SW 8260B	Bromochloromethane	78.9	123	20		0.48									
SW 8260B	Bromodichloromethane	75.5	121	20		0.29									
SW 8260B	Bromoform	71.5	131	20		0.89									
SW 8260B	Bromomethane	22.4	187	20		17.5									
SW 8260B	Carbon Disulfide	53	134	20		0.12									
SW 8260B	Carbon Tetrachloride	70.9	129	20		5.85									
SW 8260B	Chlorobenzene	79.7	122	20		4.09									
SW 8260B	Chlorodibromomethane	78.2	124	20		5.67									
SW 8260B	Chloroethane	41.2	153	20		12.2									
SW 8260B	Chloroform	73.2	125	20		3.22									
SW 8260B	Chloromethane	55.8	134	20		4.57									
SW 8260B	Chloroprene														
SW 8260B	cis-1,2-Dichloroethene	77.3	122	20		2.24									
SW 8260B	cis-1,3-Dichloropropene	77.7	124	20		3.26									
SW 8260B	Dibromomethane	79.5	118	20		1.74									
SW 8260B	Dichlorodifluoromethane	56	134	20		2.36									
SW 8260B	Ethyl Methacrylate														
SW 8260B	Ethylbenzene	80.9	121	20		6.16									
SW 8260B	Iodomethane	64.6	137	20		4.44									
SW 8260B	Isobutanol														
SW 8260B	Methacrylonitrile														
SW 8260B	Methyl methacrylate														
SW 8260B	Methylene chloride	69.5	120	20		0.06									
SW 8260B	Propionitrile														
SW 8260B	Styrene	79.9	124	20		0.85									
SW 8260B	Tetrachloroethene	73.5	130	20		5.61									
SW 8260B	Toluene	77.9	116	20		6.23									
SW 8260B	trans-1,2-Dichloroethene	72.6	125	20		0.87									
SW 8260B	trans-1,3-Dichloropropene	73.5	127	20		5.11									
SW 8260B	trans-1,4-Dichloro-2-butene	58.3	129	20		2.04									
SW 8260B	Trichloroethene	79.5	121	20		1.11									
SW 8260B	Trichlorofluoromethane	49.1	157	20		0.86									
SW 8260B	Vinyl Acetate	41.7	159	20		0.23									
SW 8260B	Vinyl Chloride	61.5	134	20		1.76									
SW 8260B	Xylene, total					3.44									
SW 8260B	*VOCs - SW 8011*														
SW 8011	1,2-Dibromo-3-chloropropane	64.8	131	20			99.8	101	1.02	104	107	3.15	101	101	0.2
SW 8011	1,2-Dibromoethane	79.8	122	20			105	105	0.36	108	110	1.36	105	105	0.14

TABLE D-12

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3242743-1 % Recovery	LCSDR3242743-2 % Recovery	LCSR3242743-3 % Recovery	NA LCS/LCSD RPD	LCSR3242967-1 % Recovery	LCSR3242967-2 % Recovery	LCSR3243234-4 % Recovery	LCSDR3243234-5 % Recovery	NA LCS/LCSD RPD	LCSR3243357-1 % Recovery
	VOCs - SW 8260														
SW 8260B	1,1,1,2-Tetrachloroethane	78.5	125	20		89.6	86.9		2.97	91.4					86.1
SW 8260B	1,1,1-Trichloroethane	71.1	129	20		88.1	87.5		0.66	93					89.5
SW 8260B	1,1,2,2-Tetrachloroethane	79.3	123	20		97.4	99.3		1.98	92.2					87.3
SW 8260B	1,1,2-Trichloroethane	81.6	120	20		96.4	94.2		2.32	98.1					92.5
SW 8260B	1,1-Dichloroethane	71.7	127	20		90.7	91.9		1.34	95					92.6
SW 8260B	1,1-Dichloroethene	59.9	137	20		91.8	93.6		2.02	97.1					91.2
SW 8260B	1,1-Dichloropropene	72.5	127	20		94.2	92.6		1.69	96.9					94.7
SW 8260B	1,2,3-Trichloropropane	74.9	124	20		87.4	88.5		1.24	86.7					84.5
SW 8260B	1,2,4-Trichlorobenzene	76.1	136	20		81.9	88.6		7.93	82.5					86.4
SW 8260B	1,2-Dibromo-3-chloropropane	64.8	131	20		73.6	76.1		3.36	77.9					75.1
SW 8260B	1,2-Dibromoethane	79.8	122	20		92.5	93		0.58	94.8					88.5
SW 8260B	1,2-Dichlorobenzene	84.7	118	20		94.1	97.1		3.06	98.1					95.1
SW 8260B	1,2-Dichloroethane	65.3	126	20		88.7	90.3		1.78	90.6					90.4
SW 8260B	1,2-Dichloropropane	77.4	125	20		97	98.4		1.38	101					96.2
SW 8260B	1,3-Dichlorobenzene	77.6	127	20		92.7	95.9		3.39	96.1					92.6
SW 8260B	1,3-Dichloropropane	80.6	115	20		101	97.8		3	98.8					96.3
SW 8260B	1,4-Dichlorobenzene	82.2	114	20		89.2	91		2.02	92.7					86.1
SW 8260B	2,2-Dichloropropane	61.3	134	20		86.5	87.1		0.66	86.5					78.1
SW 8260B	2-Butanone (MEK)	46.4	155	20		94.5	88.6		6.45	87.4					84.4
SW 8260B	2-Hexanone	59.4	151	20		105	97.2		7.42	96.4					99.1
SW 8260B	4-Methyl-2-pentanone (MIBK)	63.3	138	20		102	100		1.55	96.9					98.2
SW 8260B	Acetone	28.7	175	20.9		83.6	70.3		17.3	72.2					71.9
SW 8260B	Acetonitrile							150			149				
SW 8260B	Acrolein	40.4	172	20		69.1	67.3		2.67	70.4					19.1
SW 8260B	Acrylonitrile	58.2	145	20		96.2	98.7		2.57	95.6					90.8
SW 8260B	Allyl Chloride					86.8	87.1		0.32	90.9					87.1
SW 8260B	Benzene	73	122	20		91.4	91.7		0.28	95.6					92.2
SW 8260B	Bromochloromethane	78.9	123	20		93.9	92.3		1.75	101					92.1
SW 8260B	Bromodichloromethane	75.5	121	20		91.8	92.2		0.52	95.5					90.3
SW 8260B	Bromoform	71.5	131	20		87.3	88.5		1.43	88.2					85.3
SW 8260B	Bromomethane	22.4	187	20		80.3	70.7		12.7	77.5					61.3
SW 8260B	Carbon Disulfide	53	134	20		88.4	88.5		0.18	93.3					88.7
SW 8260B	Carbon Tetrachloride	70.9	129	20		81.6	81.6		0.05	85.5					83.5
SW 8260B	Chlorobenzene	79.7	122	20		95	93.1		2.1	96.4					91.9
SW 8260B	Chlorodibromomethane	78.2	124	20		89.2	90.6		1.63	92					89.1
SW 8260B	Chloroethane	41.2	153	20		79	78.9		0.12	82.6					80.2
SW 8260B	Chloroform	73.2	125	20		89.8	91.3		1.69	92					91.1
SW 8260B	Chloromethane	55.8	134	20		89.3	94.2		5.38	95.6					91.2
SW 8260B	Chloroprene							97.2			104				
SW 8260B	cis-1,2-Dichloroethene	77.3	122	20		88.7	92.3		4.06	91.3					94.2
SW 8260B	cis-1,3-Dichloropropene	77.7	124	20		87.1	85.2		2.25	87					86.4
SW 8260B	Dibromomethane	79.5	118	20		89.4	90.5		1.17	90.4					90.1
SW 8260B	Dichlorodifluoromethane	56	134	20		84.6	84.8		0.28	80.7					77.4
SW 8260B	Ethyl Methacrylate							103			111				
SW 8260B	Ethylbenzene	80.9	121	20		94.2	92.2		2.21	97.2					91.6
SW 8260B	Iodomethane	64.6	137	20		61.6	71.2		14.5	74.2					71.8
SW 8260B	Isobutanol							133			134				
SW 8260B	Methacrylonitrile							122			121				
SW 8260B	Methyl methacrylate							139			112				
SW 8260B	Methylene chloride	69.5	120	20		87.1	85.8		1.57	88.5					85.4
SW 8260B	Propionitrile							144			134				
SW 8260B	Styrene	79.9	124	20		93.3	93.9		0.66	97					92.8
SW 8260B	Tetrachloroethene	73.5	130	20		95.5	91.5		4.28	99					91.9
SW 8260B	Toluene	77.9	116	20		98.3	96		2.35	101					95
SW 8260B	trans-1,2-Dichloroethene	72.6	125	20		91.3	94.1		3.02	96.7					94.6
SW 8260B	trans-1,3-Dichloropropene	73.5	127	20		80.8	81.4		0.75	82.7					81
SW 8260B	trans-1,4-Dichloro-2-butene	58.3	129	20		52.5	52.8		0.49	50.3					55.2
SW 8260B	Trichloroethene	79.5	121	20		92.6	92.9		0.39	101					100
SW 8260B	Trichlorofluoromethane	49.1	157	20		81.5	82.2		0.86	86.7					83.1
SW 8260B	Vinyl Acetate	41.7	159	20		92.5	92		0.57	65.8					43.5
SW 8260B	Vinyl Chloride	61.5	134	20		81.7	82.6		1.04	84.1					83
SW 8260B	Xylene, total					95.5	93.3		2.26	97.5					93.3
SW 8260B	*VOCs - SW 8011*														
SW 8011	1,2-Dibromo-3-chloropropane	64.8	131	20								100	101	1.15	
SW 8011	1,2-Dibromoethane	79.8	122	20								103	102	1.01	

TABLE D-12

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – VOCs

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3243357-2 % Recovery	LCSR3267864-1 % Recovery	LCSR3267864-2 % Recovery	LCSR3267864-3 % Recovery	NA LCS/LCSD RPD	LCSR3268072-2 % Recovery	LCSR3268072-3 % Recovery	NA LCS/LCSD RPD
	VOCs - SW 8260												
SW 8260B	1,1,1,2-Tetrachloroethane	78.5	125	20			109	113		3.19			
SW 8260B	1,1,1-Trichloroethane	71.1	129	20			103	102		1.35			
SW 8260B	1,1,2,2-Tetrachloroethane	79.3	123	20			111	112		1.48			
SW 8260B	1,1,2-Trichloroethane	81.6	120	20			105	107		1.9			
SW 8260B	1,1-Dichloroethane	71.7	127	20			93	91.3		1.88			
SW 8260B	1,1-Dichloroethene	59.9	137	20			96.9	95.5		1.37			
SW 8260B	1,1-Dichloropropene	72.5	127	20			100	98.4		1.55			
SW 8260B	1,2,3-Trichloropropane	74.9	124	20			119	116		2.33			
SW 8260B	1,2,4-Trichlorobenzene	76.1	136	20			104	105		1.42			
SW 8260B	1,2-Dibromo-3-chloropropane	64.8	131	20			121	120		0.852			
SW 8260B	1,2-Dibromoethane	79.8	122	20			113	115		1.63			
SW 8260B	1,2-Dichlorobenzene	84.7	118	20			103	104		1.29			
SW 8260B	1,2-Dichloroethane	65.3	126	20			99.9	99.9		0.0113			
SW 8260B	1,2-Dichloropropane	77.4	125	20			94.7	93.2		1.63			
SW 8260B	1,3-Dichlorobenzene	77.6	127	20			101	104		3.82			
SW 8260B	1,3-Dichloropropane	80.6	115	20			107	113		5.02			
SW 8260B	1,4-Dichlorobenzene	82.2	114	20			92.8	95.1		2.42			
SW 8260B	2,2-Dichloropropane	61.3	134	20			101	97.5		3.31			
SW 8260B	2-Butanone (MEK)	46.4	155	20			127	122		3.79			
SW 8260B	2-Hexanone	59.4	151	20			136	136		0.645			
SW 8260B	4-Methyl-2-pentanone (MIBK)	63.3	138	20			119	117		1.05			
SW 8260B	Acetone	28.7	175	20.9			150	143		4.3			
SW 8260B	Acetonitrile					138			96.8				
SW 8260B	Acrolein	40.4	172	20			287	288		0.382			
SW 8260B	Acrylonitrile	58.2	145	20			97.8	94.2		3.82			
SW 8260B	Allyl Chloride						95.3	93.9		1.44			
SW 8260B	Benzene	73	122	20			92.3	90.6		1.86			
SW 8260B	Bromochloromethane	78.9	123	20			91.8	91.8		0.00493			
SW 8260B	Bromodichloromethane	75.5	121	20			99.2	97.6		1.58			
SW 8260B	Bromoform	71.5	131	20			111	110		0.314			
SW 8260B	Bromomethane	22.4	187	20			46.4	45		3.18			
SW 8260B	Carbon Disulfide	53	134	20			89.5	85.8		4.22			
SW 8260B	Carbon Tetrachloride	70.9	129	20			99.6	95		4.76			
SW 8260B	Chlorobenzene	79.7	122	20			103	108		4.18			
SW 8260B	Chlorodibromomethane	78.2	124	20			107	111		3.92			
SW 8260B	Chloroethane	41.2	153	20			89.2	87.6		1.86			
SW 8260B	Chloroform	73.2	125	20			100	100		0.0795			
SW 8260B	Chloromethane	55.8	134	20			59.6	63		5.67			
SW 8260B	Chloroprene					96.8			83.2				
SW 8260B	cis-1,2-Dichloroethene	77.3	122	20			90.9	89.1		1.96			
SW 8260B	cis-1,3-Dichloropropene	77.7	124	20			104	108		3.5			
SW 8260B	Dibromomethane	79.5	118	20			98.6	102		3.29			
SW 8260B	Dichlorodifluoromethane	56	134	20			135	128		5.14			
SW 8260B	Ethyl Methacrylate					110			121				
SW 8260B	Ethylbenzene	80.9	121	20			104	106		1.22			
SW 8260B	Iodomethane	64.6	137	20			44.1	57.1		25.7			
SW 8260B	Isobutanol					131			118				
SW 8260B	Methacrylonitrile					120			110				
SW 8260B	Methyl methacrylate					109			102				
SW 8260B	Methylene chloride	69.5	120	20			83.1	86		3.51			
SW 8260B	Propionitrile					130			109				
SW 8260B	Styrene	79.9	124	20			103	105		1.23			
SW 8260B	Tetrachloroethene	73.5	130	20			111	113		1.98			
SW 8260B	Toluene	77.9	116	20			96.6	97.9		1.37			
SW 8260B	trans-1,2-Dichloroethene	72.6	125	20			94.5	93.5		1.13			
SW 8260B	trans-1,3-Dichloropropene	73.5	127	20			99.2	101		1.84			
SW 8260B	trans-1,4-Dichloro-2-butene	58.3	129	20			76.1	79		3.67			
SW 8260B	Trichloroethene	79.5	121	20			102	98.8		3.21			
SW 8260B	Trichlorofluoromethane	49.1	157	20			127	122		4.59			
SW 8260B	Vinyl Acetate	41.7	159	20			106	106		0.159			
SW 8260B	Vinyl Chloride	61.5	134	20			89.2	88		1.42			
SW 8260B	Xylene, total						101	103		2.22			
SW 8260B	*VOCs - SW 8011*												
SW 8011	1,2-Dibromo-3-chloropropane	64.8	131	20							105	105	0.0539
SW 8011	1,2-Dibromoethane	79.8	122	20							95.8	96.4	0.613

TABLE D-13

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3234049-2 % Recovery	LCSDR3234049-3 % Recovery	NA LCS/LCSD RPD	LCSR3234166-2 % Recovery	LCSDR3234166-3 % Recovery	NA LCS/LCSD RPD	LCSR3234289-6 % Recovery	LCSDR3234289-8 % Recovery	NA LCS/LCSD RPD	LCSR3234632-2 % Recovery	LCSDR3234632-3 % Recovery	NA LCS/LCSD RPD	LCSR3234633-2 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20								111	114	2				
	Cyanide																	
E-2011	Cyanide	84	116	20														107
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20											98	95	3	
SW 6020	Arsenic, Total	80	120	20											95	94	0	
SW 6020	Barium, Total	80	120	20											93	91	2	
SW 6020	Beryllium, Total	80	120	20											91	90	1	
SW 6020	Cadmium, Total	80	120	20											96	96	0	
SW 6020	Calcium, Total	80	120	20											95	94	1	
SW 6020	Chromium, Total	80	120	20											97	96	1	
SW 6020	Cobalt, Total	80	120	20											98	99	1	
SW 6020	Copper, Total	80	120	20											96	95	3	
SW 6020	Iron, Total	80	120	20											100	100	0	
SW 6020	Lead, Total	80	120	20											93	93	0	
SW 6020	Magnesium, Total	80	120	20											96	95	1	
SW 6020	Manganese, Total	80	120	20											97	95	2	
SW 6020	Nickel, Total	80	120	20											99	100	1	
SW 6020	Potassium, Total	80	120	20											93	92	1	
SW 6020	Selenium, Total	80	120	20											99	96	3	
SW 6020	Silver, Total	80	120	20											102	101	1	
SW 6020	Sodium, Total	80	120	20											98	97	1	
SW 6020	Thallium, Total	80	120	20											93	93	0	
SW 6020	Tin, Total	80	120	20											92	92	0	
SW 6020	Vanadium, Total	80	120	20											95	95	0	
SW 6020	Zinc, Total	80	120	20											95	97	2	
	Mercury																	
SW 7470A	Mercury, Total	80	120	20		107	108	1	105	108	3							
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15														
SW 9056A	Sulfate	80	120	15														

TABLE D-13

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSDR3234633-3 % Recovery	NA LCS/LCSD RPD	LCSR3234731-4 % Recovery	LCSDR3234731-6 % Recovery	NA LCS/LCSD RPD	LCSR3234732-3 % Recovery	LCSDR3234732-4 % Recovery	NA LCS/LCSD RPD	LCSR3235020-2 % Recovery	LCSDR3235020-3 % Recovery	NA LCS/LCSD RPD	LCSR3235079-2 % Recovery	LCSDR3235079-3 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20				115	112	3	115	112	3					
	Cyanide																	
E-2011	Cyanide	84	116	20		102	5											
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20										105	104	1		
SW 6020	Arsenic, Total	80	120	20										104	103	1		
SW 6020	Barium, Total	80	120	20										97	94	4		
SW 6020	Beryllium, Total	80	120	20										93	90	4		
SW 6020	Cadmium, Total	80	120	20										99	98	1		
SW 6020	Calcium, Total	80	120	20										100	94	6		
SW 6020	Chromium, Total	80	120	20										100	100	0		
SW 6020	Cobalt, Total	80	120	20										101	102	1		
SW 6020	Copper, Total	80	120	20										100	98	3		
SW 6020	Iron, Total	80	120	20										99	101	2		
SW 6020	Lead, Total	80	120	20										95	93	2		
SW 6020	Magnesium, Total	80	120	20										99	97	2		
SW 6020	Manganese, Total	80	120	20										97	98	2		
SW 6020	Nickel, Total	80	120	20										102	102	0		
SW 6020	Potassium, Total	80	120	20										98	94	3		
SW 6020	Selenium, Total	80	120	20										97	95	3		
SW 6020	Silver, Total	80	120	20										95	92	3		
SW 6020	Sodium, Total	80	120	20										100	98	3		
SW 6020	Thallium, Total	80	120	20										94	93	2		
SW 6020	Tin, Total	80	120	20										94	93	2		
SW 6020	Vanadium, Total	80	120	20										98	98	0		
SW 6020	Zinc, Total	80	120	20										98	99	1		
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15													100	100
SW 9056A	Sulfate	80	120	15													99	100

TABLE D-13

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	NA LCS/LCSD RPD	LCSR3235081-2 % Recovery	LCSDR3235081-3 % Recovery	NA LCS/LCSD RPD	LCSR3235317-2 % Recovery	LCSDR3235317-3 % Recovery	NA LCS/LCSD RPD	LCSR3238921-6 % Recovery	LCSDR3238921-8 % Recovery	NA LCS/LCSD RPD	LCSR3238922-3 % Recovery	LCSDR3238922-5 % Recovery	NA LCS/LCSD RPD
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20									107	106	1	101	102	2
	Cyanide																	
E-2011	Cyanide	84	116	20						101	103	2						
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20														
SW 6020	Arsenic, Total	80	120	20														
SW 6020	Barium, Total	80	120	20														
SW 6020	Beryllium, Total	80	120	20														
SW 6020	Cadmium, Total	80	120	20														
SW 6020	Calcium, Total	80	120	20														
SW 6020	Chromium, Total	80	120	20														
SW 6020	Cobalt, Total	80	120	20														
SW 6020	Copper, Total	80	120	20														
SW 6020	Iron, Total	80	120	20														
SW 6020	Lead, Total	80	120	20														
SW 6020	Magnesium, Total	80	120	20														
SW 6020	Manganese, Total	80	120	20														
SW 6020	Nickel, Total	80	120	20														
SW 6020	Potassium, Total	80	120	20														
SW 6020	Selenium, Total	80	120	20														
SW 6020	Silver, Total	80	120	20														
SW 6020	Sodium, Total	80	120	20														
SW 6020	Thallium, Total	80	120	20														
SW 6020	Tin, Total	80	120	20														
SW 6020	Vanadium, Total	80	120	20														
SW 6020	Zinc, Total	80	120	20														
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15		0	99	99	0									
SW 9056A	Sulfate	80	120	15		0	100	100	0									

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3239096-2 % Recovery	LCSDR3239096-3 % Recovery	NA LCS/LCSD RPD	LCSR3239175-2 % Recovery	LCSDR3239175-3 % Recovery	NA LCS/LCSD RPD	LCSR3239201-2 % Recovery	LCSDR3239201-3 % Recovery	NA LCS/LCSD RPD	LCSR3239210-2 % Recovery	LCSDR3239210-3 % Recovery	NA LCS/LCSD RPD	LCSR3239276-2 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20														
	Cyanide																	
E-2011	Cyanide	84	116	20														
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20														
SW 6020	Arsenic, Total	80	120	20														
SW 6020	Barium, Total	80	120	20														
SW 6020	Beryllium, Total	80	120	20														
SW 6020	Cadmium, Total	80	120	20														
SW 6020	Calcium, Total	80	120	20														
SW 6020	Chromium, Total	80	120	20														
SW 6020	Cobalt, Total	80	120	20														
SW 6020	Copper, Total	80	120	20														
SW 6020	Iron, Total	80	120	20														
SW 6020	Lead, Total	80	120	20														
SW 6020	Magnesium, Total	80	120	20														
SW 6020	Manganese, Total	80	120	20														
SW 6020	Nickel, Total	80	120	20														
SW 6020	Potassium, Total	80	120	20														
SW 6020	Selenium, Total	80	120	20														
SW 6020	Silver, Total	80	120	20														
SW 6020	Sodium, Total	80	120	20														
SW 6020	Thallium, Total	80	120	20														
SW 6020	Tin, Total	80	120	20														
SW 6020	Vanadium, Total	80	120	20														
SW 6020	Zinc, Total	80	120	20														
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														99
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15		100	100	0	99	99	0	99	99	0	99	99	0	
SW 9056A	Sulfate	80	120	15		100	100	0	100	100	0	100	100	0	99	99	0	

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSDR3239276-3 % Recovery	NA LCS/LCSD RPD	LCSR3239429-2 % Recovery	LCSDR3239429-3 % Recovery	NA LCS/LCSD RPD	LCSR3239669-2 % Recovery	LCSDR3239669-3 % Recovery	NA LCS/LCSD RPD	LCSR3240226-2 % Recovery	LCSDR3240226-3 % Recovery	NA LCS/LCSD RPD	LCSR3240420-2 % Recovery	LCSDR3240420-3 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20														
	Cyanide																	
E-2011	Cyanide	84	116	20				97	102	5				92	98	7		
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20													102	96
SW 6020	Arsenic, Total	80	120	20													103	98
SW 6020	Barium, Total	80	120	20													91	86
SW 6020	Beryllium, Total	80	120	20														
SW 6020	Cadmium, Total	80	120	20													107	106
SW 6020	Calcium, Total	80	120	20													104	98
SW 6020	Chromium, Total	80	120	20													105	102
SW 6020	Cobalt, Total	80	120	20													108	105
SW 6020	Copper, Total	80	120	20													99	96
SW 6020	Iron, Total	80	120	20													106	102
SW 6020	Lead, Total	80	120	20													97	95
SW 6020	Magnesium, Total	80	120	20													103	98
SW 6020	Manganese, Total	80	120	20													99	94
SW 6020	Nickel, Total	80	120	20													108	105
SW 6020	Potassium, Total	80	120	20													100	97
SW 6020	Selenium, Total	80	120	20													98	101
SW 6020	Silver, Total	80	120	20													102	100
SW 6020	Sodium, Total	80	120	20													105	101
SW 6020	Thallium, Total	80	120	20													98	97
SW 6020	Tin, Total	80	120	20													92	88
SW 6020	Vanadium, Total	80	120	20													103	99
SW 6020	Zinc, Total	80	120	20													108	103
	Mercury																	
SW 7470A	Mercury, Total	80	120	20		96	3				94	98	5					
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15														
SW 9056A	Sulfate	80	120	15														

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	NA LCS/LCSD RPD	LCSR3240626-2 % Recovery	LCSDR3240626-3 % Recovery	NA LCS/LCSD RPD	LCSR3241158-2 % Recovery	LCSDR3241158-3 % Recovery	NA LCS/LCSD RPD	LCSR3241159-2 % Recovery	LCSDR3241159-3 % Recovery	NA LCS/LCSD RPD	LCSR3241509-2 % Recovery	LCSDR3241509-3 % Recovery	NA LCS/LCSD RPD
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20														
	Cyanide																	
E-2011	Cyanide	84	116	20														
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20		6												
SW 6020	Arsenic, Total	80	120	20		5												
SW 6020	Barium, Total	80	120	20		5												
SW 6020	Beryllium, Total	80	120	20			92	87	5									
SW 6020	Cadmium, Total	80	120	20		1												
SW 6020	Calcium, Total	80	120	20		6												
SW 6020	Chromium, Total	80	120	20		3												
SW 6020	Cobalt, Total	80	120	20		3												
SW 6020	Copper, Total	80	120	20		3												
SW 6020	Iron, Total	80	120	20		4												
SW 6020	Lead, Total	80	120	20		2												
SW 6020	Magnesium, Total	80	120	20		5												
SW 6020	Manganese, Total	80	120	20		5												
SW 6020	Nickel, Total	80	120	20		2												
SW 6020	Potassium, Total	80	120	20		2												
SW 6020	Selenium, Total	80	120	20		3												
SW 6020	Silver, Total	80	120	20		2												
SW 6020	Sodium, Total	80	120	20		3												
SW 6020	Thallium, Total	80	120	20		2												
SW 6020	Tin, Total	80	120	20		4												
SW 6020	Vanadium, Total	80	120	20		3												
SW 6020	Zinc, Total	80	120	20		4												
	Mercury																	
SW 7470A	Mercury, Total	80	120	20						84	85	0	86	84	2			
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15												99	99	0
SW 9056A	Sulfate	80	120	15												100	100	0

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3241518-3 % Recovery	LCSDR3241518-4 % Recovery	NA LCS/LCSD RPD	LCSR3241597-2 % Recovery	LCSDR3241597-3 % Recovery	NA LCS/LCSD RPD	LCSR3241607-2 % Recovery	LCSDR3241607-3 % Recovery	NA LCS/LCSD RPD	LCSR3241633-3 % Recovery	LCSDR3241633-5 % Recovery	NA LCS/LCSD RPD	LCSR3241634-8 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20											107	103	3	109
	Cyanide																	
E-2011	Cyanide	84	116	20		104	106	2										
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20														
SW 6020	Arsenic, Total	80	120	20														
SW 6020	Barium, Total	80	120	20														
SW 6020	Beryllium, Total	80	120	20														
SW 6020	Cadmium, Total	80	120	20														
SW 6020	Calcium, Total	80	120	20														
SW 6020	Chromium, Total	80	120	20														
SW 6020	Cobalt, Total	80	120	20														
SW 6020	Copper, Total	80	120	20														
SW 6020	Iron, Total	80	120	20														
SW 6020	Lead, Total	80	120	20														
SW 6020	Magnesium, Total	80	120	20														
SW 6020	Manganese, Total	80	120	20														
SW 6020	Nickel, Total	80	120	20														
SW 6020	Potassium, Total	80	120	20														
SW 6020	Selenium, Total	80	120	20														
SW 6020	Silver, Total	80	120	20														
SW 6020	Sodium, Total	80	120	20														
SW 6020	Thallium, Total	80	120	20														
SW 6020	Tin, Total	80	120	20														
SW 6020	Vanadium, Total	80	120	20														
SW 6020	Zinc, Total	80	120	20														
	Mercury																	
SW 7470A	Mercury, Total	80	120	20								102	98	4				
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15					99	99	0							
SW 9056A	Sulfate	80	120	15					100	100	0							

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSDR3241634-9 % Recovery	NA LCS/LCSD RPD	LCSR3241912-2 % Recovery	LCSDR3241912-3 % Recovery	NA LCS/LCSD RPD	LCSR3241970-3 % Recovery	LCSDR3241970-5 % Recovery	NA LCS/LCSD RPD	LCSR3241972-2 % Recovery	LCSDR3241972-3 % Recovery	NA LCS/LCSD RPD	LCSR3241973-2 % Recovery	LCSDR3241973-3 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20		102	6				101	103	2					
	Cyanide																	
E-2011	Cyanide	84	116	20				102	104	2								
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20														
SW 6020	Arsenic, Total	80	120	20														
SW 6020	Barium, Total	80	120	20														
SW 6020	Beryllium, Total	80	120	20														
SW 6020	Cadmium, Total	80	120	20														
SW 6020	Calcium, Total	80	120	20														
SW 6020	Chromium, Total	80	120	20														
SW 6020	Cobalt, Total	80	120	20														
SW 6020	Copper, Total	80	120	20														
SW 6020	Iron, Total	80	120	20														
SW 6020	Lead, Total	80	120	20														
SW 6020	Magnesium, Total	80	120	20														
SW 6020	Manganese, Total	80	120	20														
SW 6020	Nickel, Total	80	120	20														
SW 6020	Potassium, Total	80	120	20														
SW 6020	Selenium, Total	80	120	20														
SW 6020	Silver, Total	80	120	20														
SW 6020	Sodium, Total	80	120	20														
SW 6020	Thallium, Total	80	120	20														
SW 6020	Tin, Total	80	120	20														
SW 6020	Vanadium, Total	80	120	20														
SW 6020	Zinc, Total	80	120	20														
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15										99	99	0	99	99
SW 9056A	Sulfate	80	120	15										100	100	1	101	100

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	NA LCS/LCSD RPD	LCSR3242621-2 % Recovery	LCSDR3242621-3 % Recovery	NA LCS/LCSD RPD	LCSR3242666-2 % Recovery	LCSDR3242666-3 % Recovery	NA LCS/LCSD RPD	LCSR3242729-3 % Recovery	NA LCS/LCSD RPD	LCSDR3242729-5 % Recovery	LCSR3242825-2 % Recovery	LCSDR3242825-3 % Recovery	NA LCS/LCSD RPD
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20														
	Cyanide																	
E-2011	Cyanide	84	116	20									107	0	107	106	93	13
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20														
SW 6020	Arsenic, Total	80	120	20														
SW 6020	Barium, Total	80	120	20														
SW 6020	Beryllium, Total	80	120	20														
SW 6020	Cadmium, Total	80	120	20														
SW 6020	Calcium, Total	80	120	20														
SW 6020	Chromium, Total	80	120	20														
SW 6020	Cobalt, Total	80	120	20														
SW 6020	Copper, Total	80	120	20														
SW 6020	Iron, Total	80	120	20														
SW 6020	Lead, Total	80	120	20														
SW 6020	Magnesium, Total	80	120	20														
SW 6020	Manganese, Total	80	120	20														
SW 6020	Nickel, Total	80	120	20														
SW 6020	Potassium, Total	80	120	20														
SW 6020	Selenium, Total	80	120	20														
SW 6020	Silver, Total	80	120	20														
SW 6020	Sodium, Total	80	120	20														
SW 6020	Thallium, Total	80	120	20														
SW 6020	Tin, Total	80	120	20														
SW 6020	Vanadium, Total	80	120	20														
SW 6020	Zinc, Total	80	120	20														
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15		0				100	100	0						
SW 9056A	Sulfate	80	120	15		0	100	100	0									

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3242867-2 % Recovery	LCSDR3242867-3 % Recovery	NA LCS/LCSD RPD	LCSR3242895-2 % Recovery	LCSDR3242895-3 % Recovery	NA LCS/LCSD RPD	LCSR3242965-2 % Recovery	LCSDR3242965-3 % Recovery	NA LCS/LCSD RPD	LCSR3243069-2 % Recovery	LCSDR3243069-3 % Recovery	NA LCS/LCSD RPD	LCSR3243078-2 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20														
	Cyanide																	
E-2011	Cyanide	84	116	20														
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20		97	97	1	104	103	0	100	99	1				
SW 6020	Arsenic, Total	80	120	20		97	97	1	98	98	0	103	99	3				
SW 6020	Barium, Total	80	120	20					95	96	1	93	87	7				
SW 6020	Beryllium, Total	80	120	20					92	92	1							
SW 6020	Cadmium, Total	80	120	20		102	103	1	102	103	1	109	103	6				
SW 6020	Calcium, Total	80	120	20		95	95	0	101	101	1	98	96	3				
SW 6020	Chromium, Total	80	120	20		98	99	1	101	102	1	105	102	3				
SW 6020	Cobalt, Total	80	120	20		102	103	1	104	105	1	107	105	2				
SW 6020	Copper, Total	80	120	20		95	97	1	99	100	1	100	97	3				
SW 6020	Iron, Total	80	120	20		101	101	0	104	105	1	106	102	4				
SW 6020	Lead, Total	80	120	20		96	96	0	98	99	0	97	93	4				
SW 6020	Magnesium, Total	80	120	20		97	97	0	104	104	0	101	99	1				
SW 6020	Manganese, Total	80	120	20		93	93	0	99	100	1	100	94	6				
SW 6020	Nickel, Total	80	120	20		101	102	1	103	102	0	107	105	2				
SW 6020	Potassium, Total	80	120	20		92	92	0	100	100	0	99	98	1				
SW 6020	Selenium, Total	80	120	20		105	100	5	106	106	1	106	102	4				
SW 6020	Silver, Total	80	120	20		97	97	0	101	103	1	101	97	4				
SW 6020	Sodium, Total	80	120	20		97	97	0	104	105	1	104	103	1				
SW 6020	Thallium, Total	80	120	20		97	97	0	100	100	1	96	92	4				
SW 6020	Tin, Total	80	120	20		92	90	2	97	96	1	91	90	1				
SW 6020	Vanadium, Total	80	120	20		95	96	1	99	100	0	103	99	4				
SW 6020	Zinc, Total	80	120	20		97	97	0	110	98	12	103	99	4				
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15														
SW 9056A	Sulfate	80	120	15											99	99	0	98

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSDR3243078-3 % Recovery	NA LCS/LCSD RPD	LCSR3243156-2 % Recovery	LCSDR3243156-3 % Recovery	NA LCS/LCSD RPD	LCSR3243318-2 % Recovery	LCSDR3243318-3 % Recovery	NA LCS/LCSD RPD	LCSR3243486-2 % Recovery	LCSDR3243486-3 % Recovery	NA LCS/LCSD RPD	LCSR3243495-2 % Recovery	LCSDR3243495-3 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20														
	Cyanide																	
E-2011	Cyanide	84	116	20														
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20													102	108
SW 6020	Arsenic, Total	80	120	20													97	101
SW 6020	Barium, Total	80	120	20				92	93	1							94	96
SW 6020	Beryllium, Total	80	120	20				90	88	2								
SW 6020	Cadmium, Total	80	120	20													96	101
SW 6020	Calcium, Total	80	120	20													93	97
SW 6020	Chromium, Total	80	120	20													98	101
SW 6020	Cobalt, Total	80	120	20													100	105
SW 6020	Copper, Total	80	120	20													94	96
SW 6020	Iron, Total	80	120	20													97	102
SW 6020	Lead, Total	80	120	20													93	95
SW 6020	Magnesium, Total	80	120	20													87	89
SW 6020	Manganese, Total	80	120	20													96	99
SW 6020	Nickel, Total	80	120	20													99	103
SW 6020	Potassium, Total	80	120	20													90	94
SW 6020	Selenium, Total	80	120	20													96	98
SW 6020	Silver, Total	80	120	20													97	99
SW 6020	Sodium, Total	80	120	20													87	91
SW 6020	Thallium, Total	80	120	20													95	98
SW 6020	Tin, Total	80	120	20													94	95
SW 6020	Vanadium, Total	80	120	20													95	99
SW 6020	Zinc, Total	80	120	20													97	102
	Mercury																	
SW 7470A	Mercury, Total	80	120	20							95	93	2					
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15										99	99	0		
SW 9056A	Sulfate	80	120	15		98	0							101	101	0		

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Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	NA LCS/LCSD RPD	LCSR3243556-2 % Recovery	LCSDR3243556-3 % Recovery	NA LCS/LCSD RPD	LCSR3243623-2 % Recovery	LCSDR3243623-3 % Recovery	NA LCS/LCSD RPD	LCSR3244147-3 % Recovery	LCSDR3244147-6 % Recovery	NA LCS/LCSD RPD	LCSR3244261-2 % Recovery	LCSDR3244261-3 % Recovery	NA LCS/LCSD RPD
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20									104	102	2			
	Cyanide																	
E-2011	Cyanide	84	116	20														
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20		6										99	98	1
SW 6020	Arsenic, Total	80	120	20		4										94	96	2
SW 6020	Barium, Total	80	120	20		2										88	87	1
SW 6020	Beryllium, Total	80	120	20			87	83	4	81	83	2						
SW 6020	Cadmium, Total	80	120	20		6										101	100	1
SW 6020	Calcium, Total	80	120	20		4										92	97	6
SW 6020	Chromium, Total	80	120	20		4										99	99	0
SW 6020	Cobalt, Total	80	120	20		5										101	103	1
SW 6020	Copper, Total	80	120	20		2										95	95	1
SW 6020	Iron, Total	80	120	20		5										99	100	1
SW 6020	Lead, Total	80	120	20		2										90	89	1
SW 6020	Magnesium, Total	80	120	20		3										100	98	2
SW 6020	Manganese, Total	80	120	20		3										93	94	1
SW 6020	Nickel, Total	80	120	20		5												
SW 6020	Potassium, Total	80	120	20		4										96	94	2
SW 6020	Selenium, Total	80	120	20		2										94	96	2
SW 6020	Silver, Total	80	120	20		3										95	94	1
SW 6020	Sodium, Total	80	120	20		4										100	99	1
SW 6020	Thallium, Total	80	120	20		3										93	92	1
SW 6020	Tin, Total	80	120	20		1										89	86	3
SW 6020	Vanadium, Total	80	120	20		4										96	96	0
SW 6020	Zinc, Total	80	120	20		5										97	101	4
	Mercury																	
SW 7470A	Mercury, Total	80	120	20														
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15														
SW 9056A	Sulfate	80	120	15														

TABLE D-13

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3244388-2 % Recovery	LCSDR3244388-3 % Recovery	NA LCS/LCSD RPD	LCSR3266911-2 % Recovery	LCSR3266911-3 % Recovery	NA LCS/LCSD RPD	LCSR3266919-5 % Recovery	LCSR3266919-6 % Recovery	NA LCS/LCSD RPD	LCSR3267027-2 % Recovery	LCSR3267027-3 % Recovery	NA LCS/LCSD RPD	LCSR3267438-8 % Recovery
	Alkalinity																	
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20								107	109	2				
	Cyanide																	
E-2011	Cyanide	84	116	20														
	Metals, Dissolved and Totals																	
SW 6020	Antimony, Total	80	120	20														105
SW 6020	Arsenic, Total	80	120	20														100
SW 6020	Barium, Total	80	120	20														98
SW 6020	Beryllium, Total	80	120	20		95	95	1										100
SW 6020	Cadmium, Total	80	120	20														103
SW 6020	Calcium, Total	80	120	20														100
SW 6020	Chromium, Total	80	120	20														100
SW 6020	Cobalt, Total	80	120	20														101
SW 6020	Copper, Total	80	120	20														97
SW 6020	Iron, Total	80	120	20														99
SW 6020	Lead, Total	80	120	20														100
SW 6020	Magnesium, Total	80	120	20														101
SW 6020	Manganese, Total	80	120	20														98
SW 6020	Nickel, Total	80	120	20		99	100	0										100
SW 6020	Potassium, Total	80	120	20														99
SW 6020	Selenium, Total	80	120	20														98
SW 6020	Silver, Total	80	120	20														104
SW 6020	Sodium, Total	80	120	20														103
SW 6020	Thallium, Total	80	120	20														98
SW 6020	Tin, Total	80	120	20														101
SW 6020	Vanadium, Total	80	120	20														99
SW 6020	Zinc, Total	80	120	20														98
	Mercury																	
SW 7470A	Mercury, Total	80	120	20											87	92	6	
	Inorganic Anions																	
SW 9056A	Chloride	80	120	15					98	98	0							
SW 9056A	Sulfate	80	120	15														

TABLE D-13

Laboratory Control Sample/Laboratory Control Sample Duplicate Summary Results – Miscellaneous

2017 Offsite Groundwater Monitoring Analytical Data

Method	Analyte	LCSRECLOW (%)	LCSRECUPP (%)	LCSRPD Limit	Sample ID: Units	LCSR3267438-9 % Recovery	NA LCS/LCSD RPD	LCSR3267695-2 % Recovery	LCSR3267695-3 % Recovery	NA LCS/LCSD RPD	LCSR3268177-2 % Recovery	LCSR3268177-3 % Recovery	NA LCS/LCSD RPD
	Alkalinity												
SM 2320B	Alkalinity, Total as $CaCO_3$	85	115	20									
	Cyanide												
E-2011	Cyanide	84	116	20				91	87	5			
	Metals, Dissolved and Totals												
SW 6020	Antimony, Total	80	120	20		102	3						
SW 6020	Arsenic, Total	80	120	20		101	1						
SW 6020	Barium, Total	80	120	20		99	1						
SW 6020	Beryllium, Total	80	120	20		102	1						
SW 6020	Cadmium, Total	80	120	20		103	1						
SW 6020	Calcium, Total	80	120	20		103	3						
SW 6020	Chromium, Total	80	120	20		100	0						
SW 6020	Cobalt, Total	80	120	20		102	1						
SW 6020	Copper, Total	80	120	20		97	0						
SW 6020	Iron, Total	80	120	20		98	0						
SW 6020	Lead, Total	80	120	20		101	0						
SW 6020	Magnesium, Total	80	120	20		102	2						
SW 6020	Manganese, Total	80	120	20		97	0						
SW 6020	Nickel, Total	80	120	20		100	1						
SW 6020	Potassium, Total	80	120	20		99	0						
SW 6020	Selenium, Total	80	120	20		100	1						
SW 6020	Silver, Total	80	120	20		103	0						
SW 6020	Sodium, Total	80	120	20		103	0						
SW 6020	Thallium, Total	80	120	20		98	0						
SW 6020	Tin, Total	80	120	20		100	1						
SW 6020	Vanadium, Total	80	120	20		99	0						
SW 6020	Zinc, Total	80	120	20		100	2						
	Mercury												
SW 7470A	Mercury, Total	80	120	20									
	Inorganic Anions												
SW 9056A	Chloride	80	120	15									
SW 9056A	Sulfate	80	120	15							100	100	0

Appendix E
Historical TCE and PCE Time Series Plots

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APPENDIX E INDEX

Table	Title
E-1	Monitoring Location Graph Index

Acronym	Definition
MW	monitoring well
RW	residential well

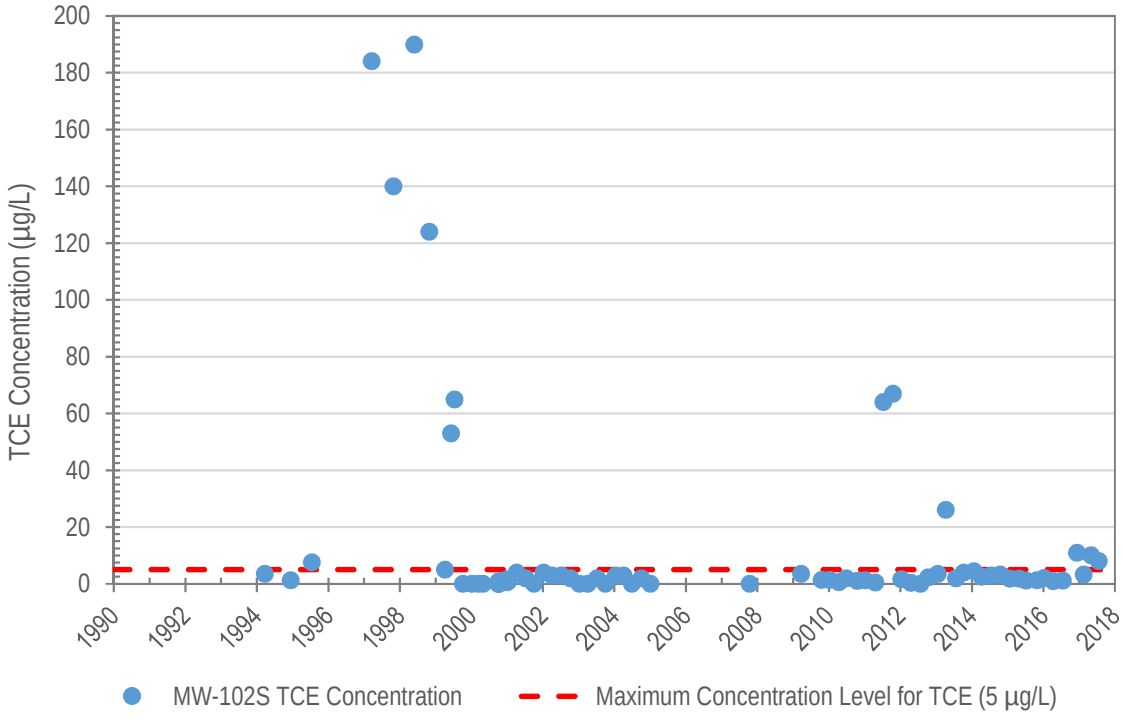
TABLE E-1

Monitoring Location Graph Index

2017 Offsite Groundwater Monitoring Sampling Summary

Monitoring Location	Figure	Monitoring Location	Figure	Monitoring Location	Figure
MW-102S	E-1	RW-2151H	E-18	RW-7586P	E-35
MW-103D	E-2	RW-2172F	E-19	RW-7677P	E-36
MW-103S	E-3	RW-2172H	E-20	RW-7688P	E-37
MW-106D	E-4	RW-2203H	E-21	RW-7773P	E-38
MW-106S	E-5	RW-2237H	E-22	RW-7776P	E-39
MW-107D	E-6	RW-2334F	E-23	RW-7953P	E-40
MW-107S	E-7	RW-5787P	E-24	RW-8000B	E-41
MW-108D	E-8	RW-6998P	E-25	RW-8012P	E-42
MW-115D	E-9	RW-7077P	E-26	RW-8030P	E-43
MW-115S	E-10	RW-7244P	E-27	RW-5898B1	E-44
MW-116D	E-11	RW-7310P	E-28	EDMS 459	
MW-116S	E-12	RW-7350P	E-29	EDMS 461	
MW-117D	E-13	RW-7412P	E-30	Muni Wells 10 and 12	
MW-117S	E-14	RW-7455P	E-31	Muni Wells 13 and 14	
MW-118D	E-15	RW-7492P	E-32	Muni Wells 16 and 29	
RW-2076F	E-16	RW-7505P	E-33	Muni Wells 30 and 33	
RW-2140H	E-17	RW-7549P	E-34	Muni Well 36	

MW-102S



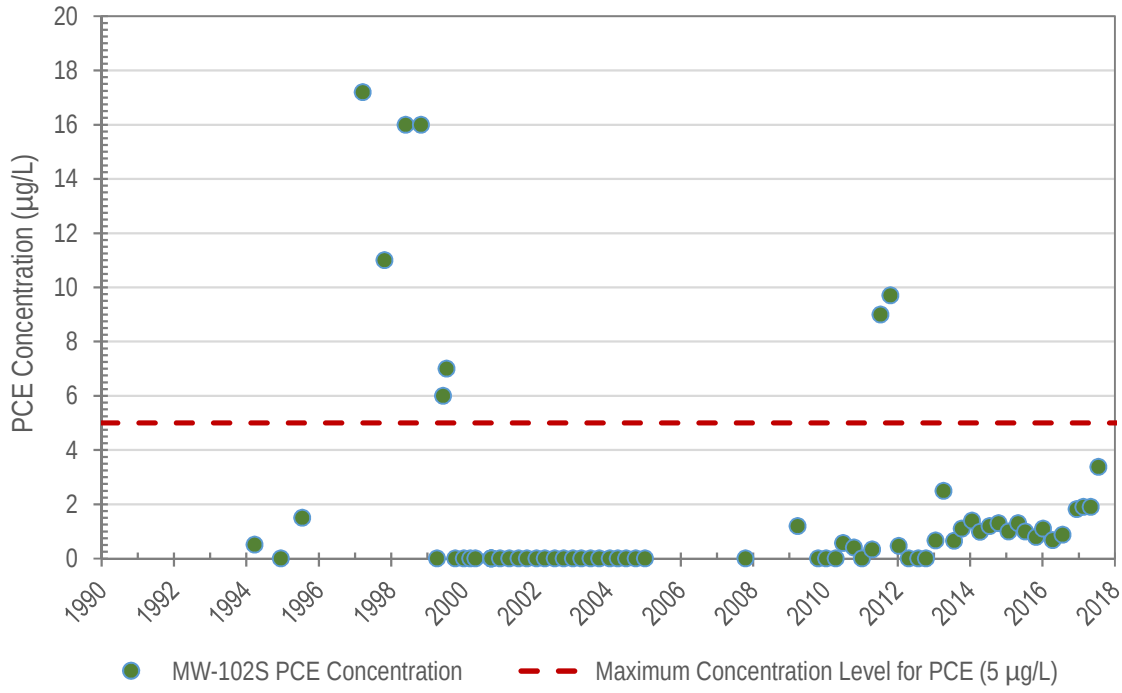


FIGURE E-1
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-102S
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-103D

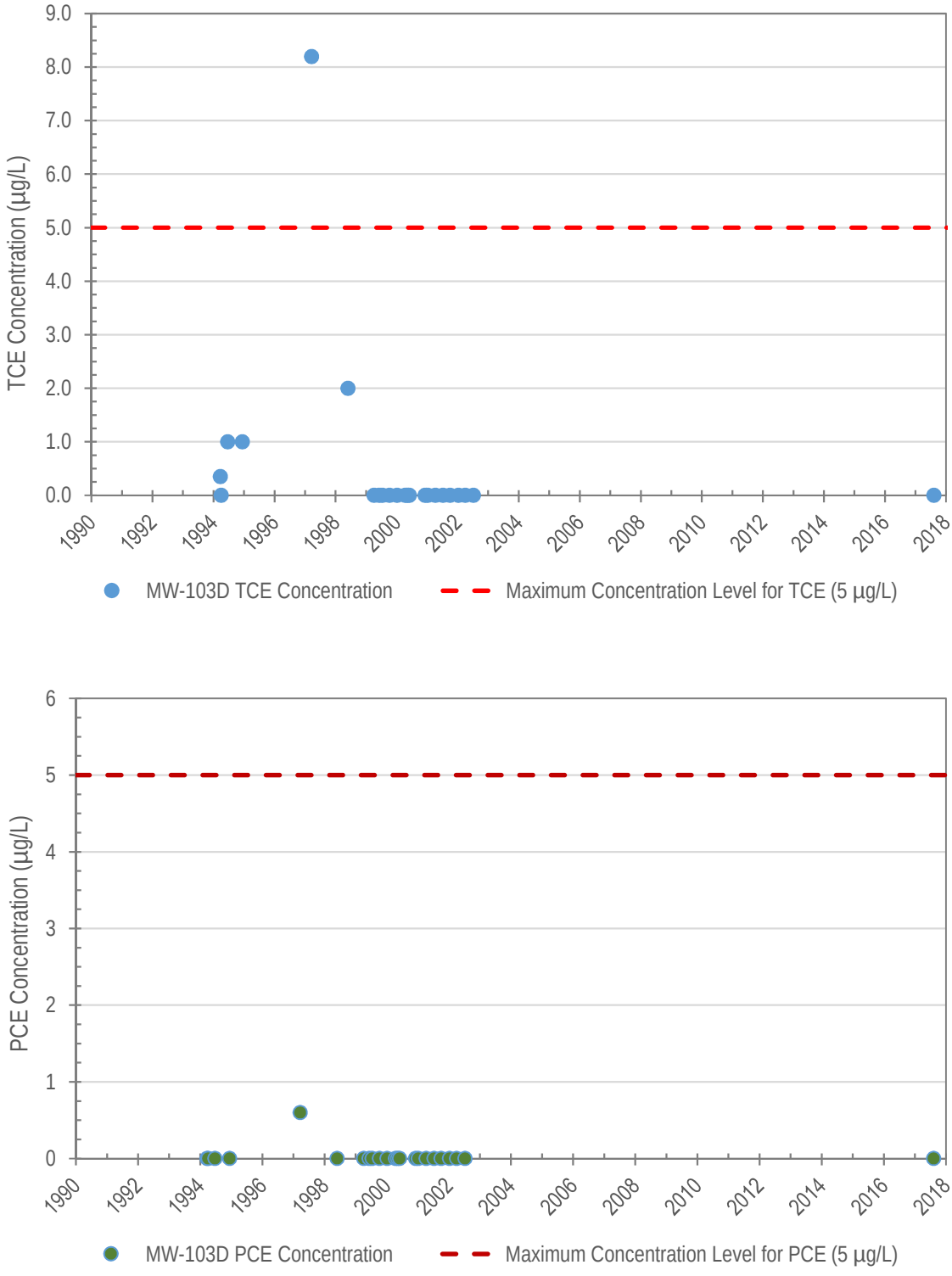


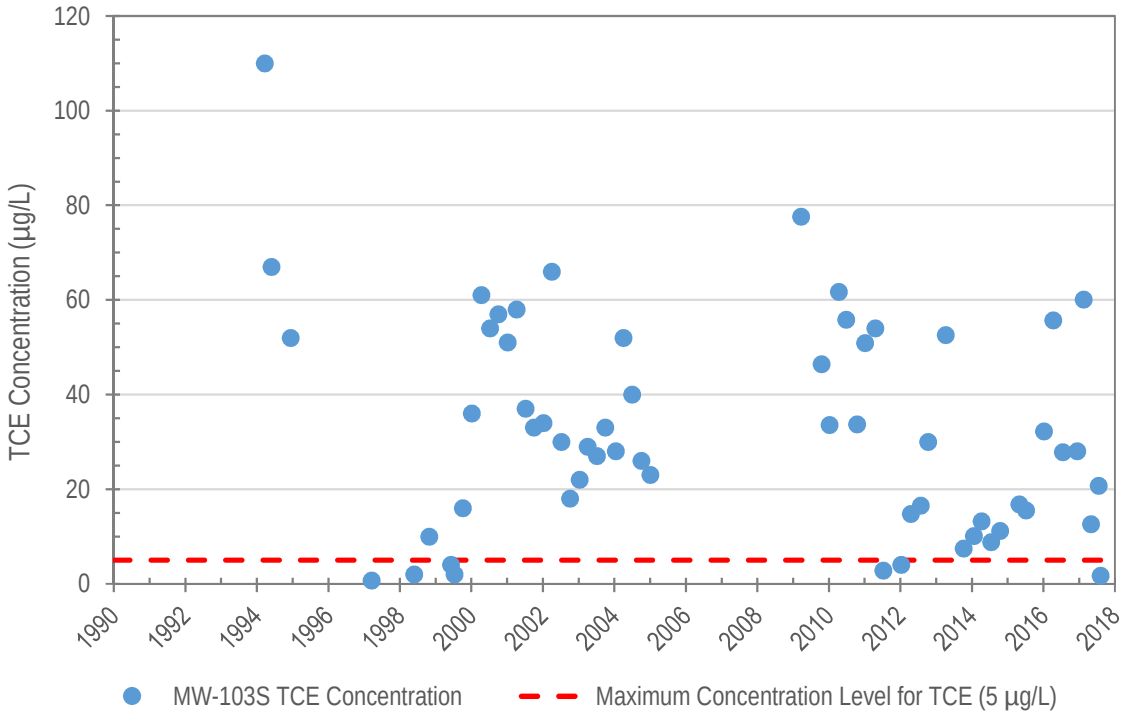
FIGURE E-2

HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-103D

FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT

BANNOCK COUNTY, IDAHO

MW-103S



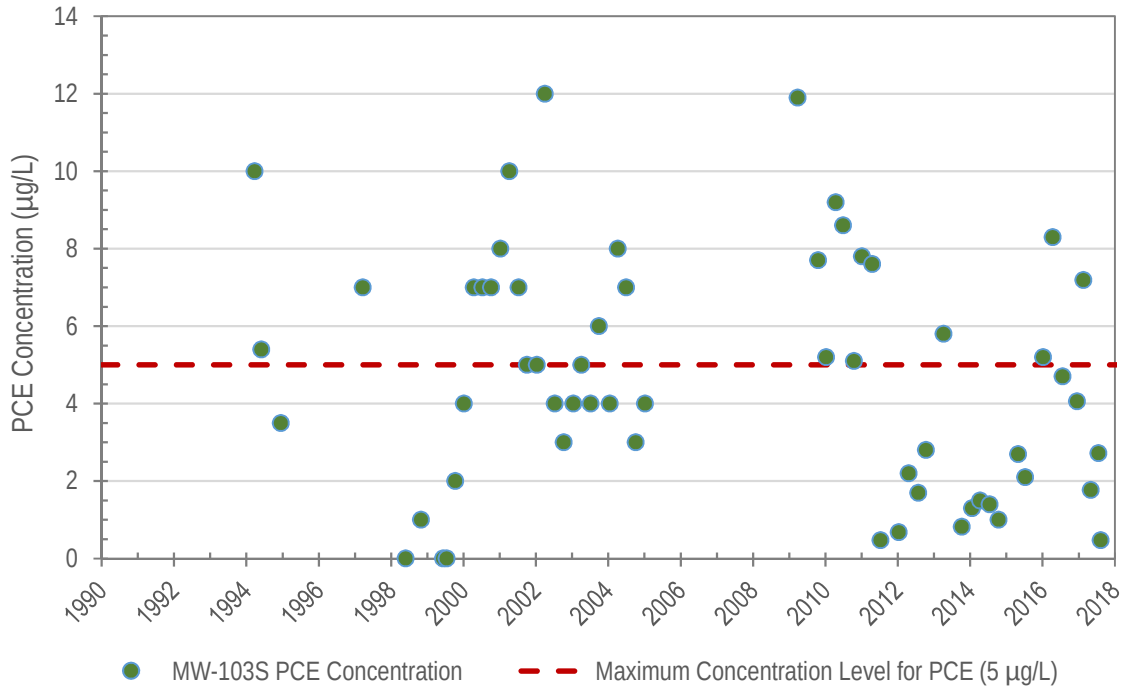
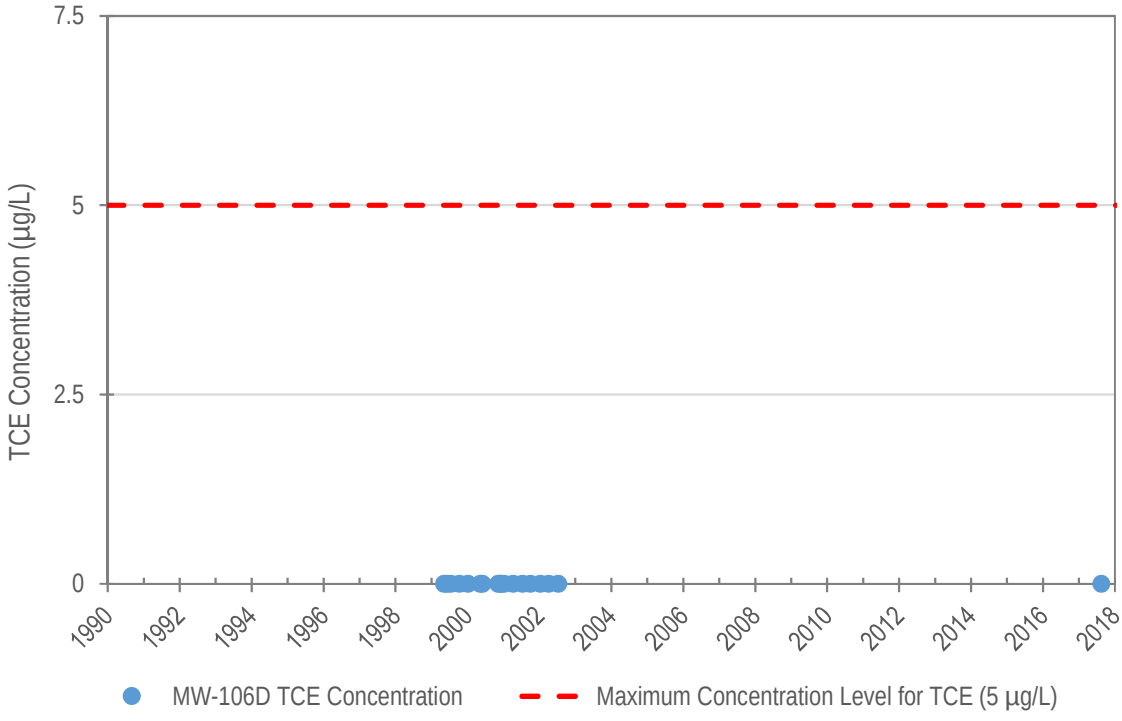


FIGURE E-3
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-103S
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-106D



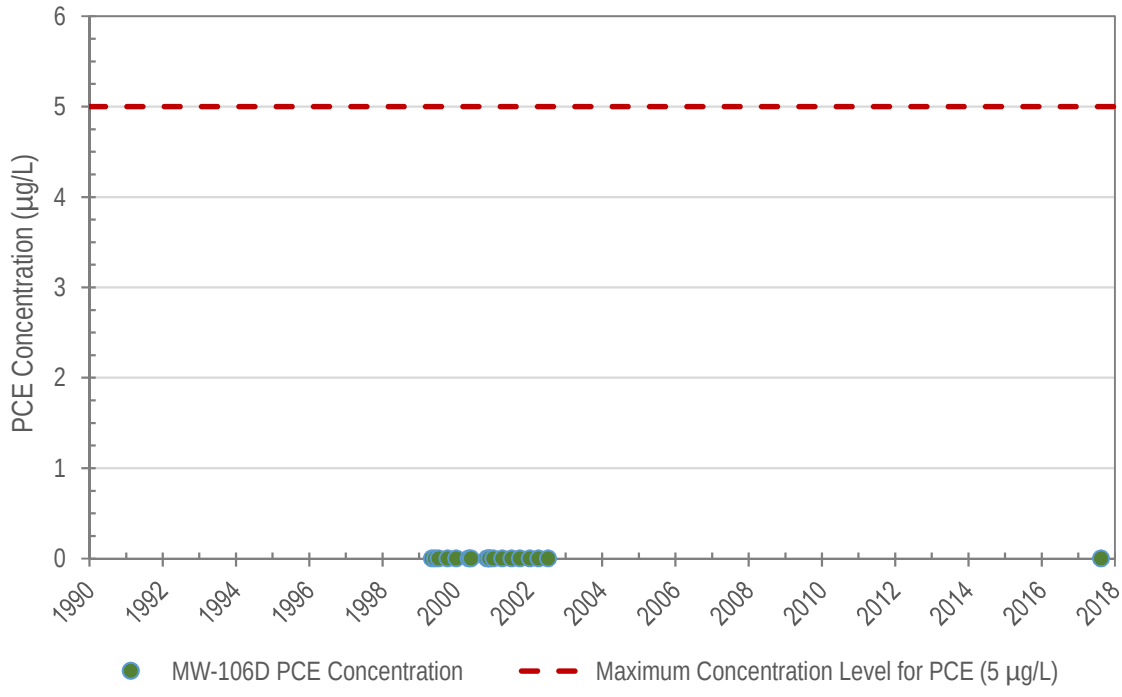


FIGURE E-4
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-106D
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-106S

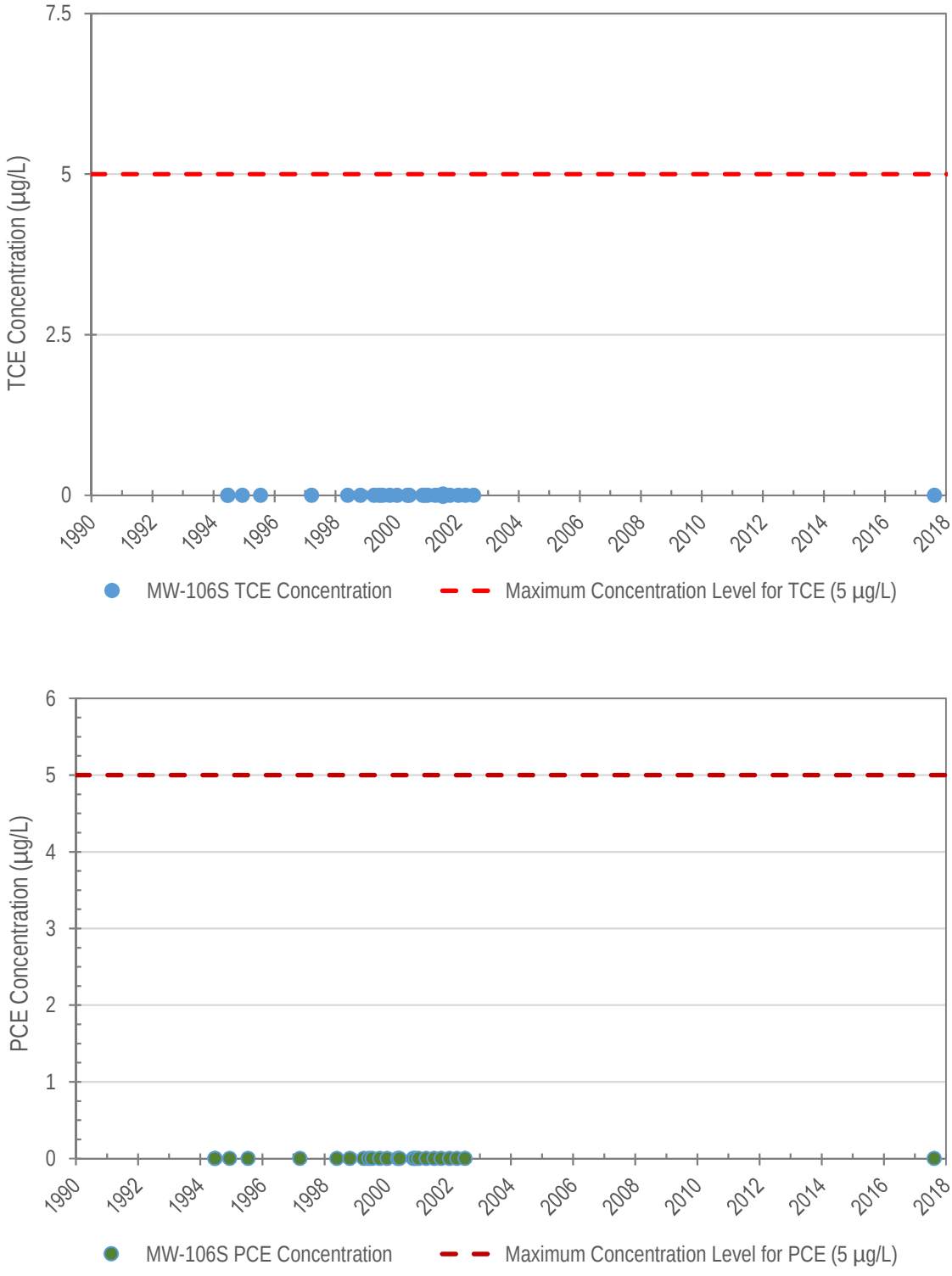
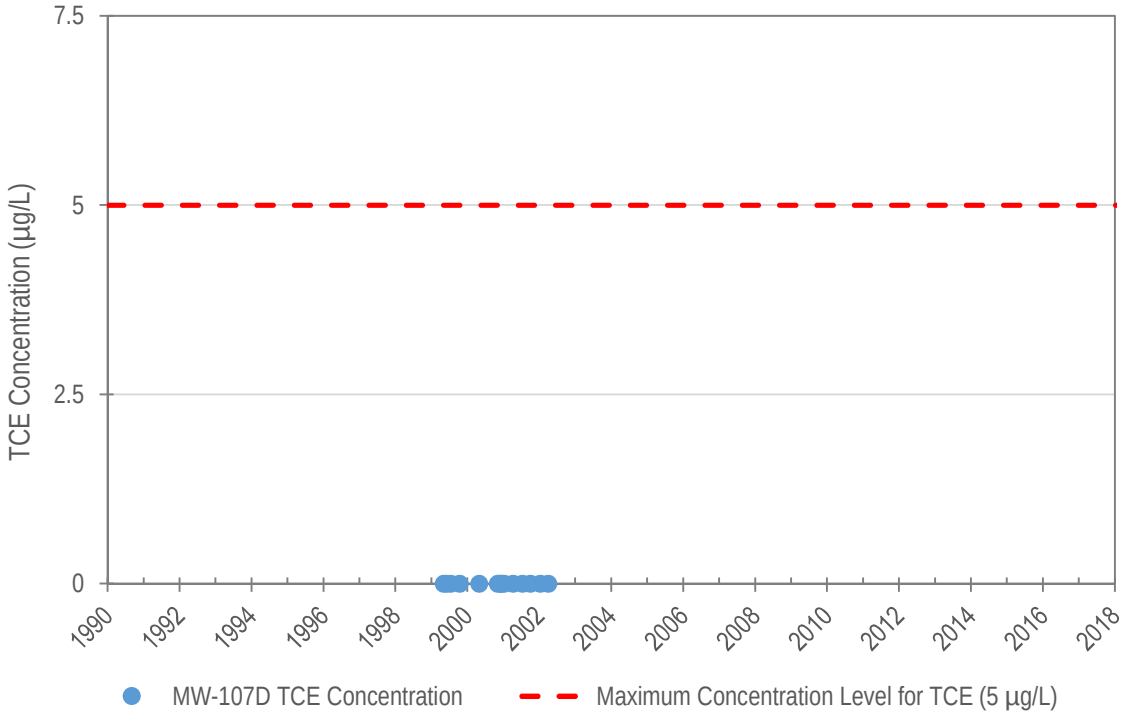


FIGURE E-5
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-106S
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-107D



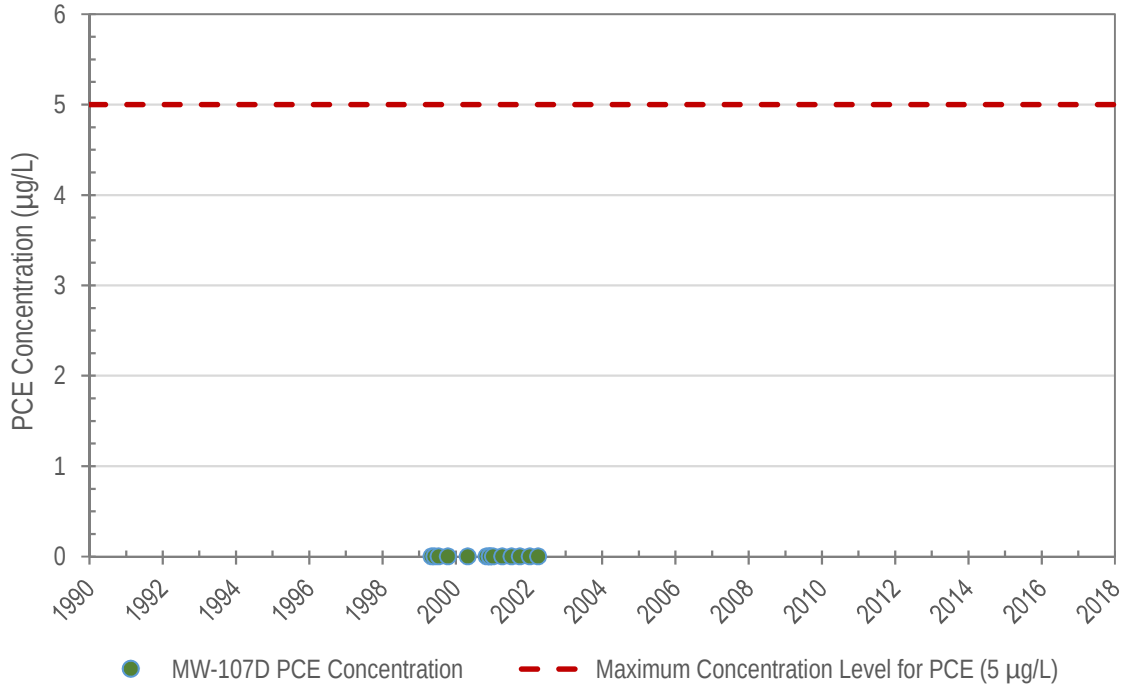
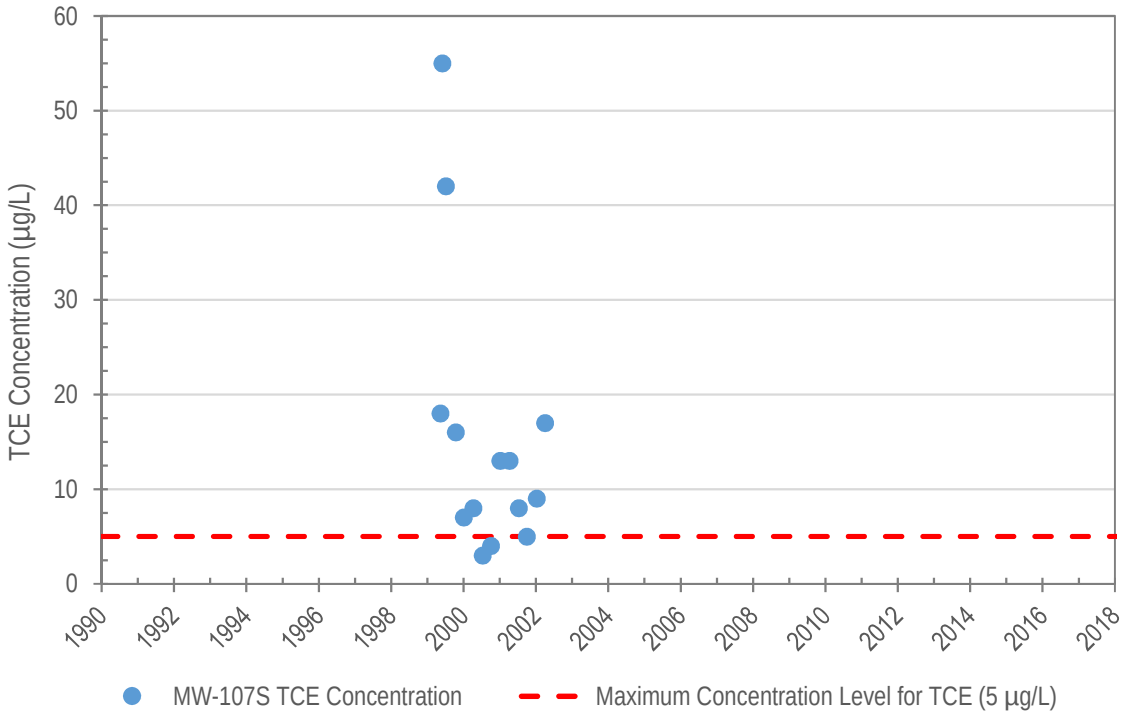


FIGURE E-6
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-107D
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-107S



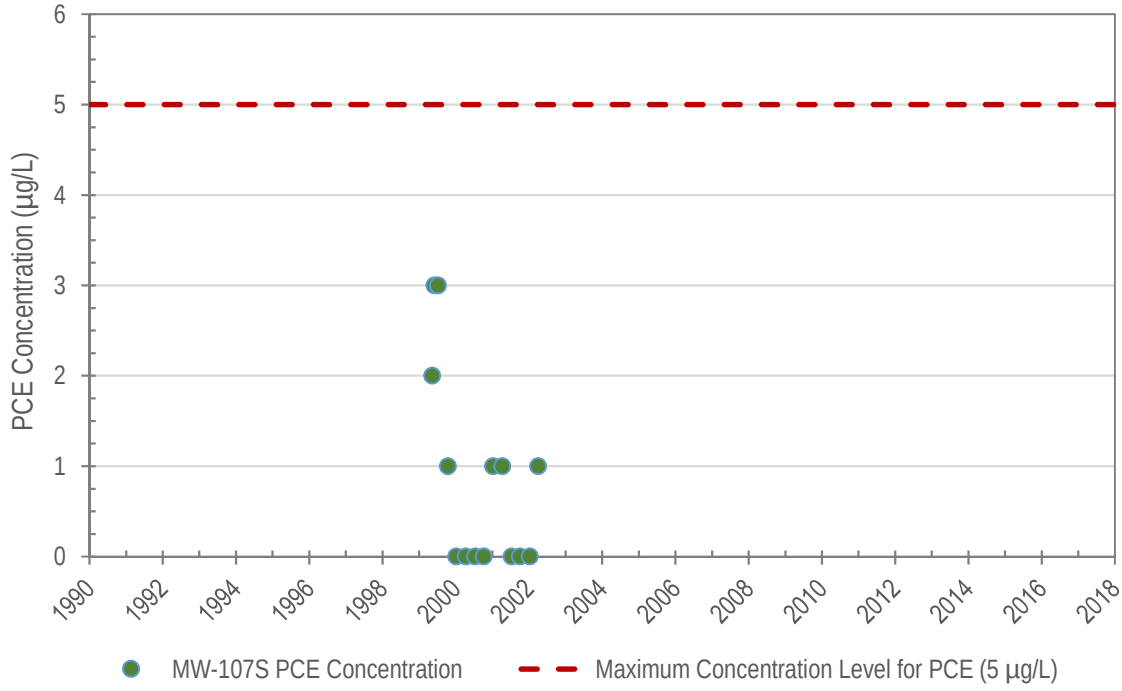


FIGURE E-7
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-107S
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-108D

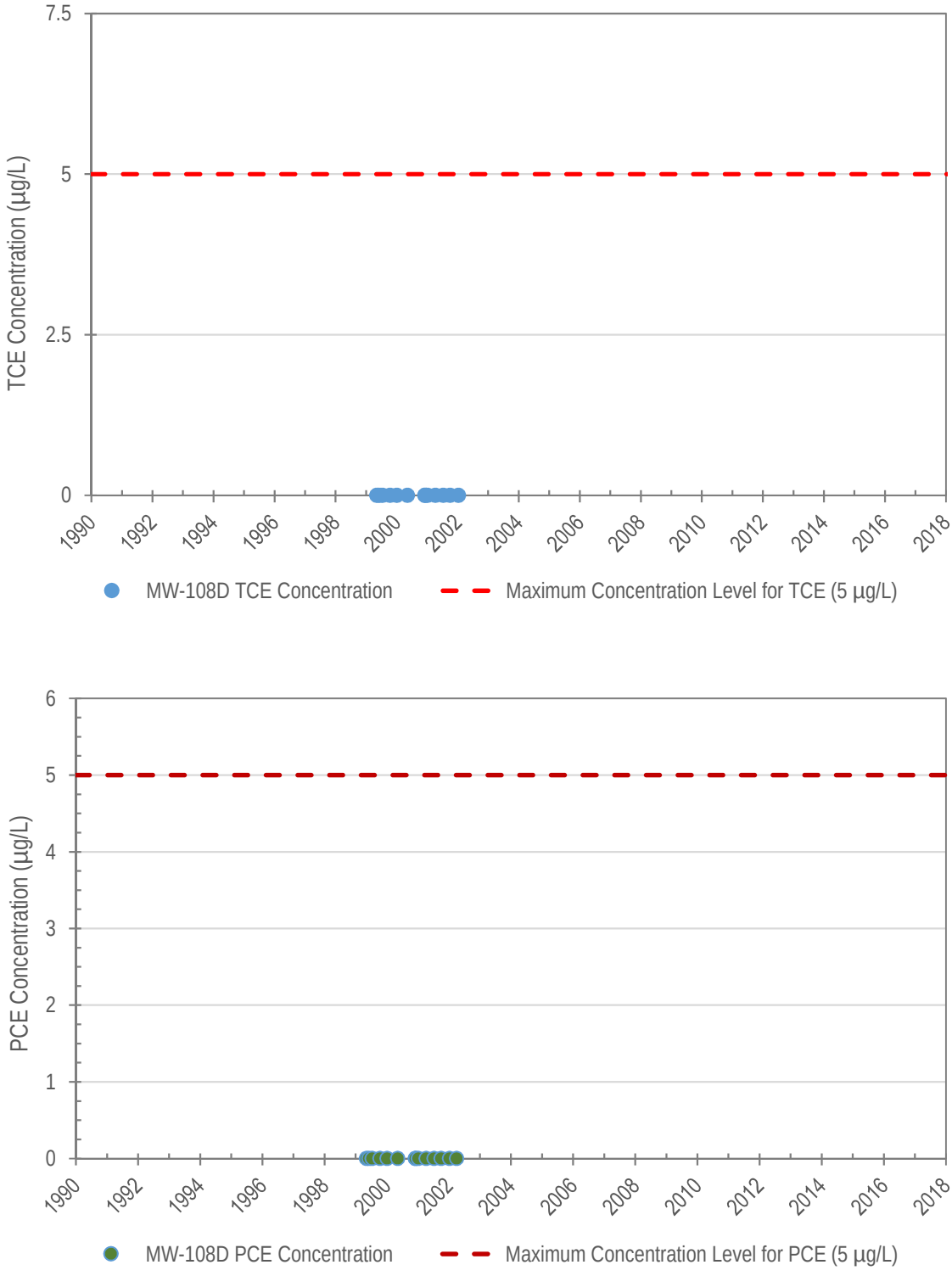


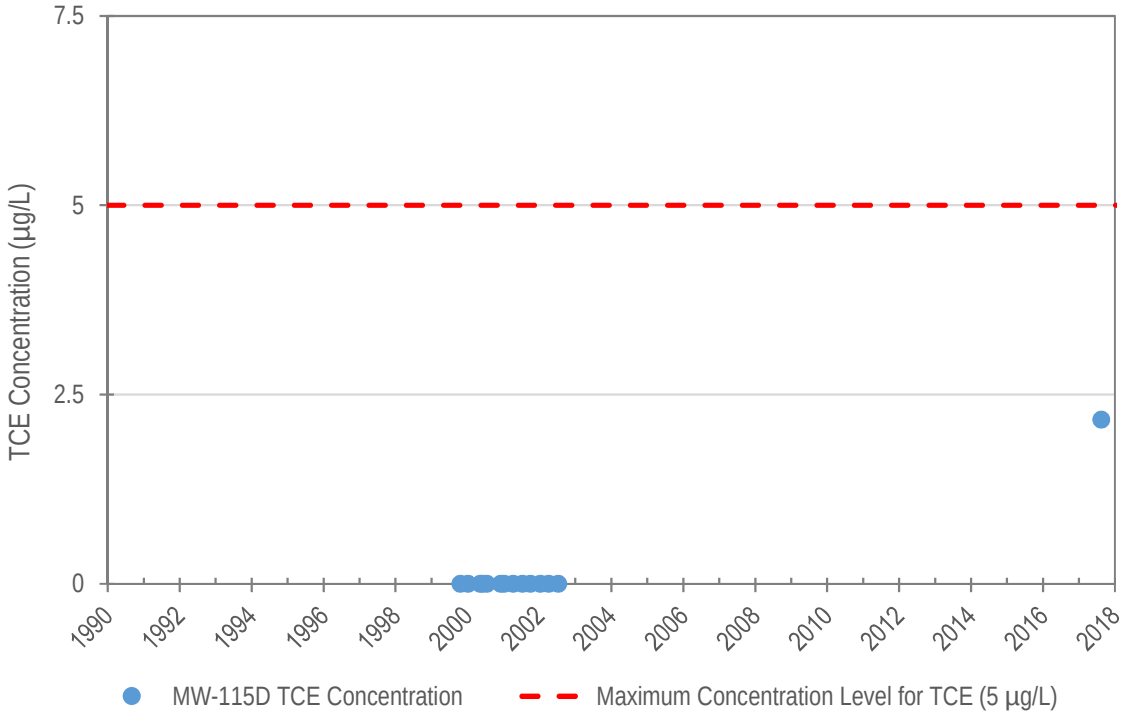
FIGURE E-8

HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-108D

FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT

BANNOCK COUNTY, IDAHO

MW-115D



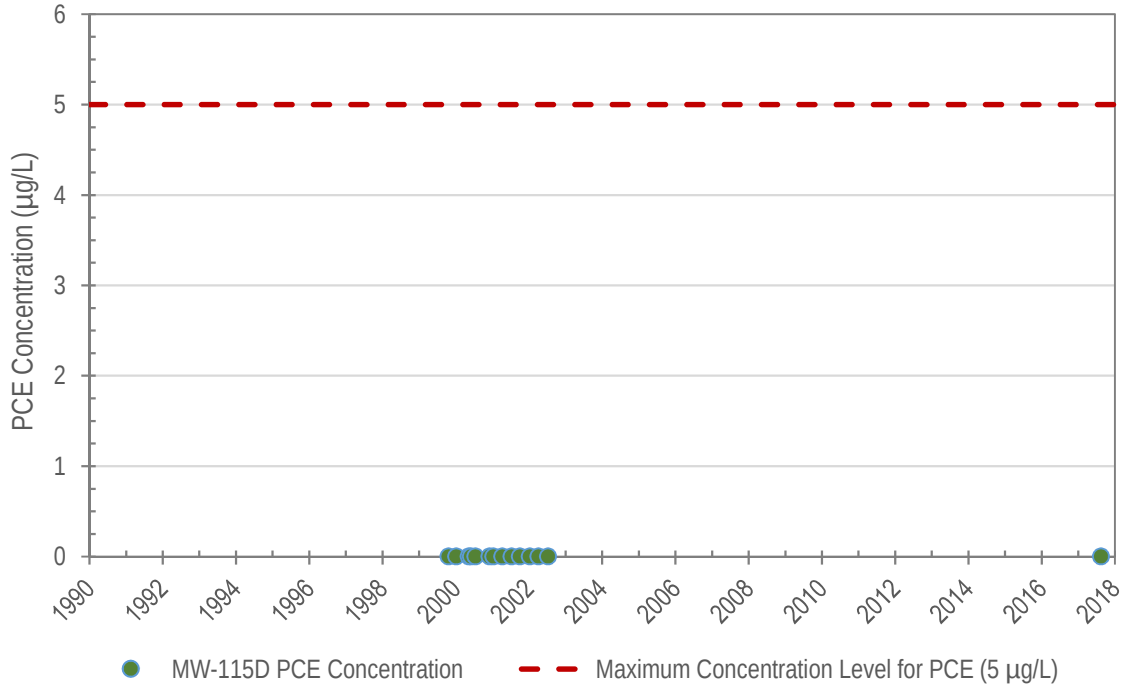
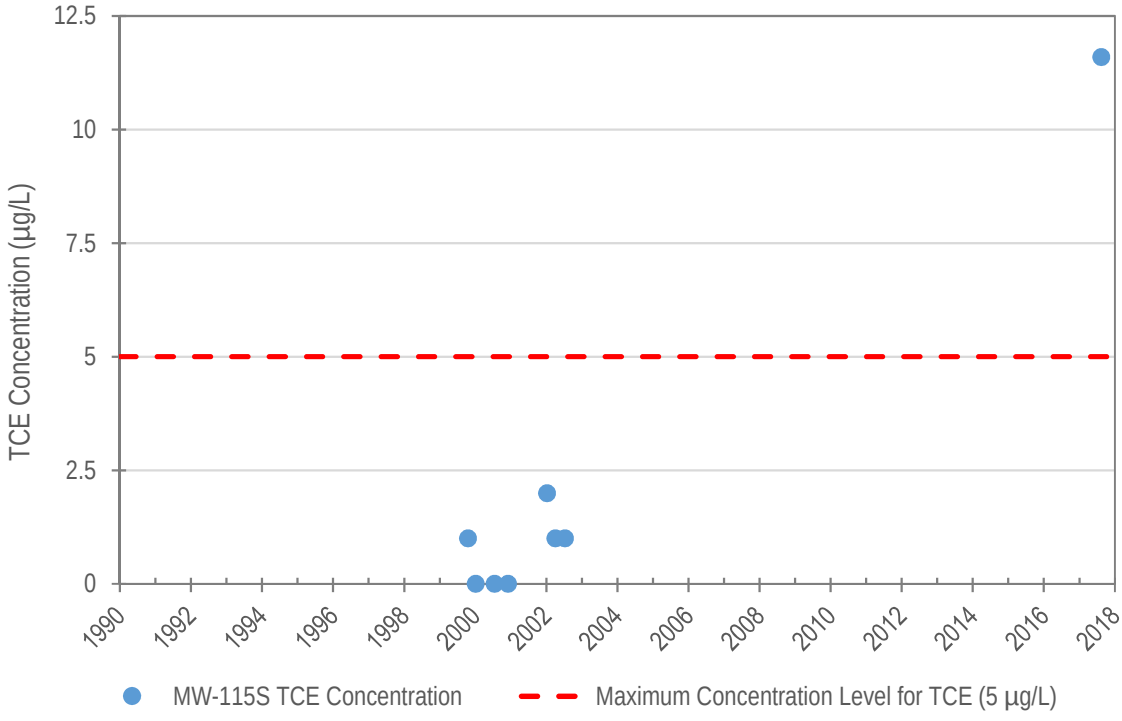


FIGURE E-9
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-115D
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-115S



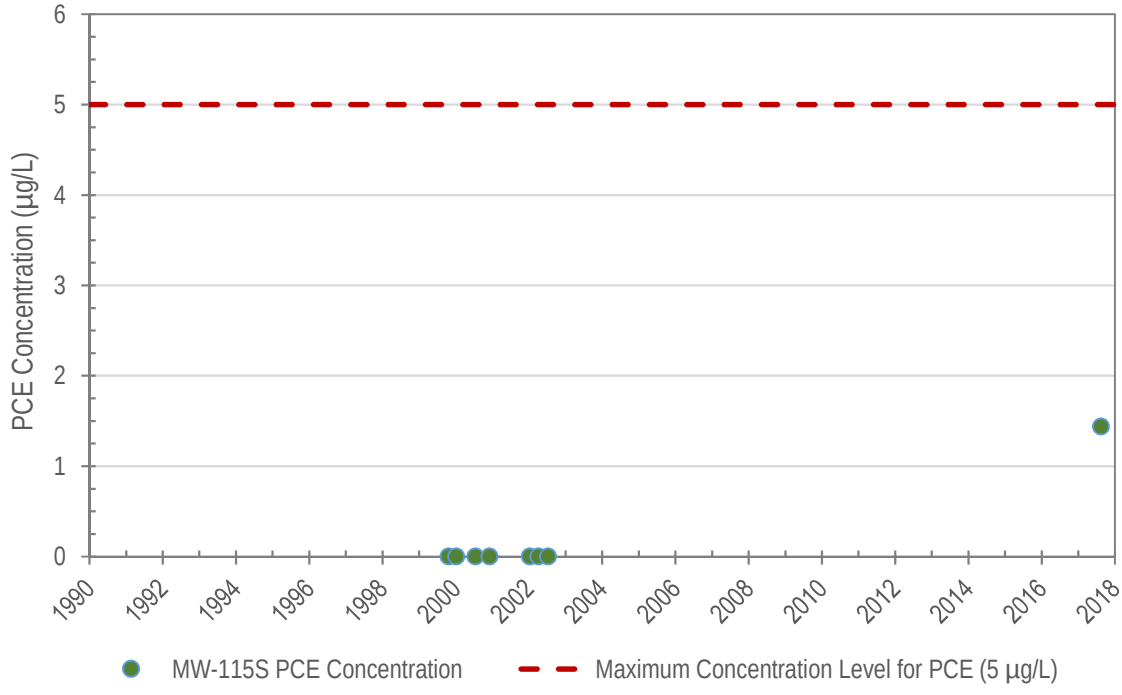
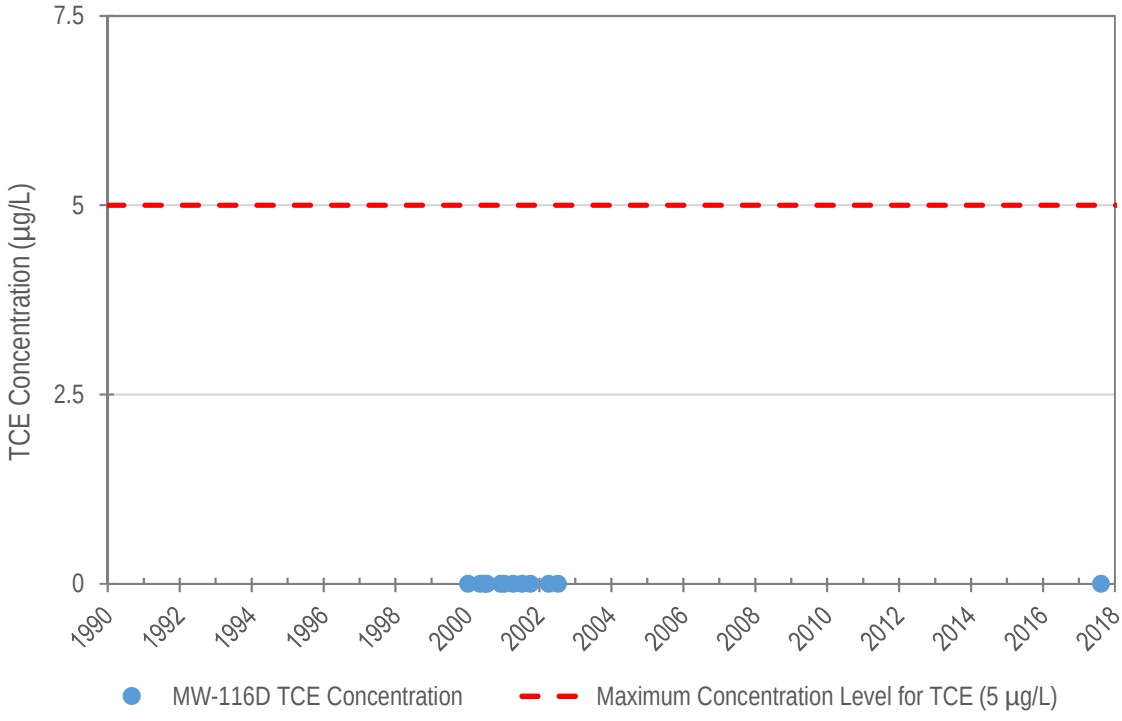


FIGURE E-10
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-115S
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-116D



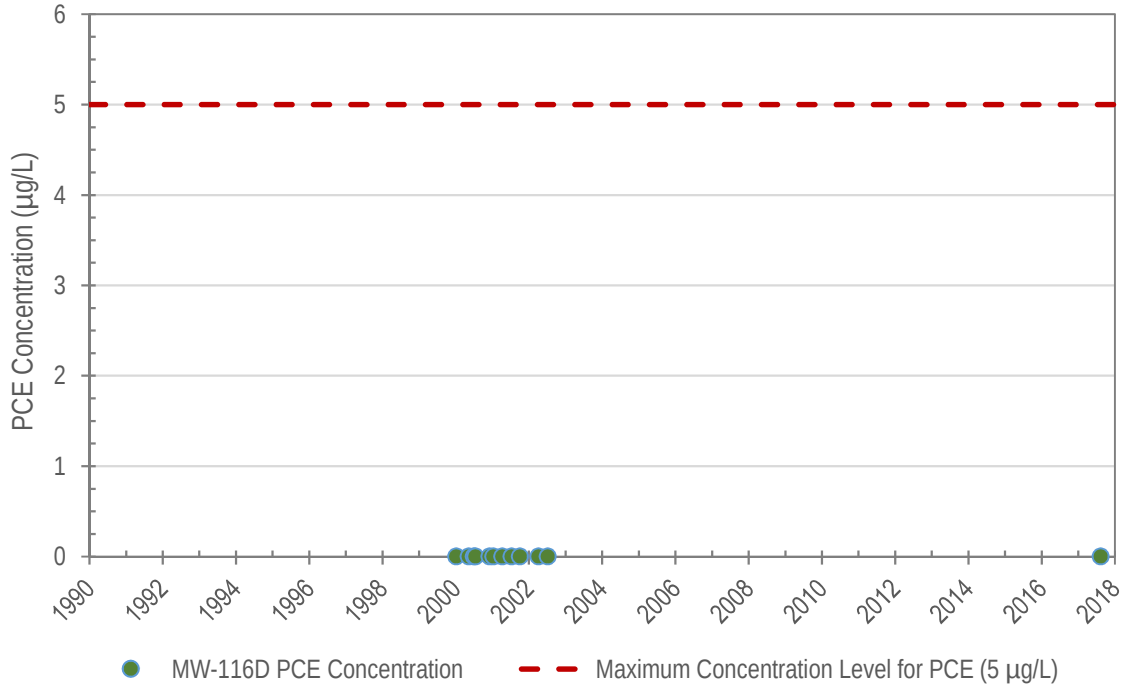
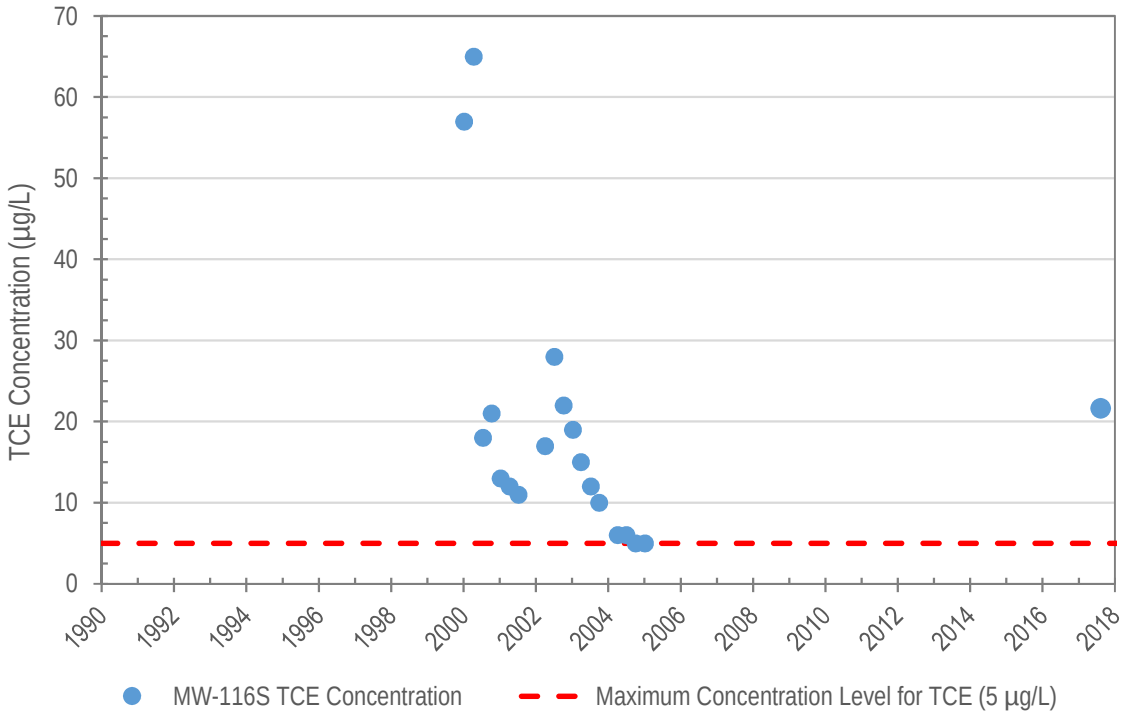


FIGURE E-11
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-116D
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-116S



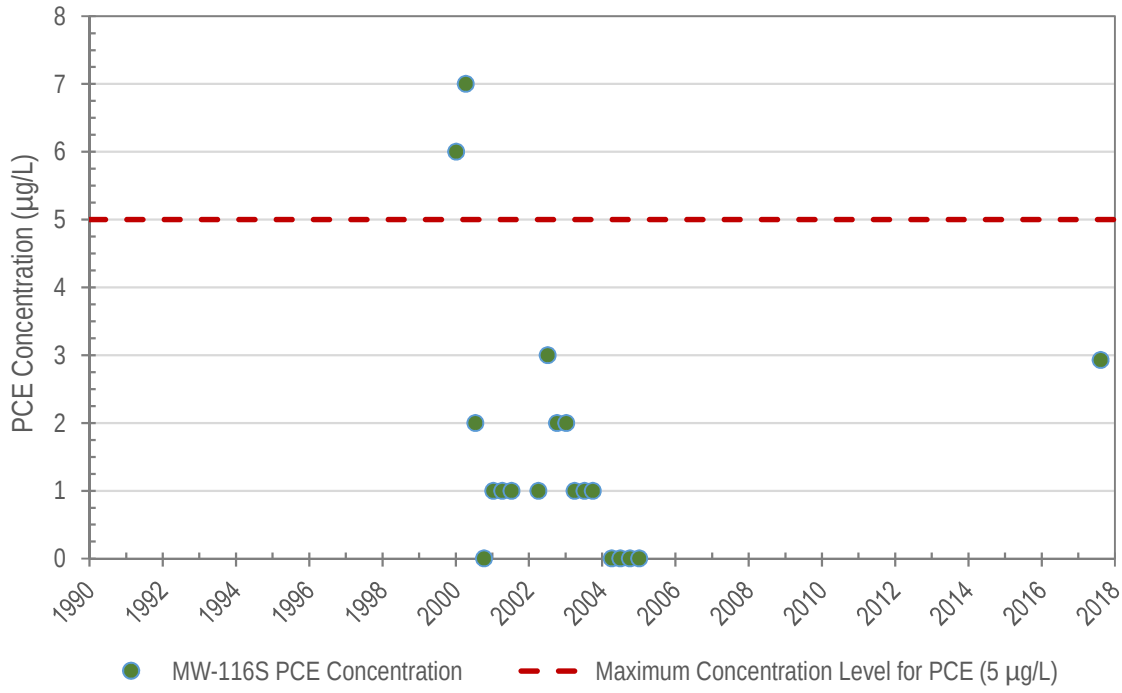


FIGURE E-12
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-116S
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

MW-117D

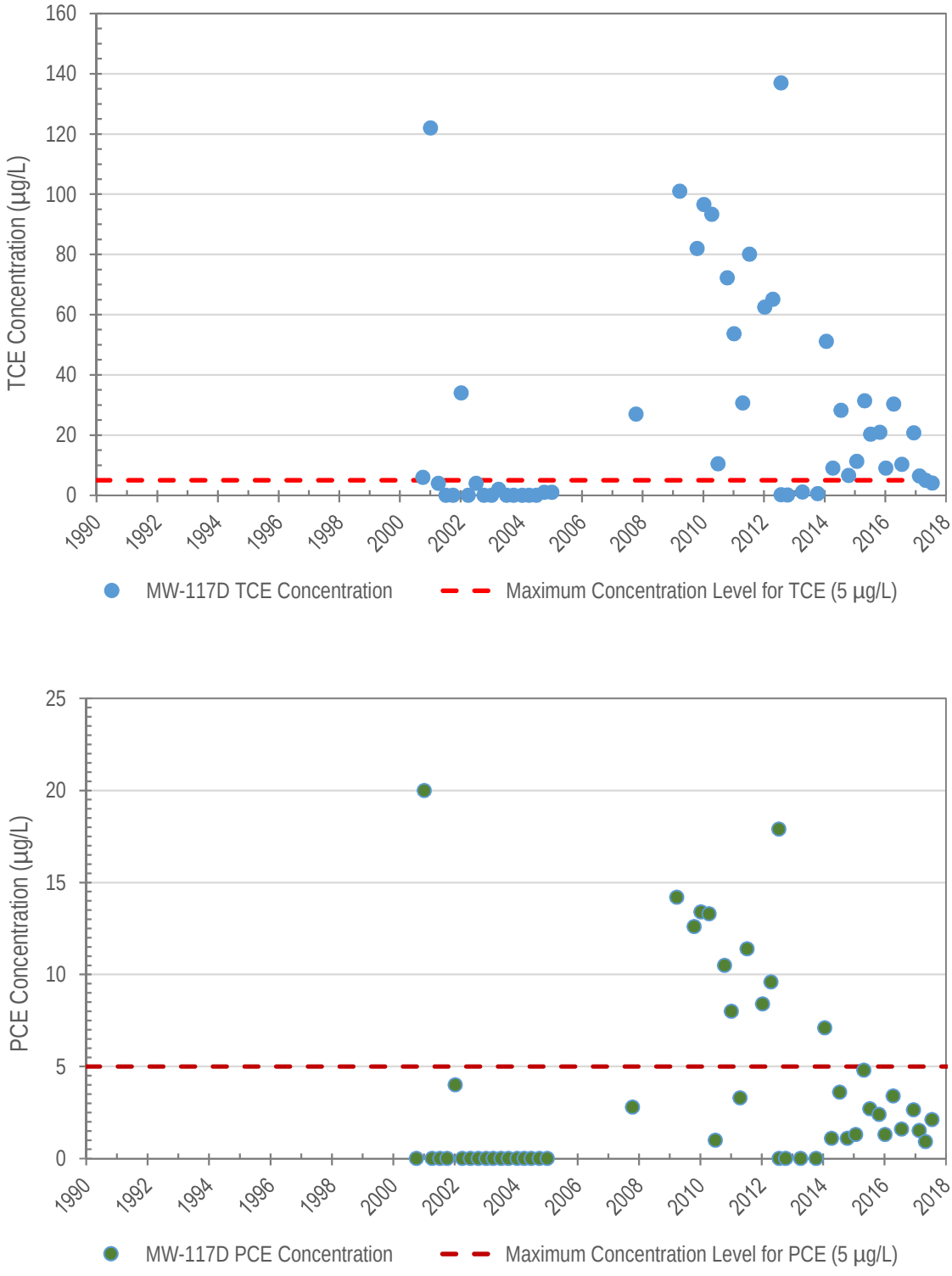


FIGURE E-13

HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-117D

FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT

BANNOCK COUNTY, IDAHO

MW-117S

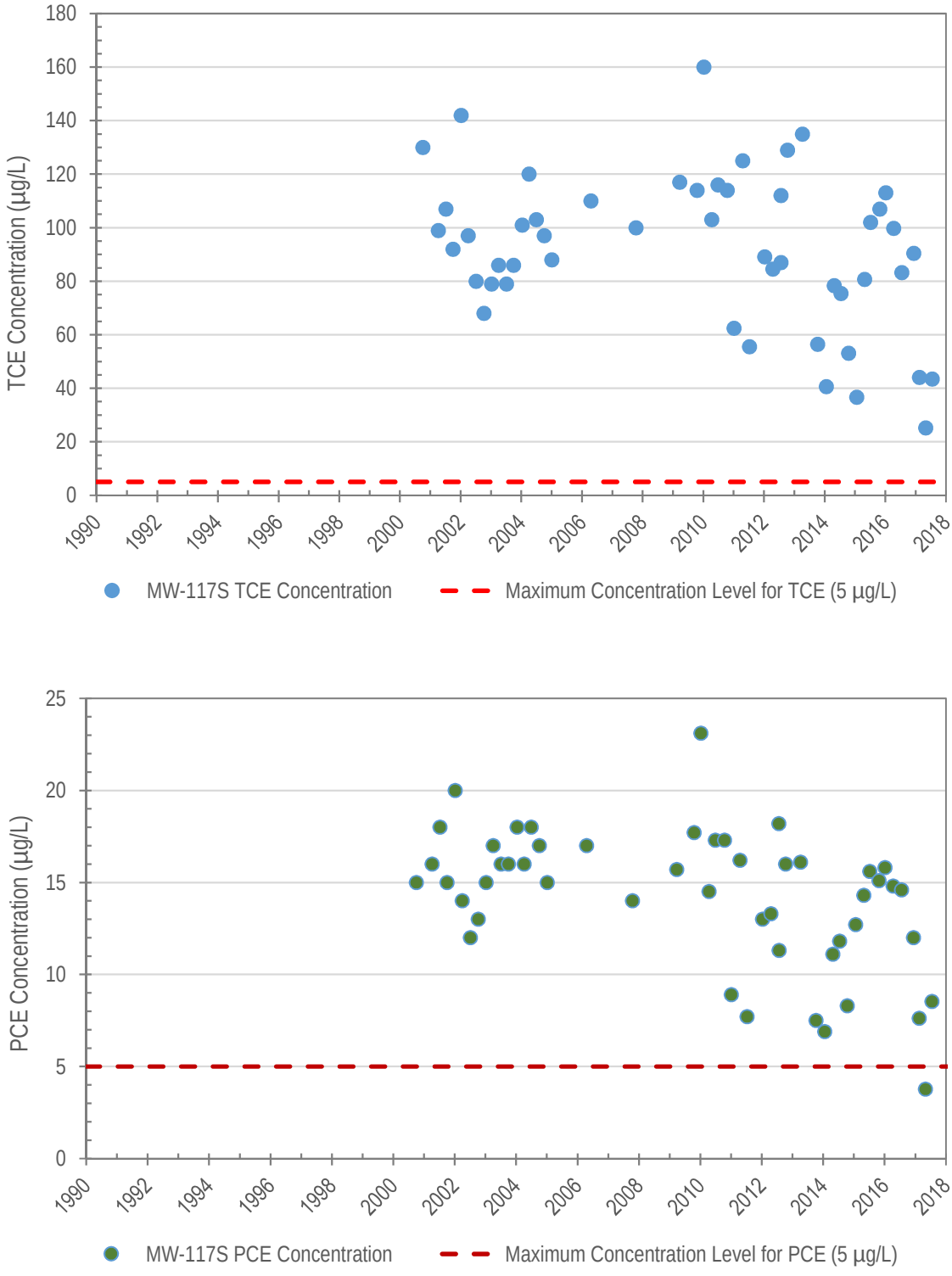


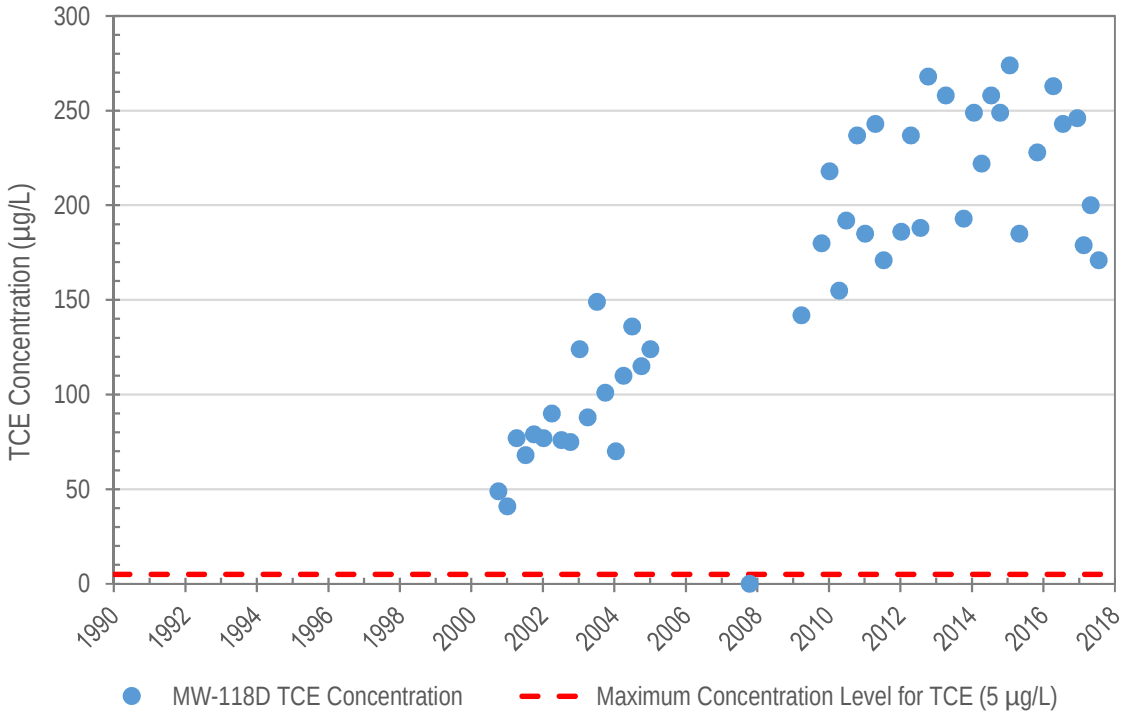
FIGURE E-14

HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-117S

FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT

BANNOCK COUNTY, IDAHO

MW-118D



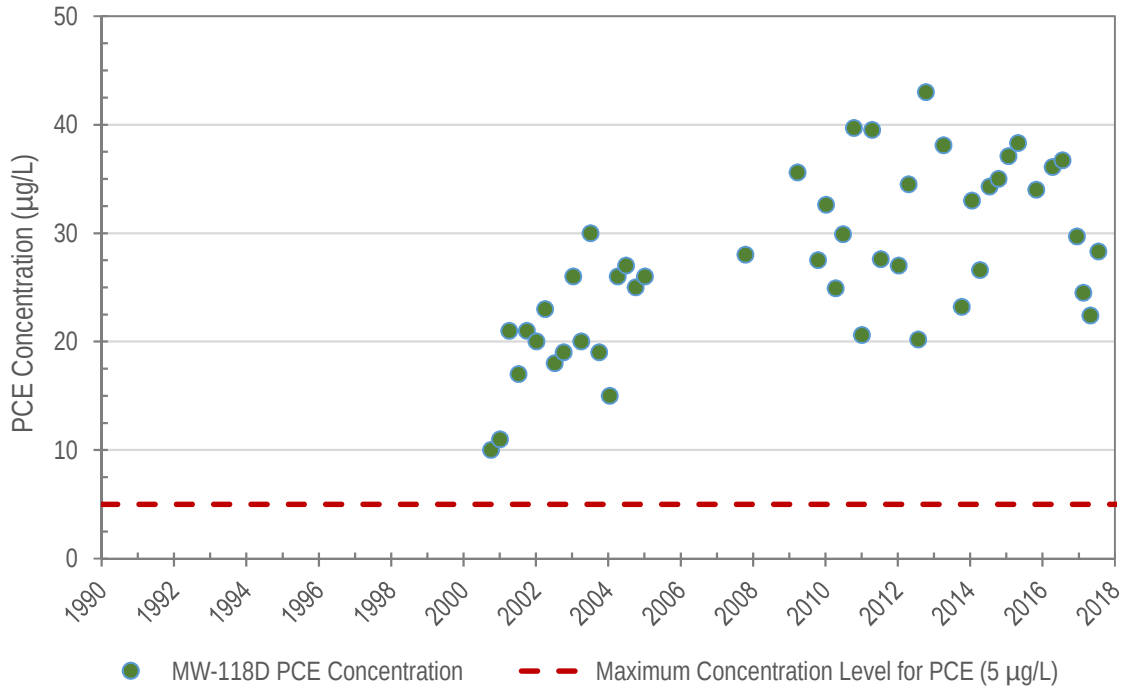


FIGURE E-15
HISTORICAL TCE AND PCE CONCENTRATIONS IN MW-118D
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2076F

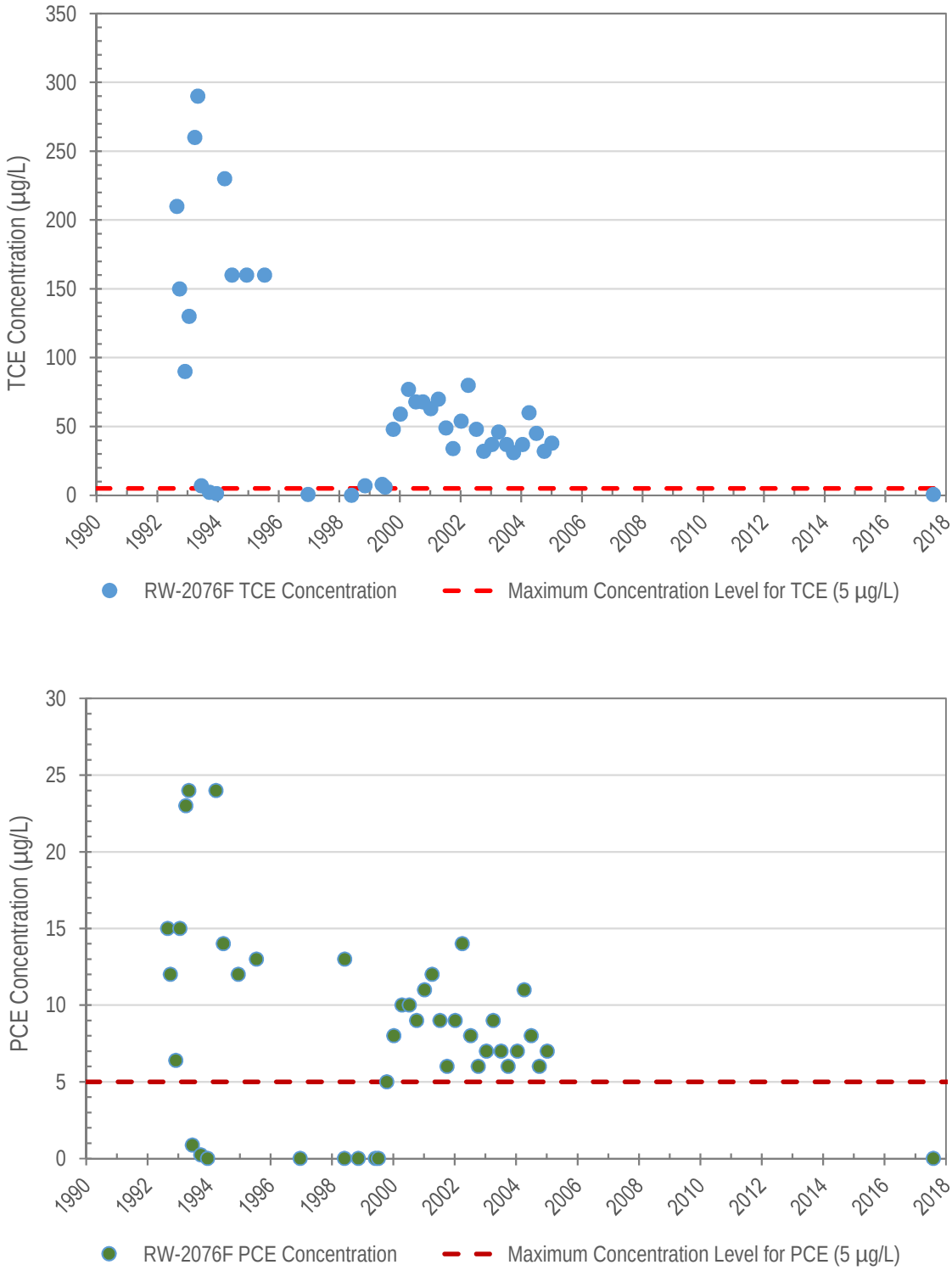
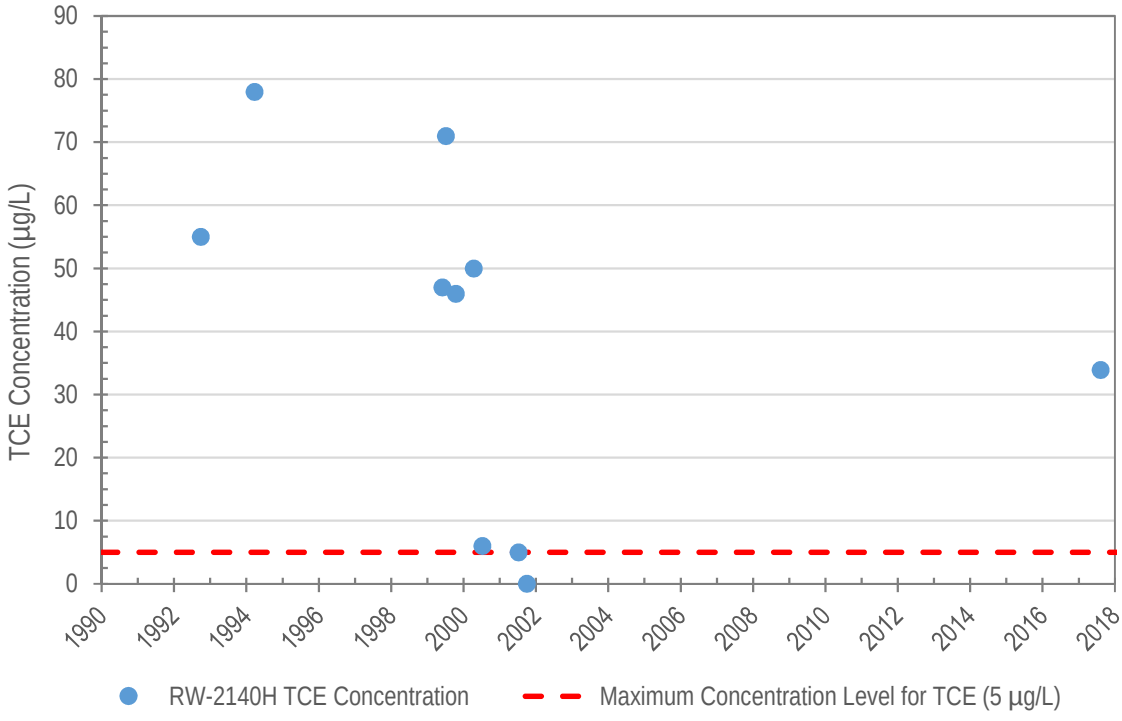


FIGURE E-16
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2076F
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2140H



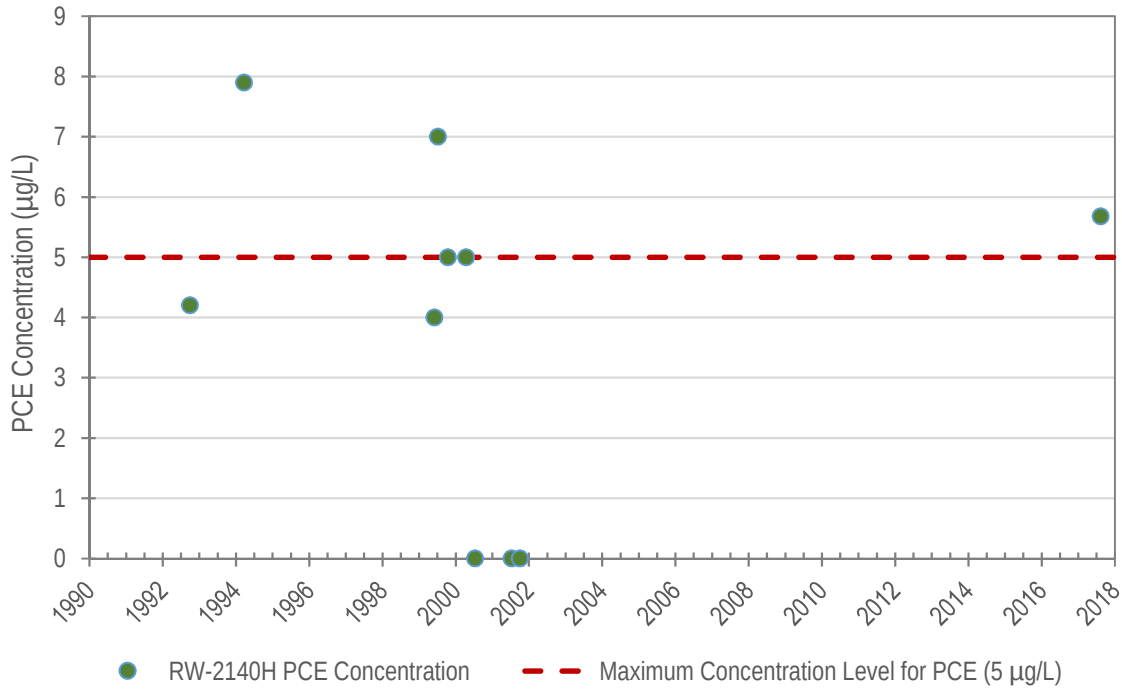


FIGURE E-17
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2140H
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2151H

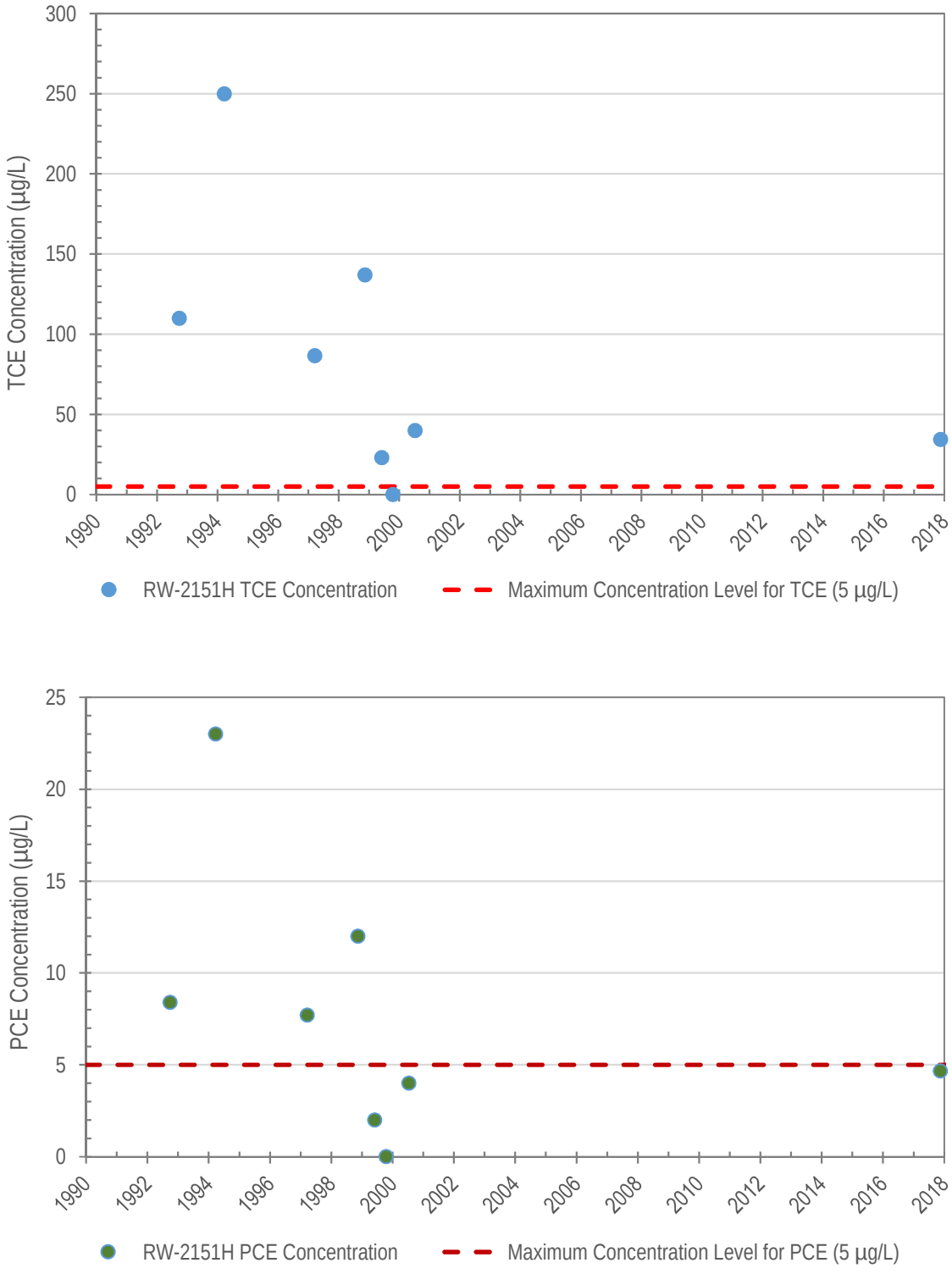
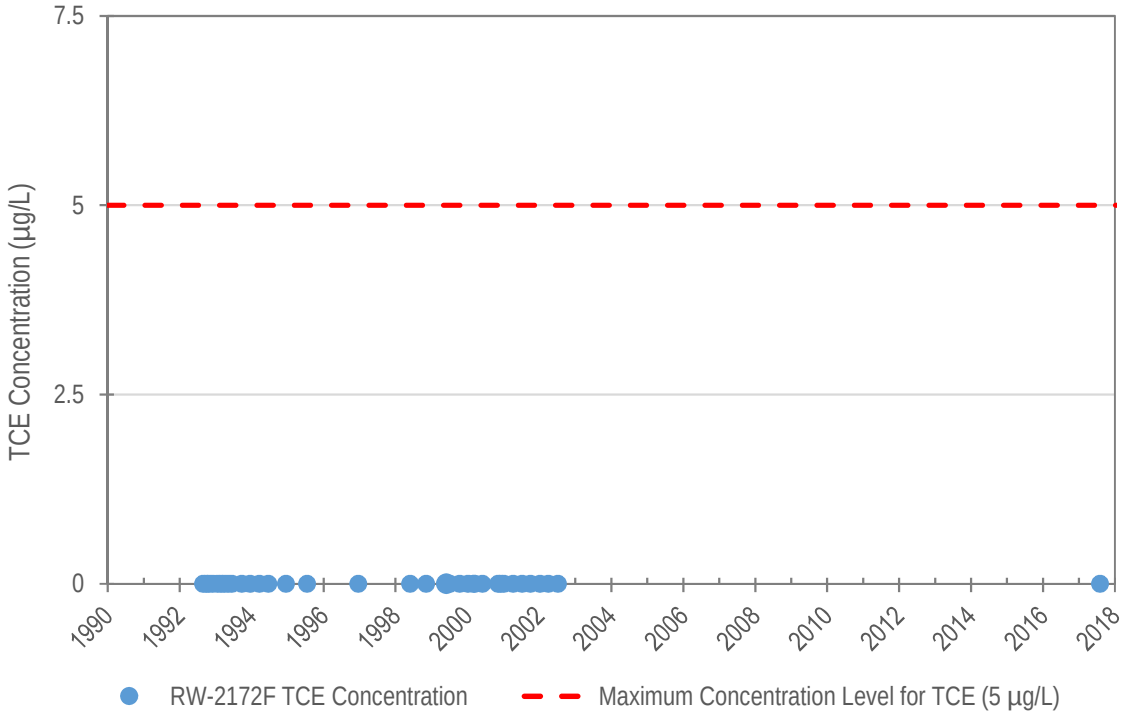


FIGURE E-18
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2151H
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2172F



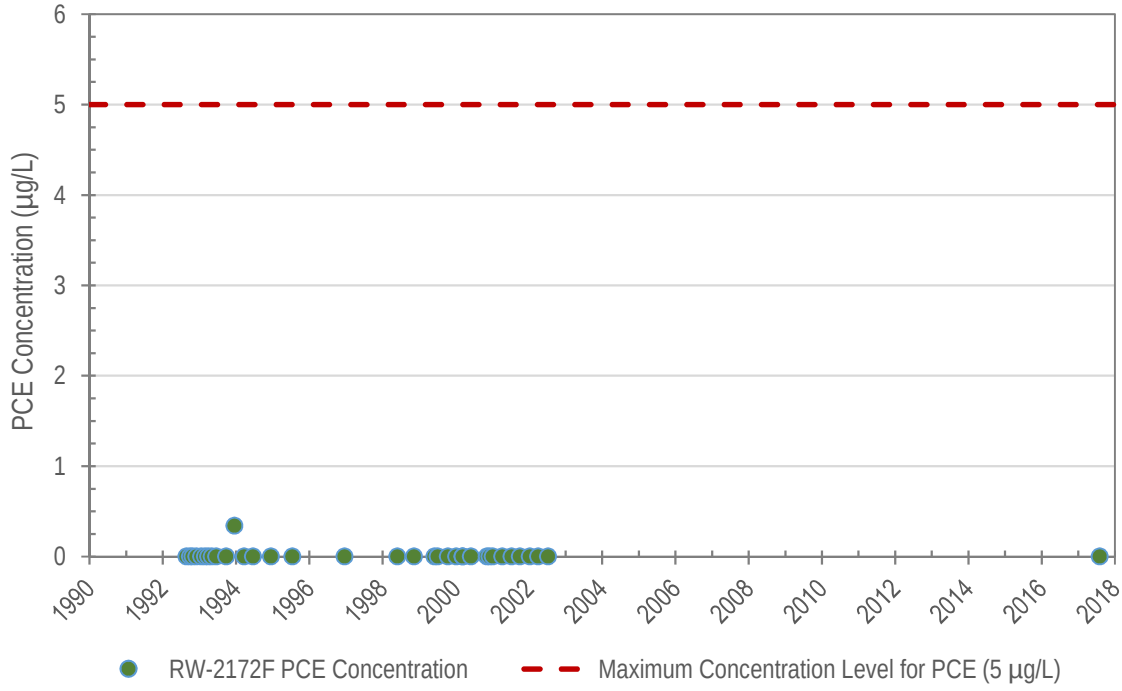
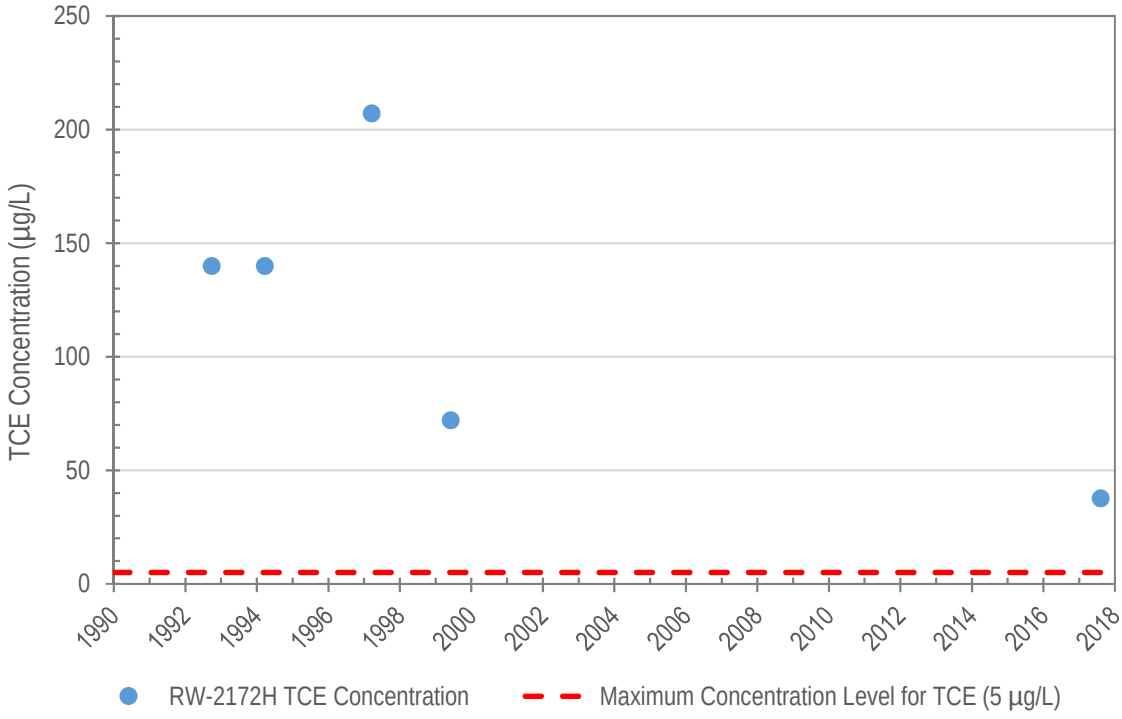


FIGURE E-19
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2172F
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2172H



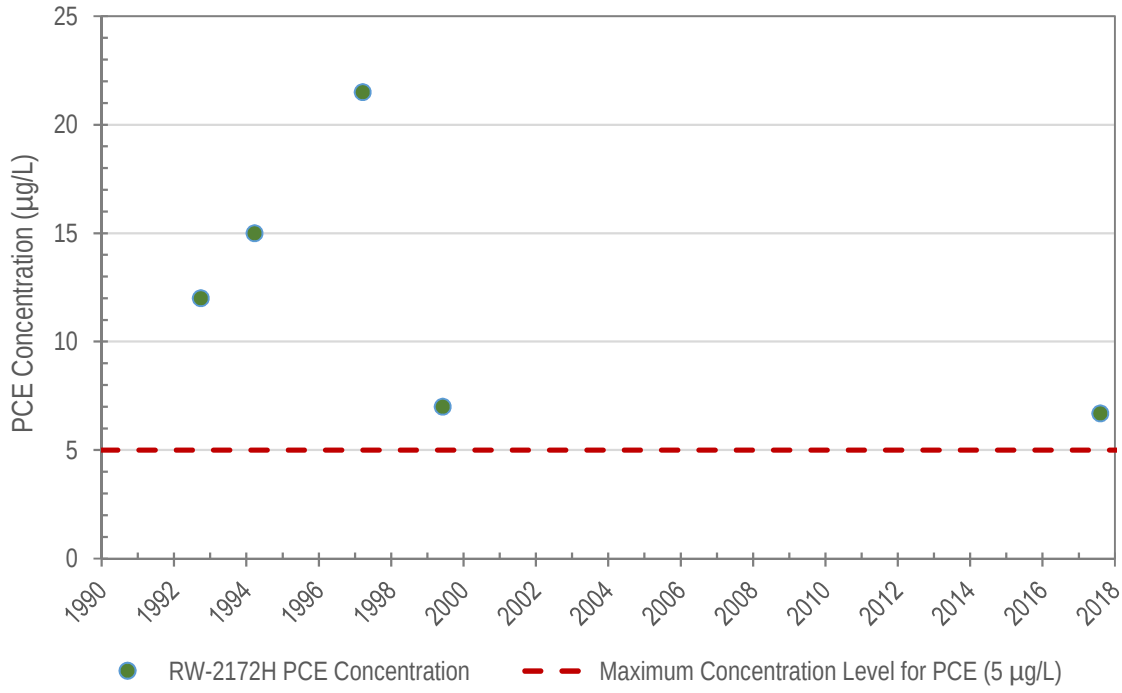
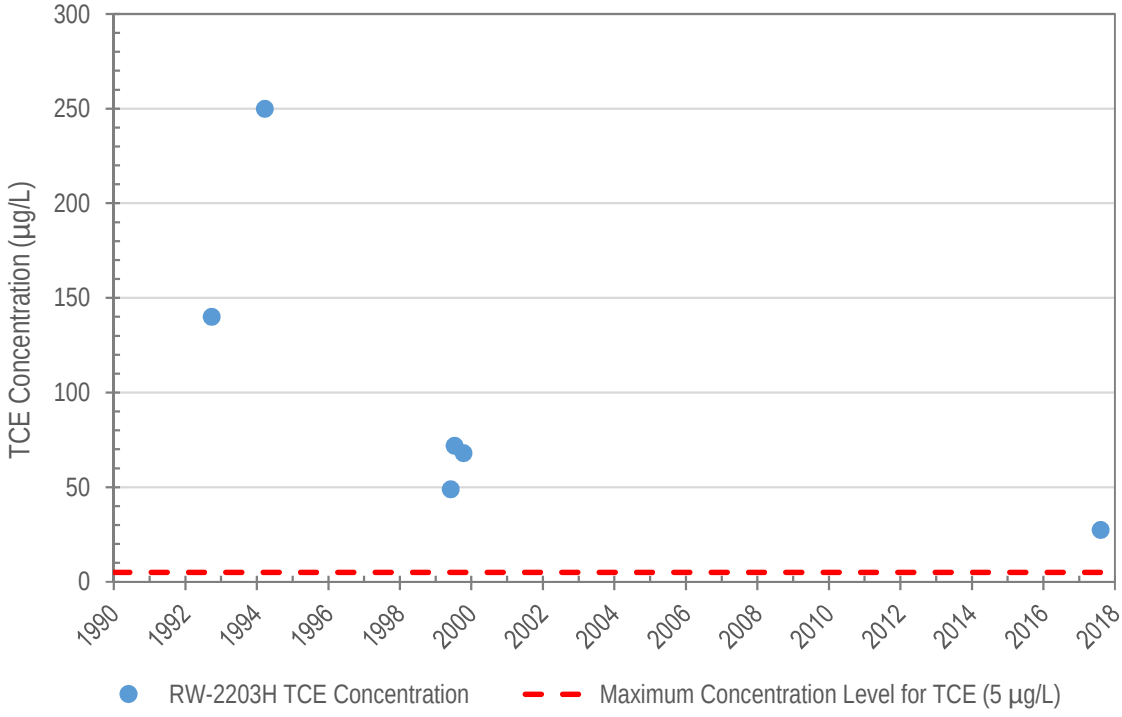


FIGURE E-20
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2172H
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2203H



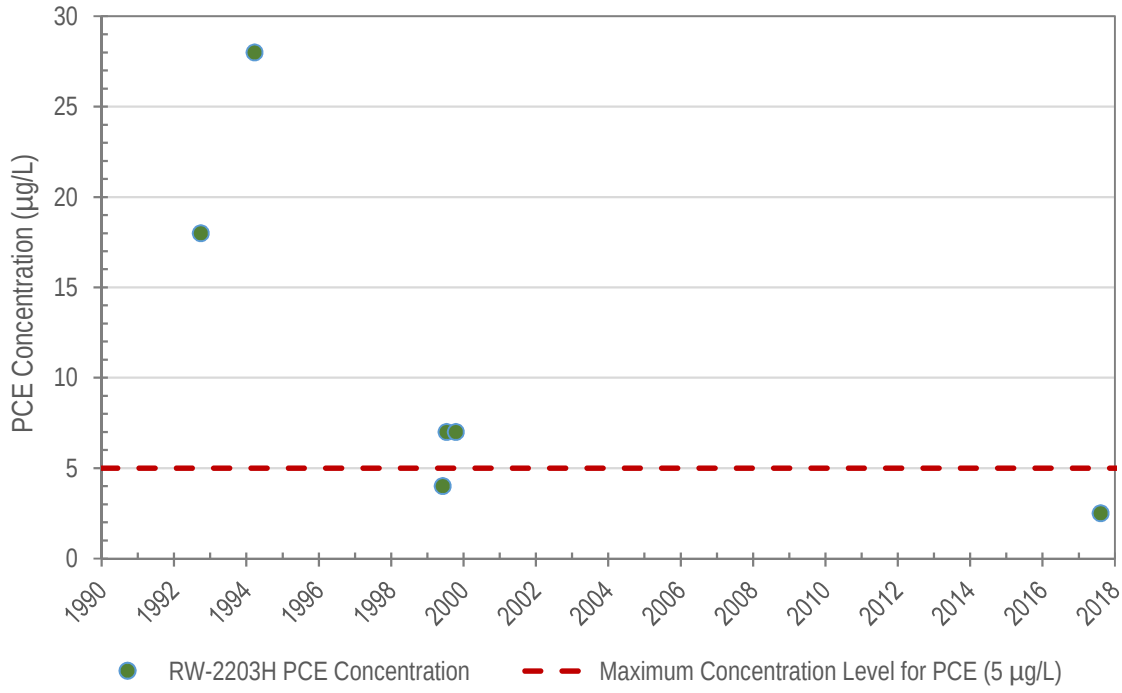
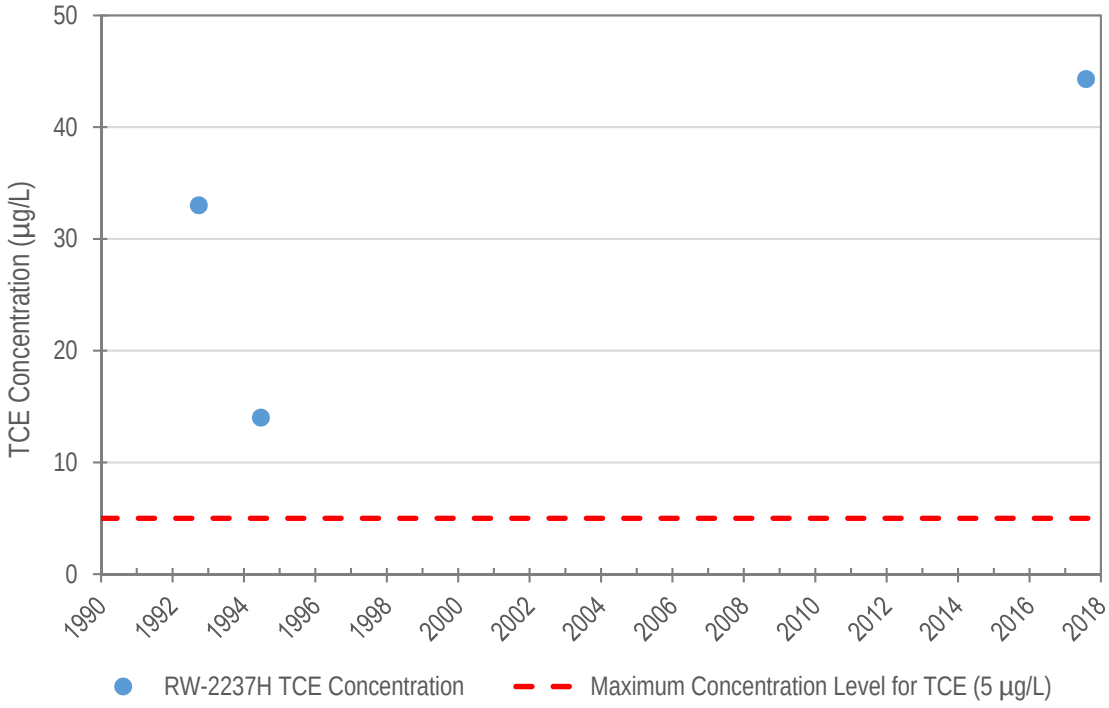


FIGURE E-21
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2203H
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2237H



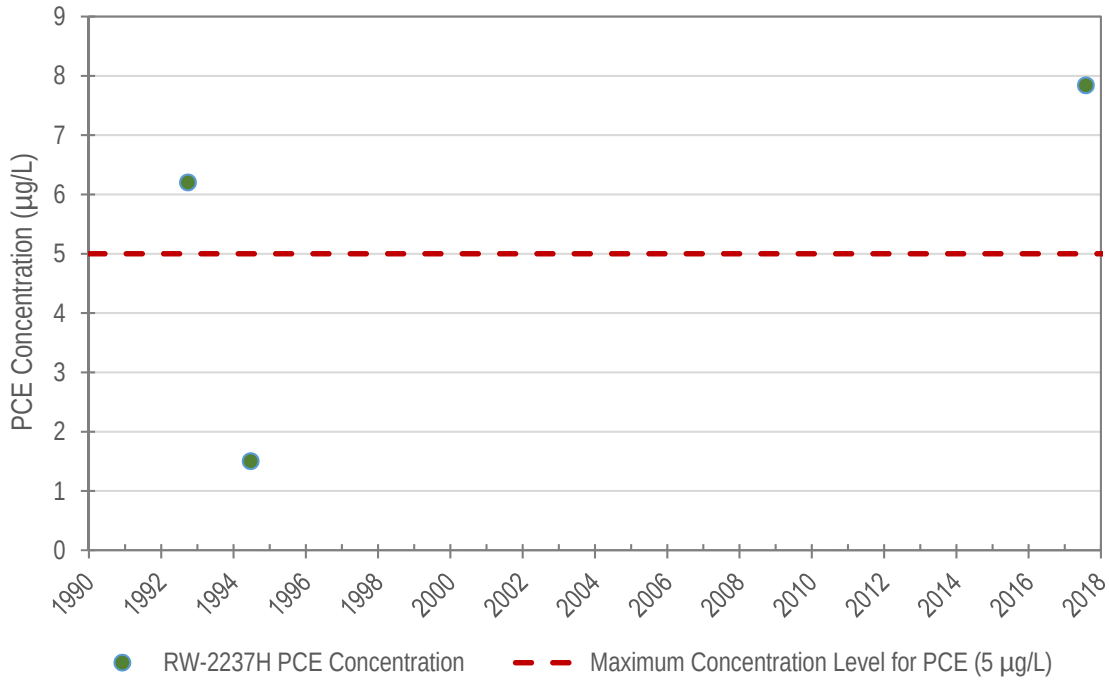
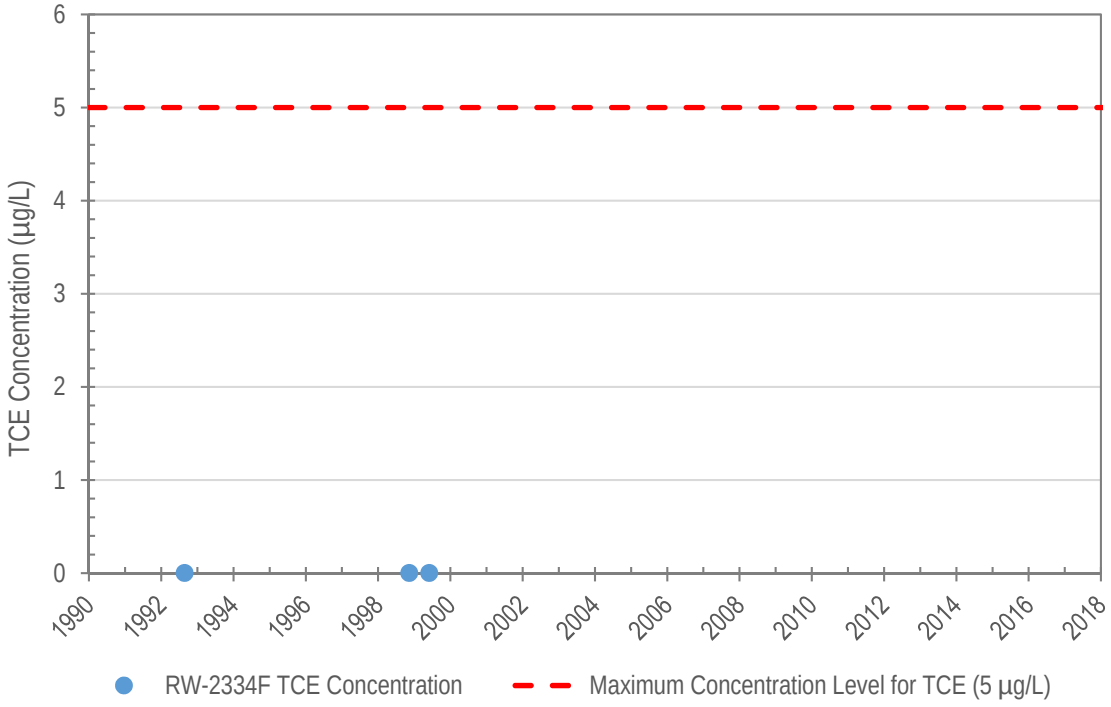


FIGURE E-22
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2237H
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-2334F



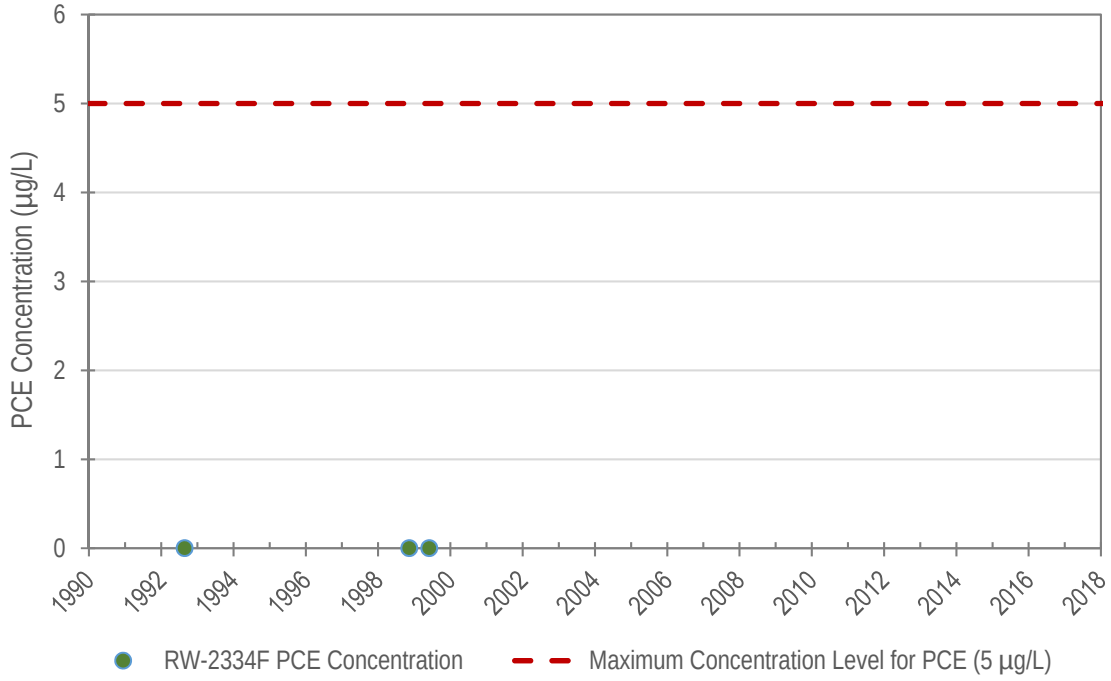
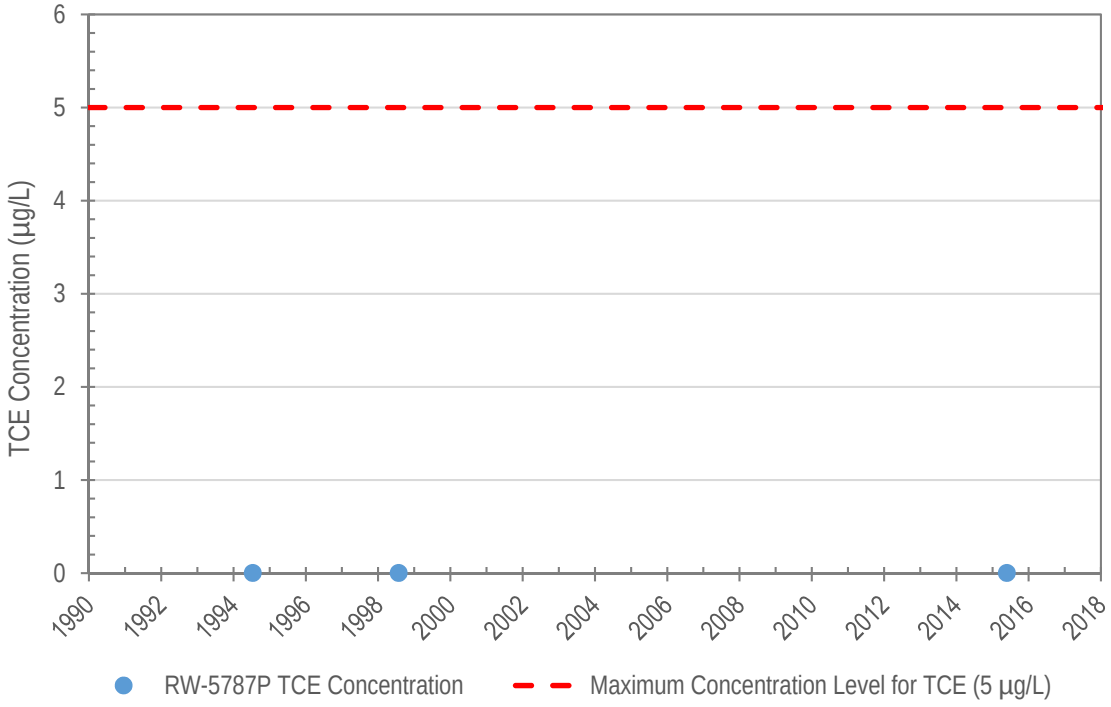


FIGURE E-23
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-2334F
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-5787P



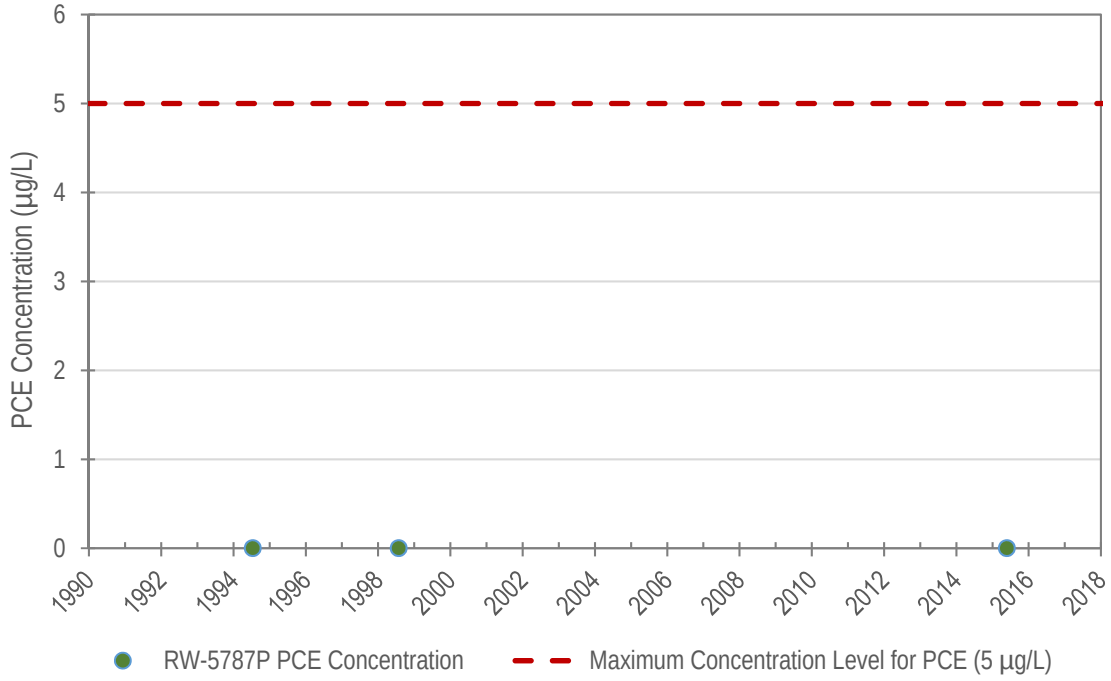
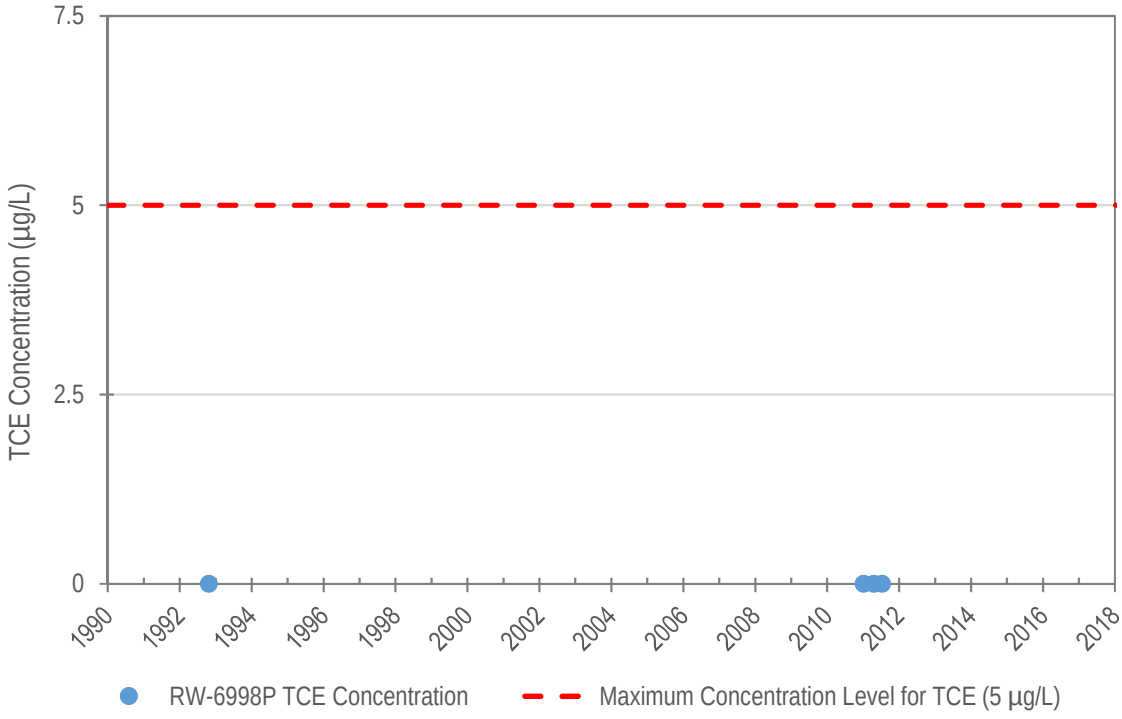


FIGURE E-24
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-5787P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-6998P



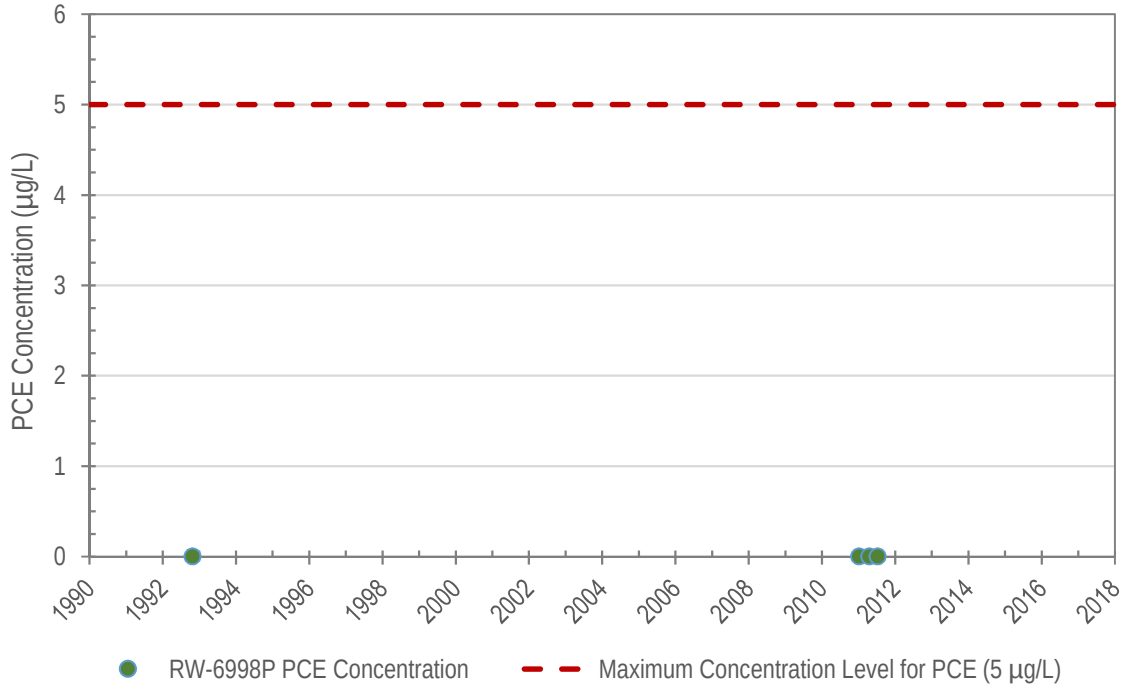


FIGURE E-25
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-6998P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7077P

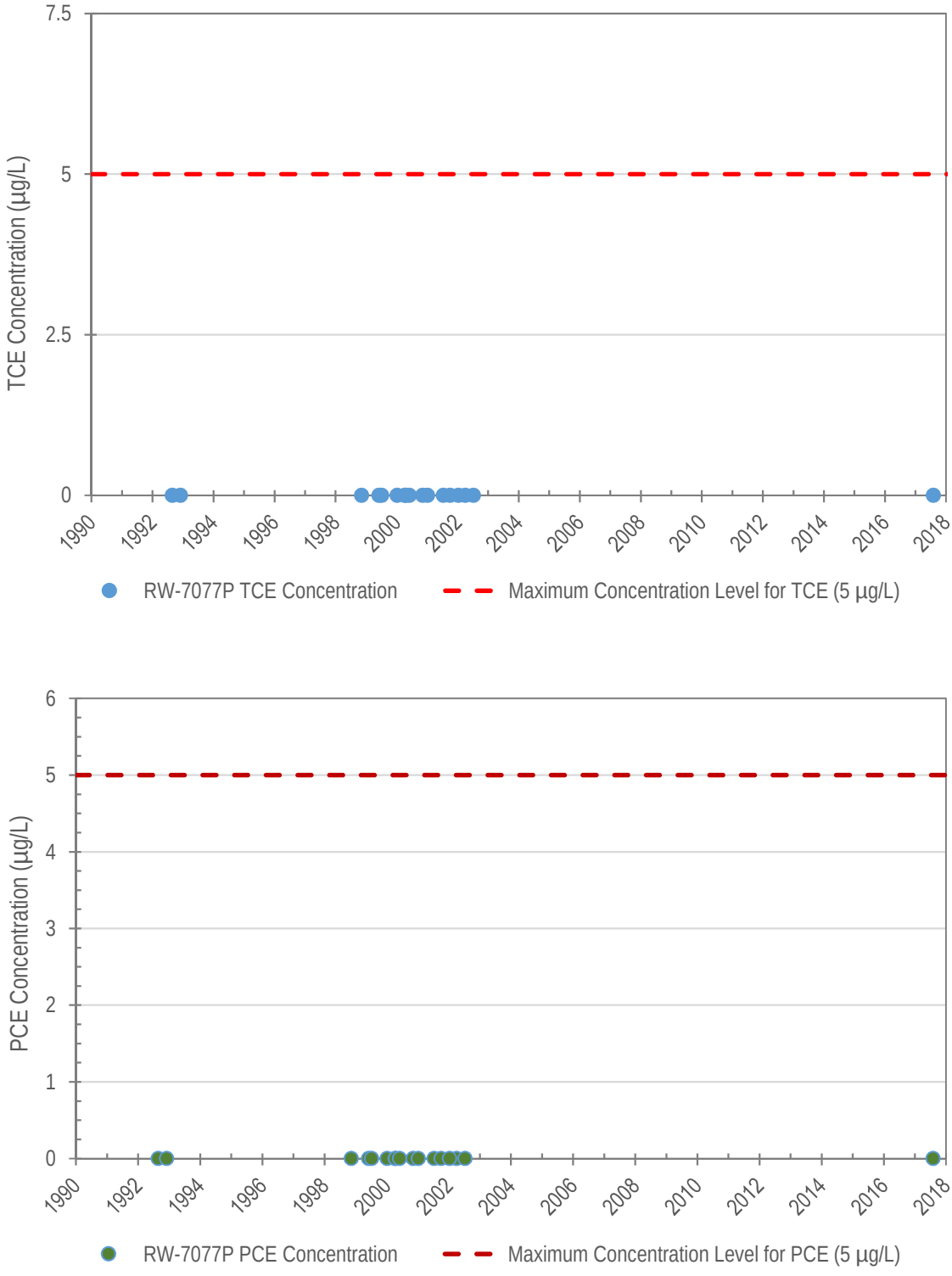
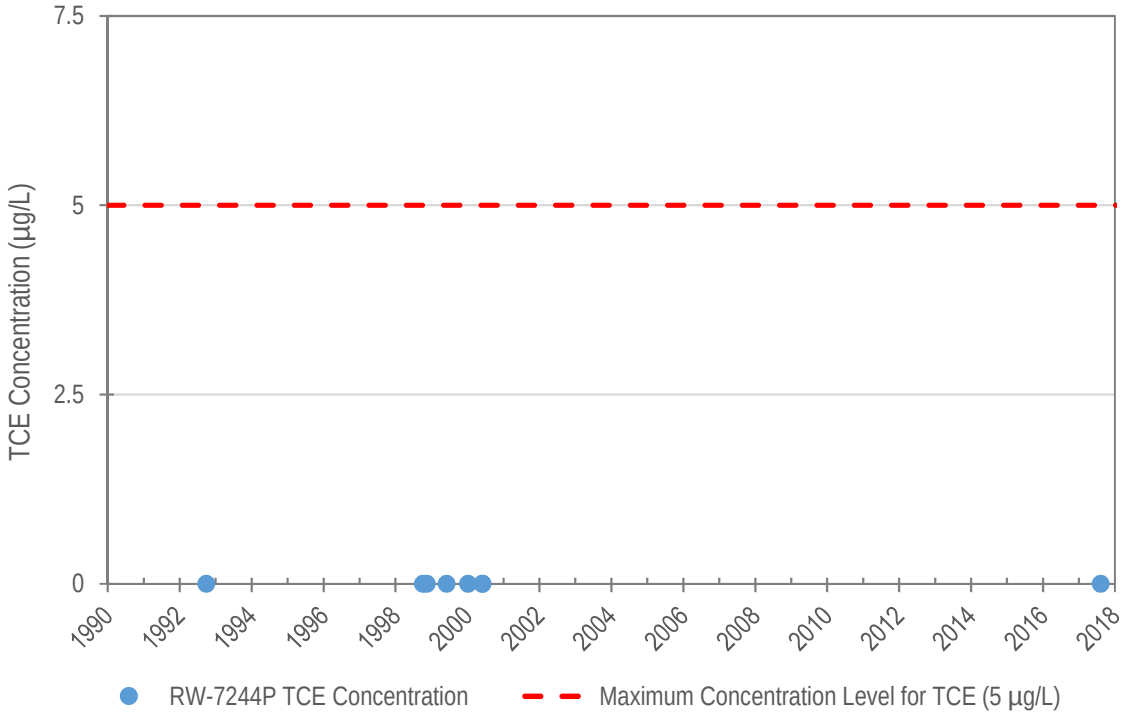


FIGURE E-26
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7077P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7244P



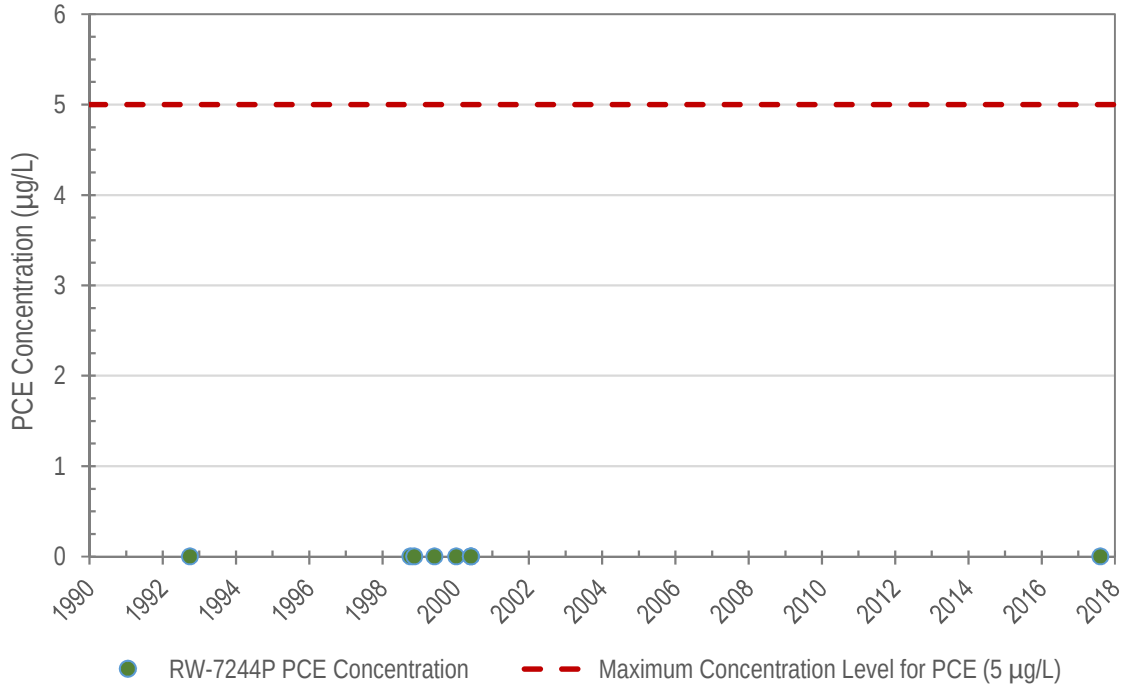
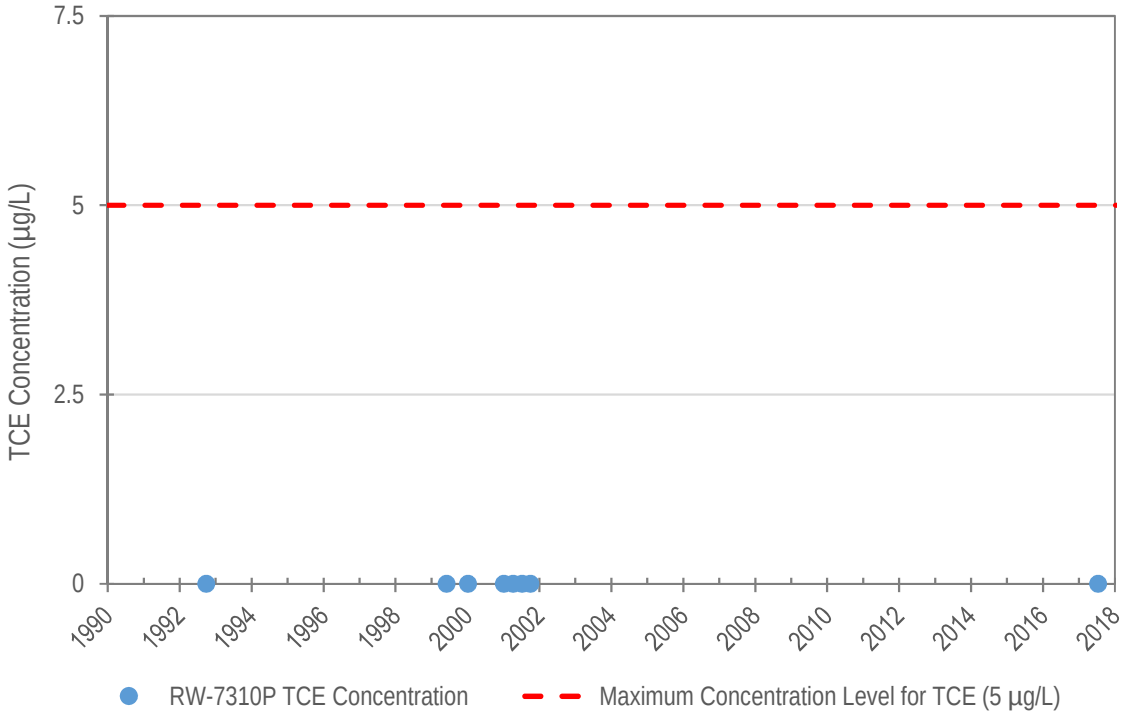


FIGURE E-27
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7244P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7310P



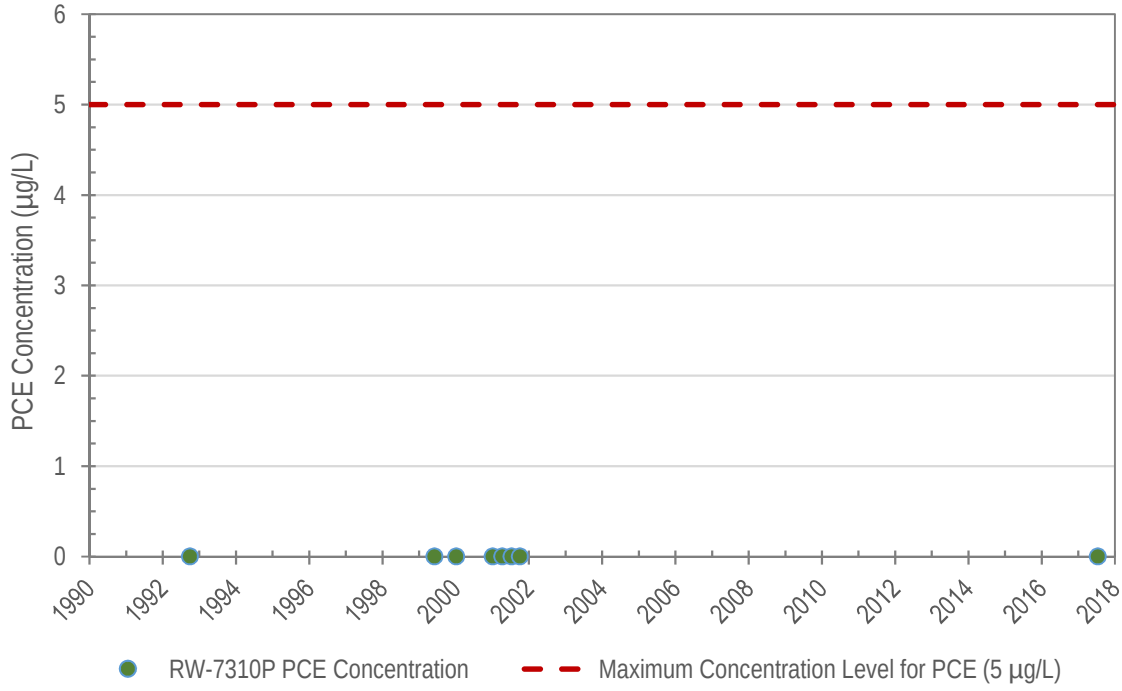
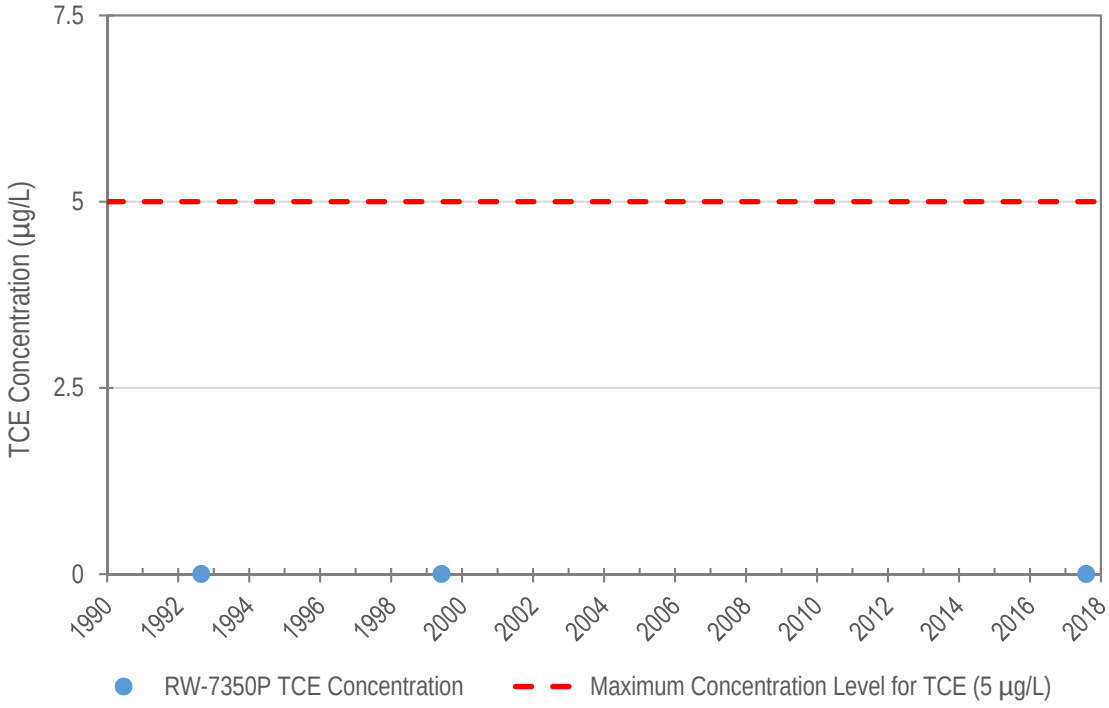


FIGURE E-28
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7310P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7350P



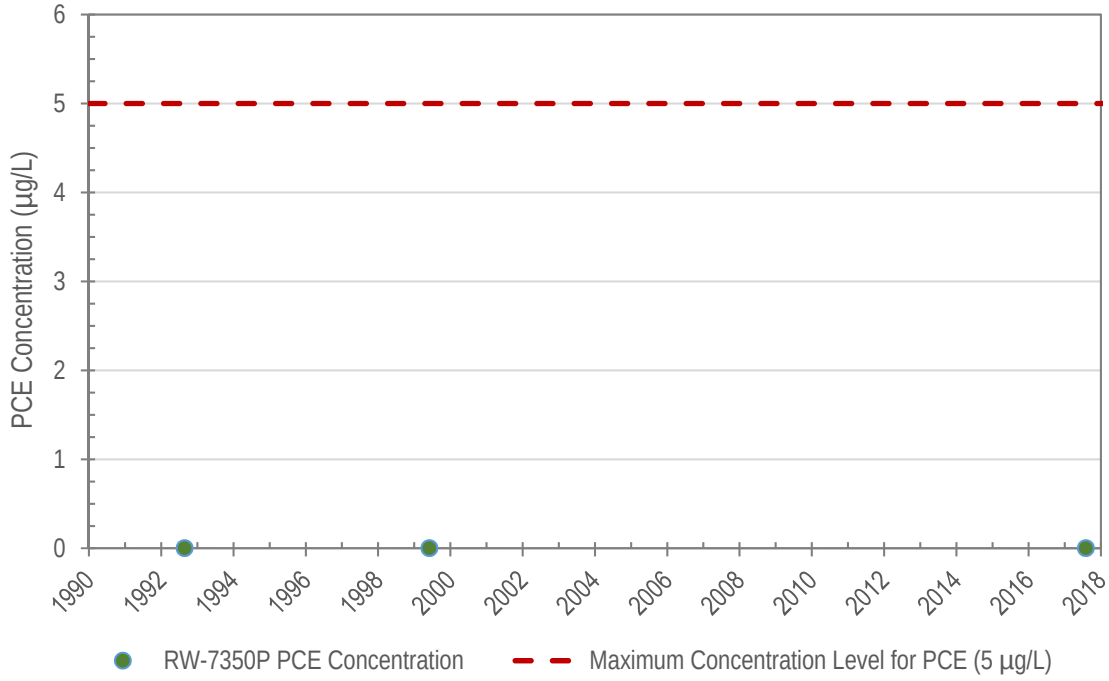


FIGURE E-29
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7350P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7412P

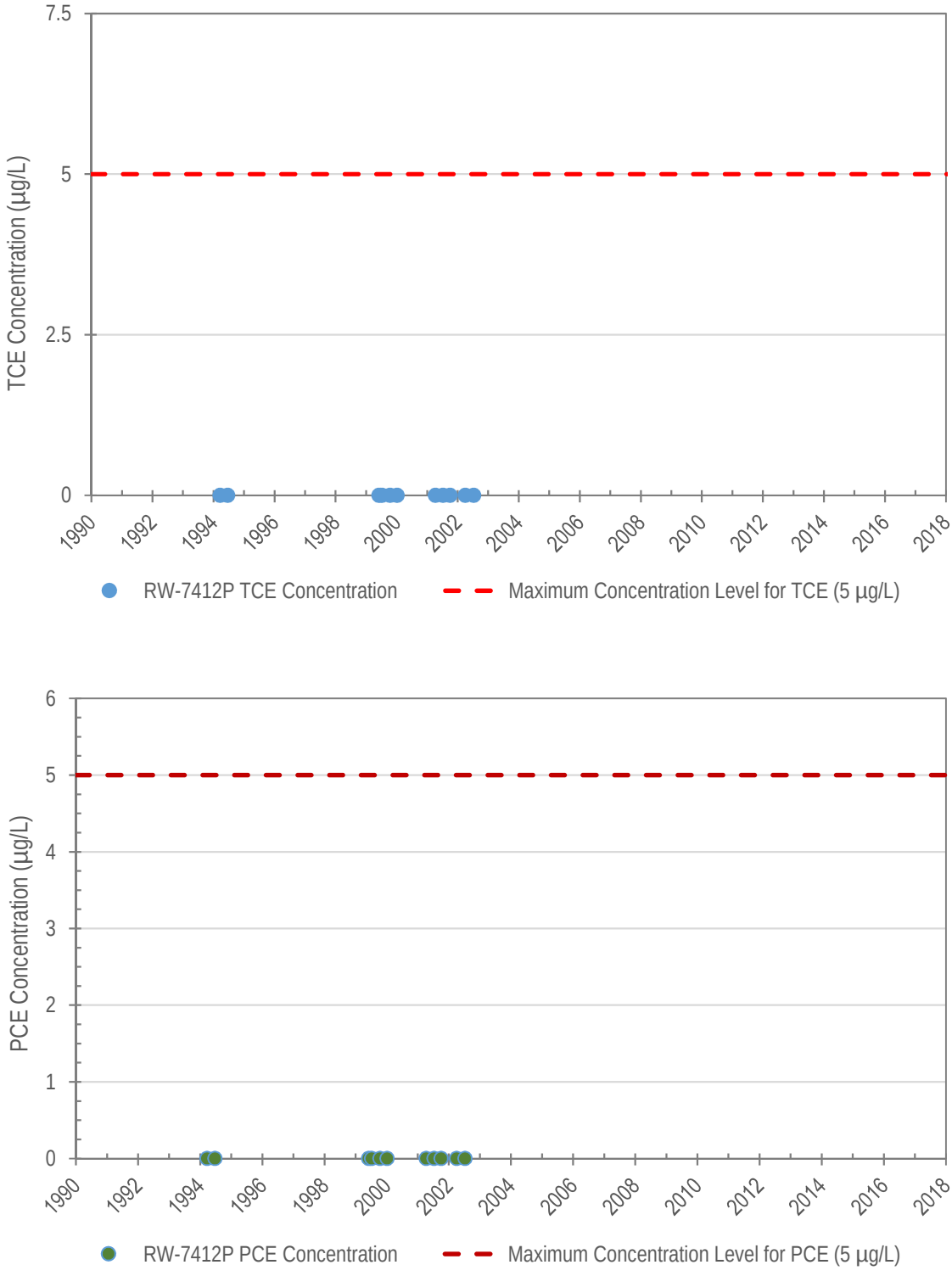
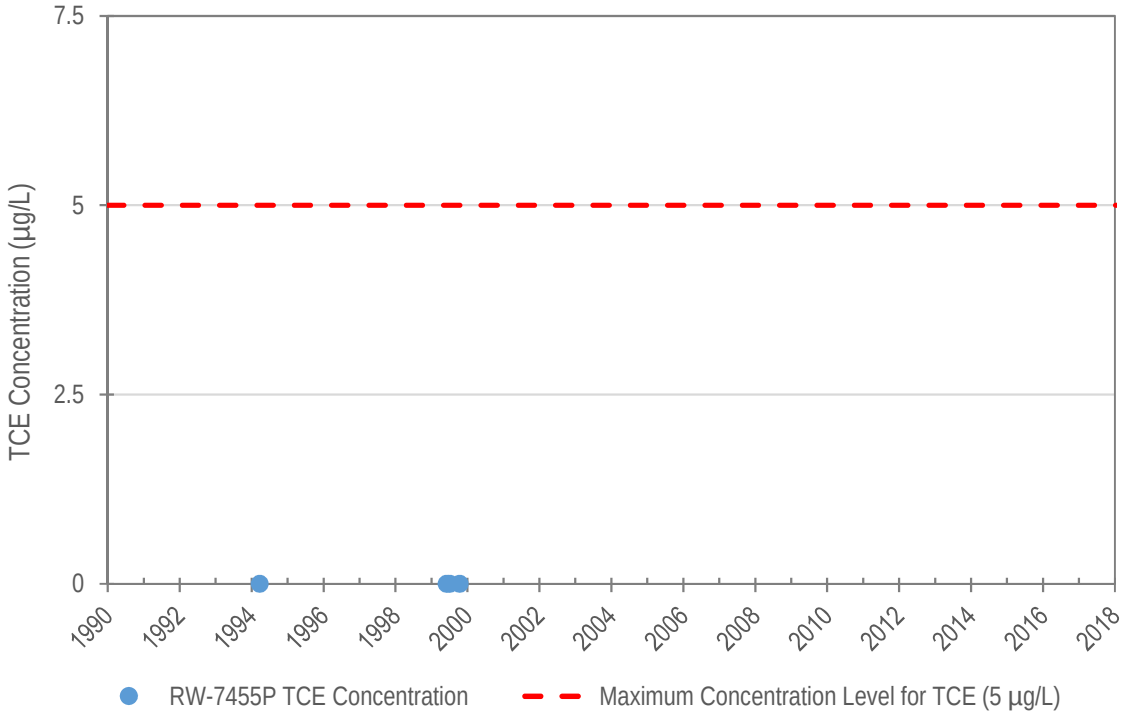


FIGURE E-30
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7412P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7455P



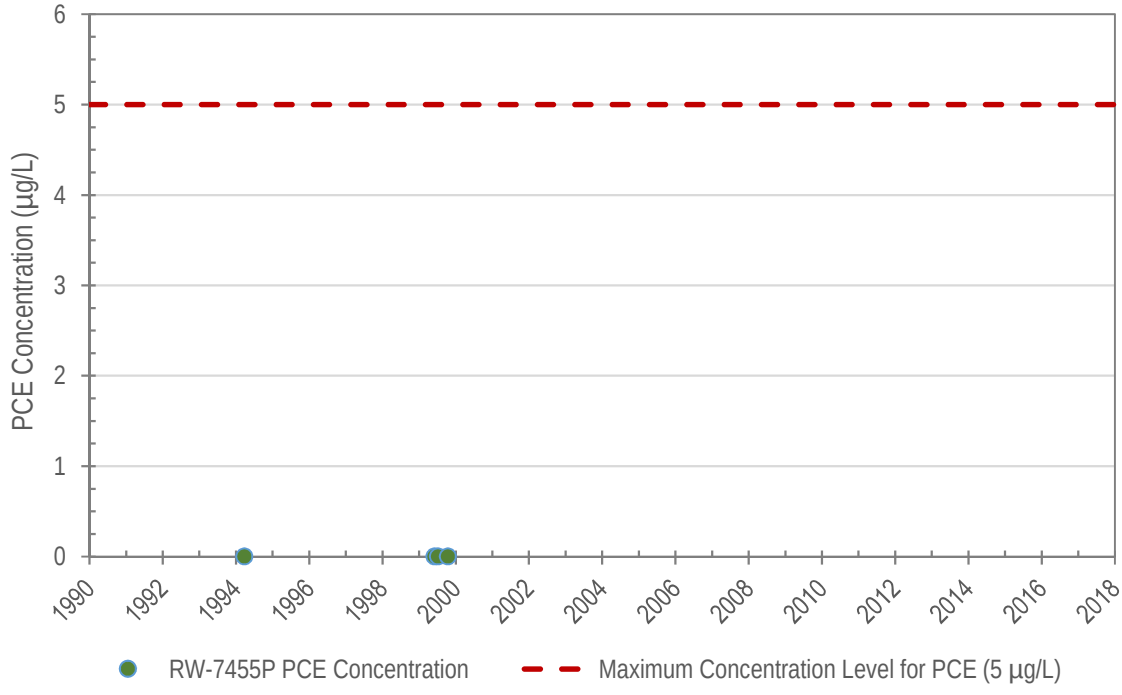
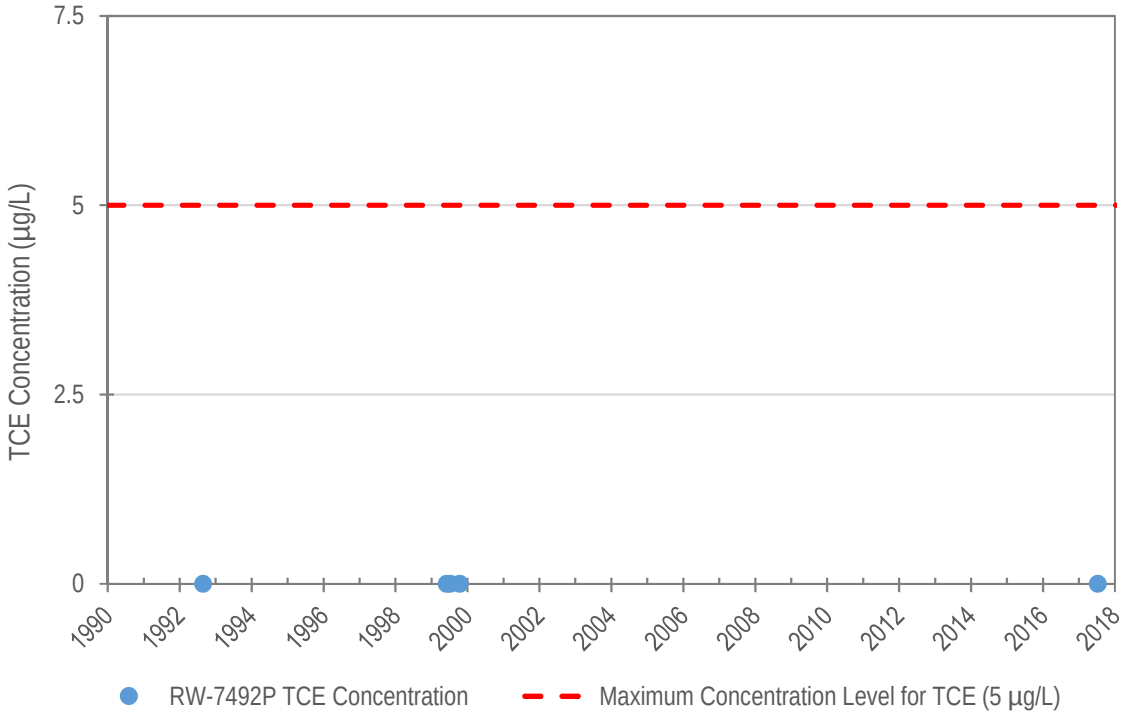


FIGURE E-31
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7455P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7492P



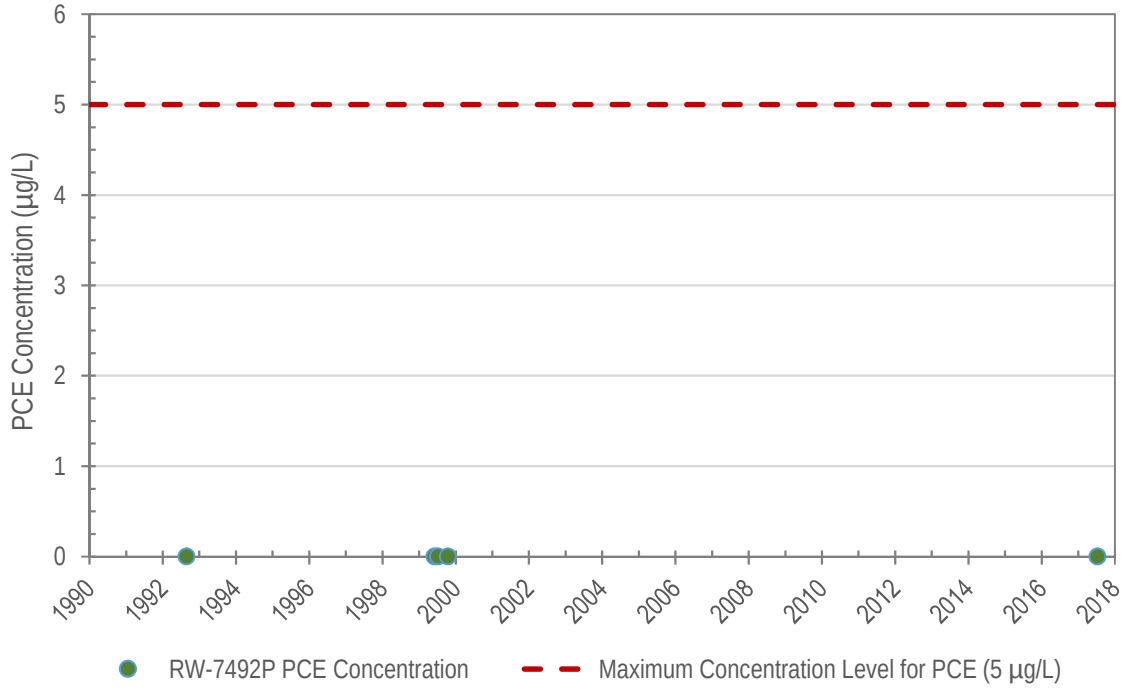
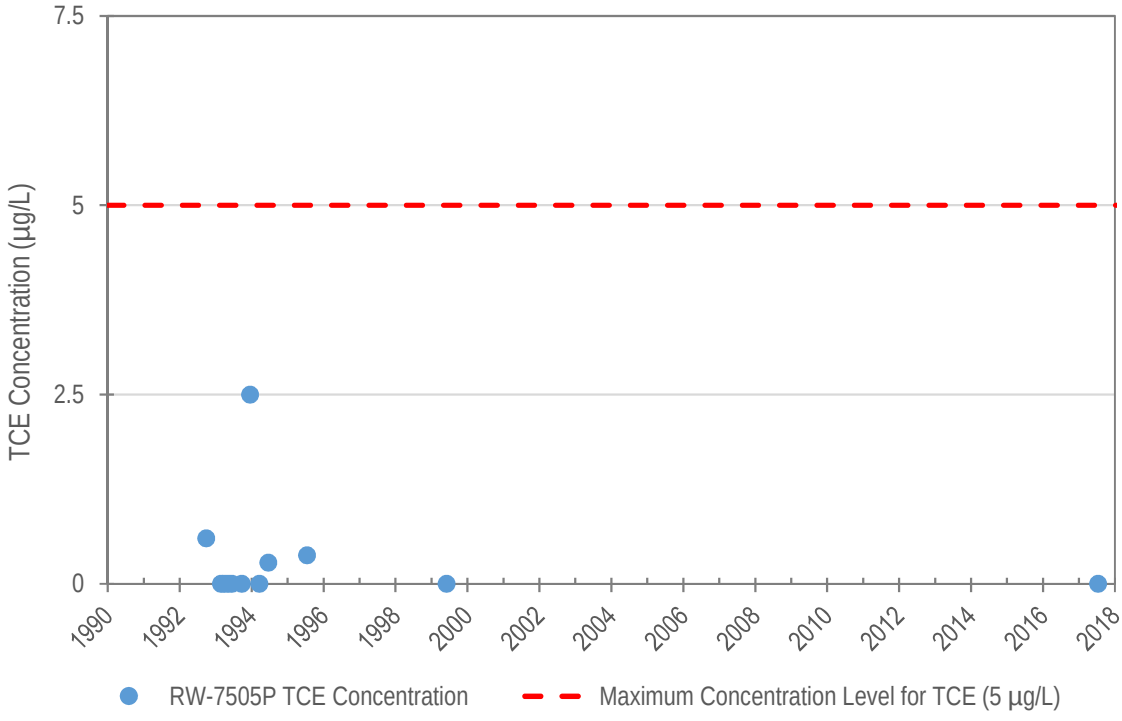


FIGURE E-32
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7492P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7505P



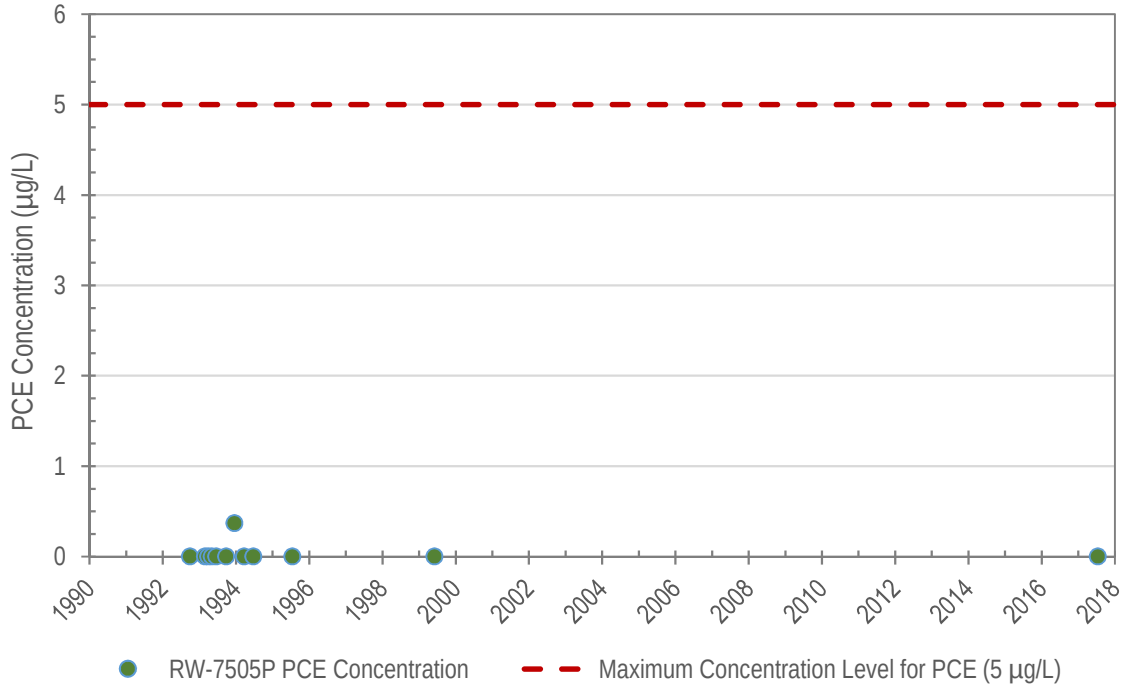
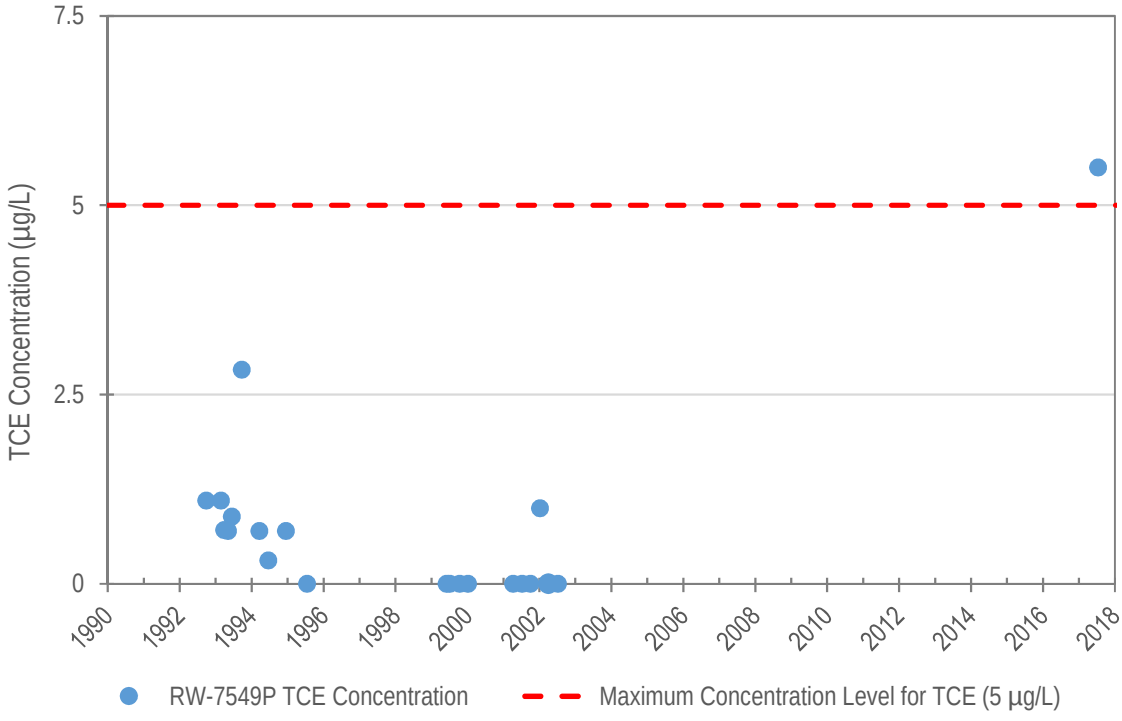


FIGURE E-33
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7505P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7549P



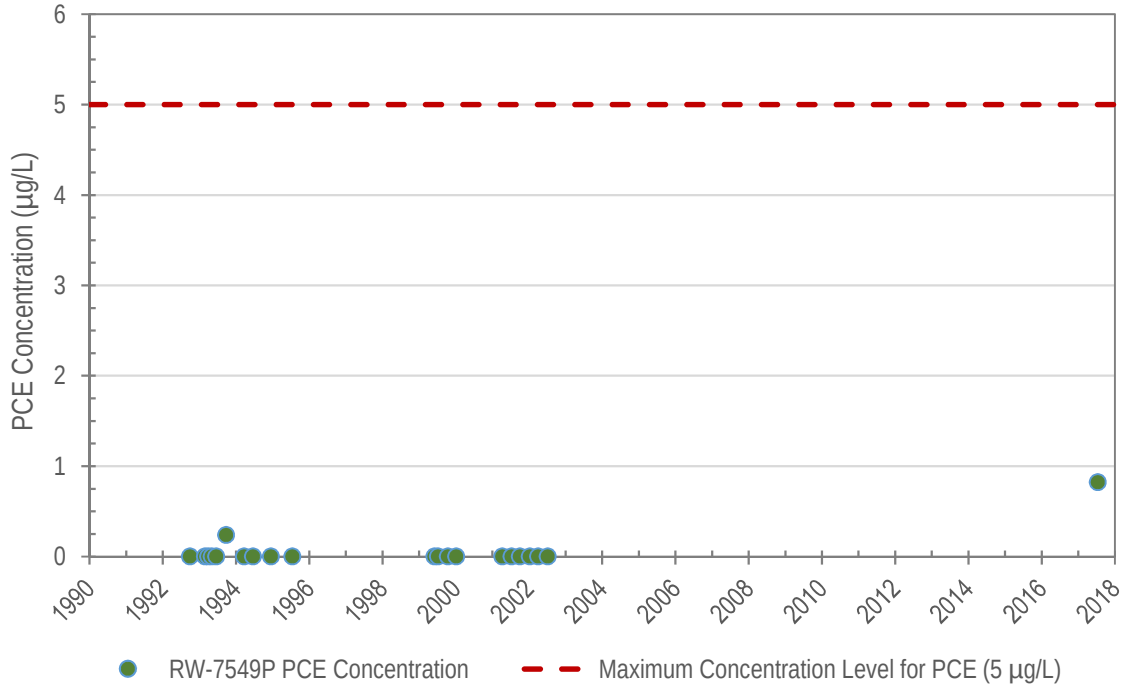
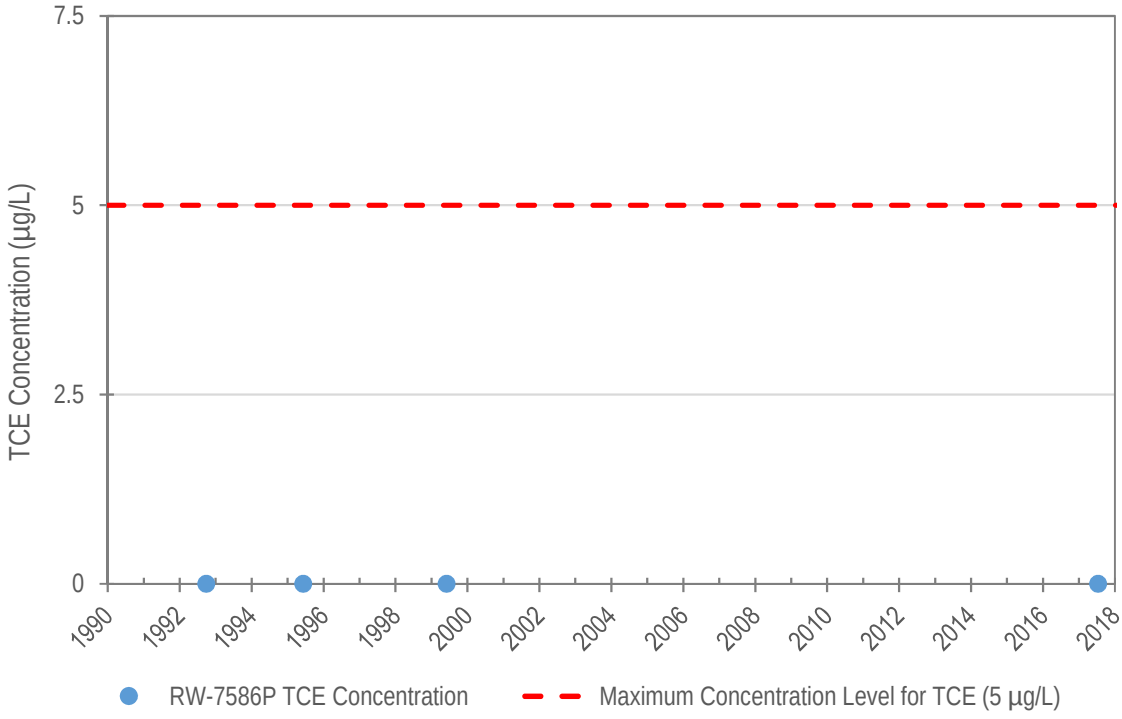


FIGURE E-34
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7549P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7586P



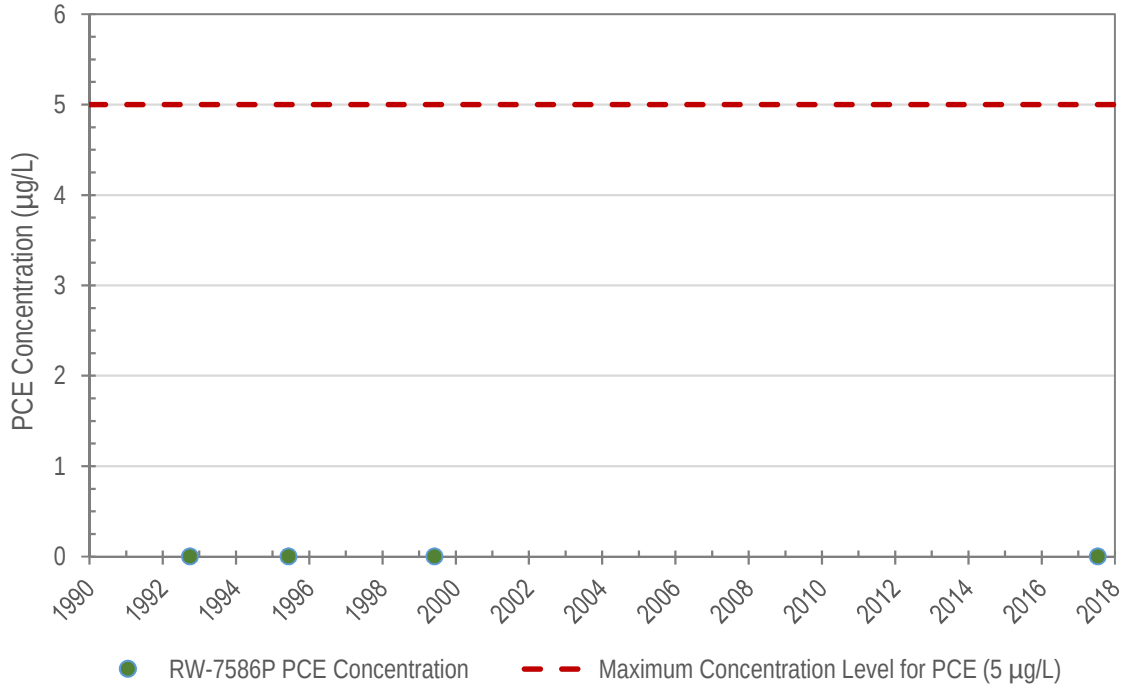
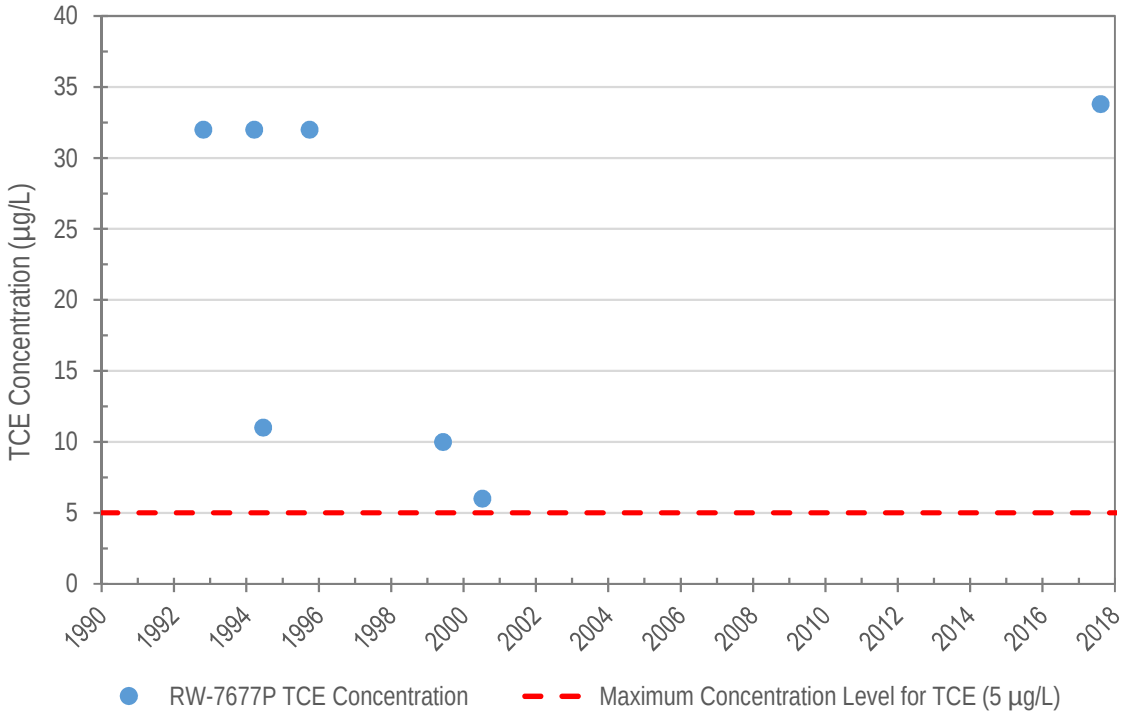


FIGURE E-35
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7586P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7677P



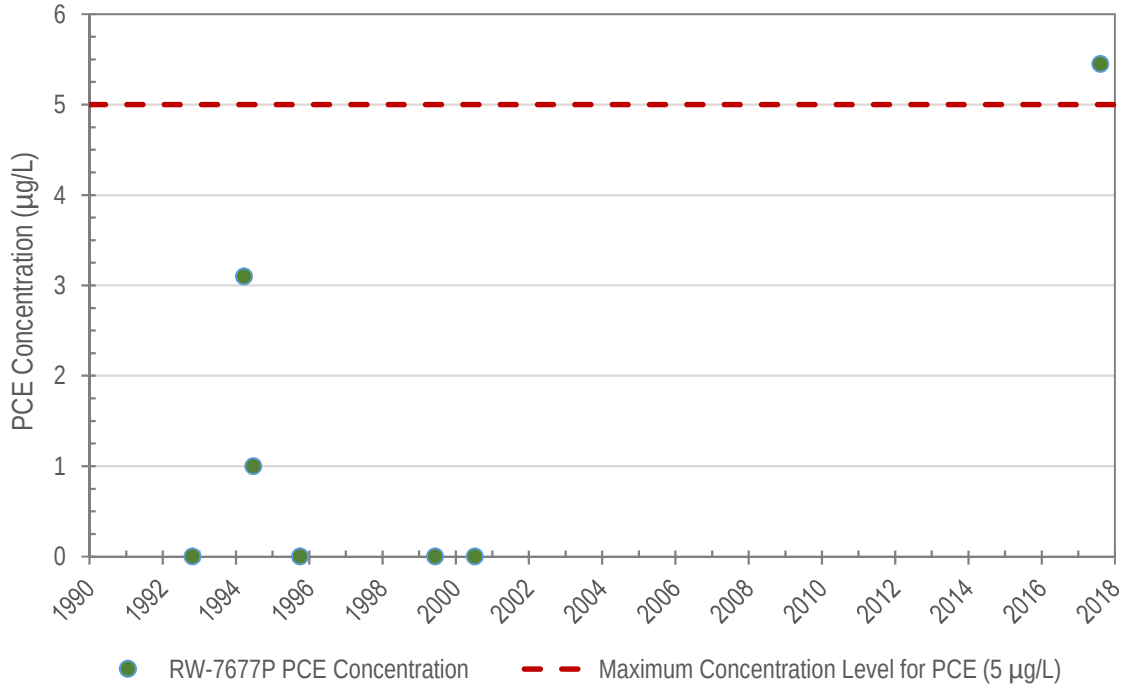
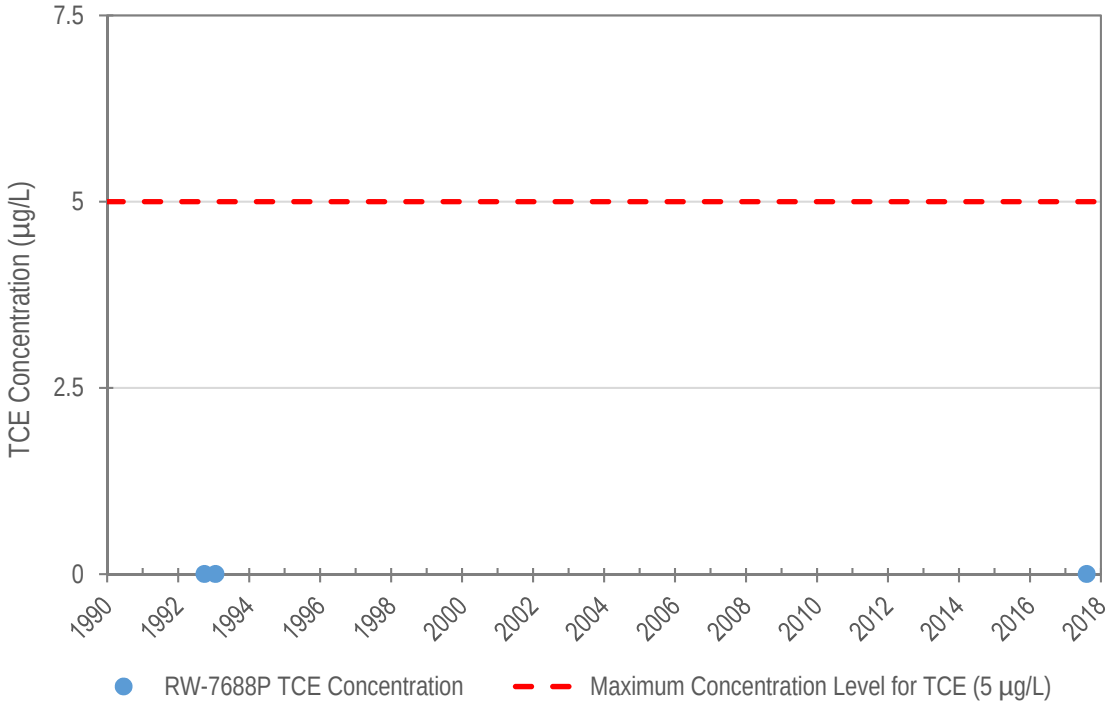


FIGURE E-36
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7677P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7688P



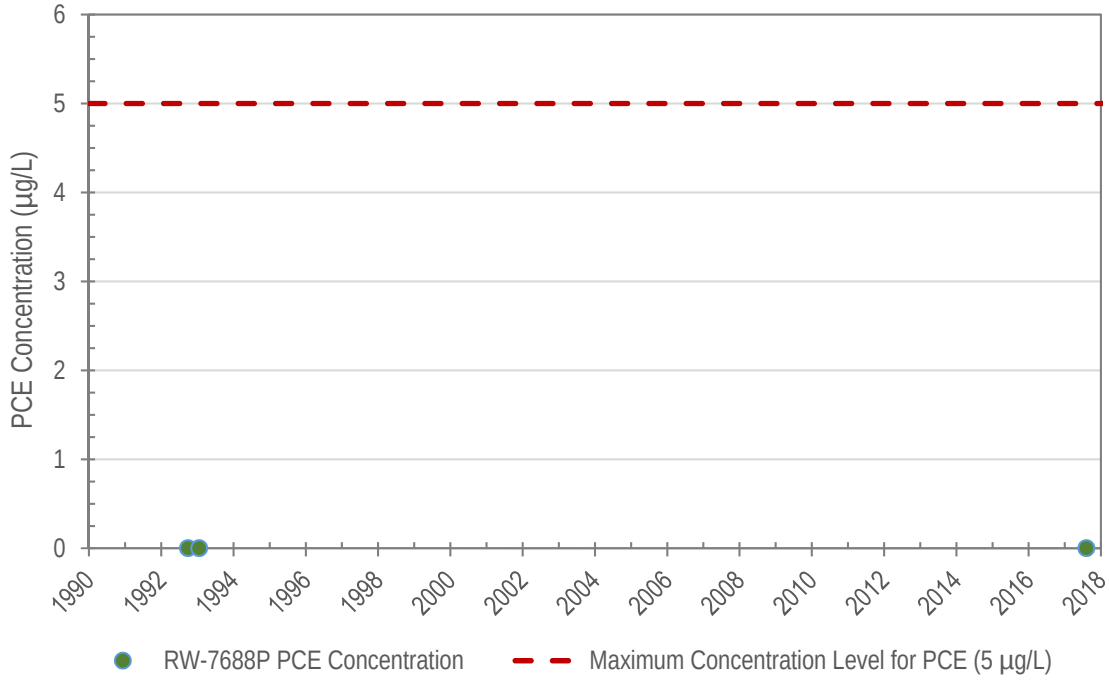
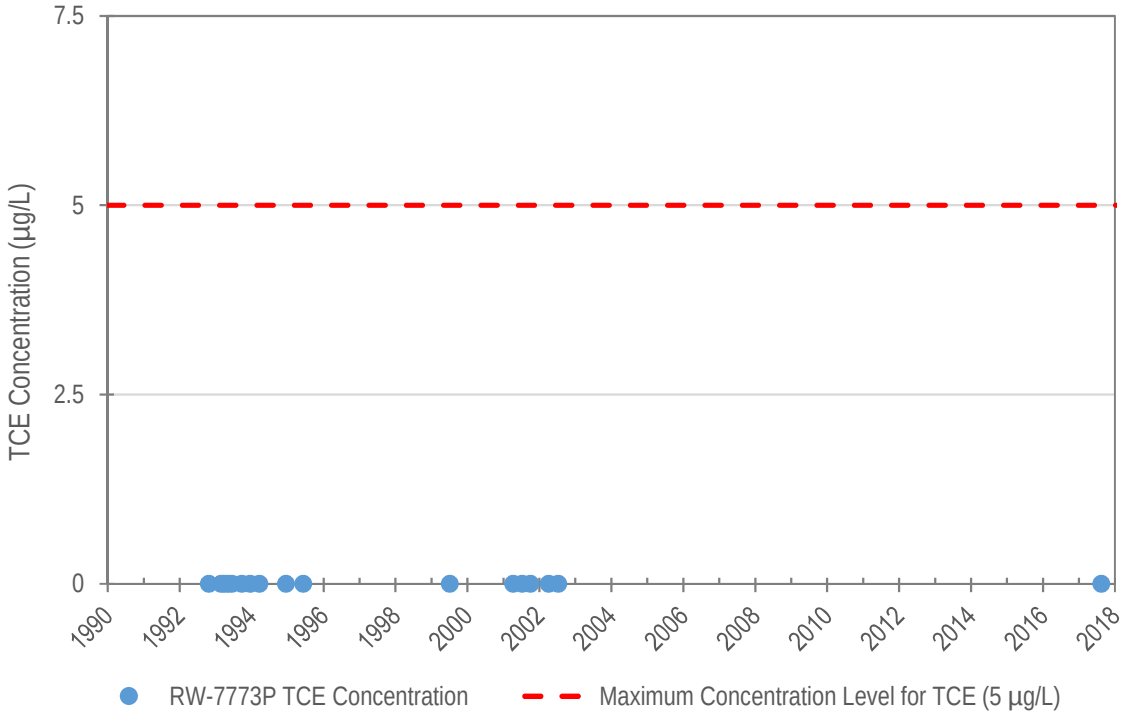


FIGURE E-37
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7688P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7773P



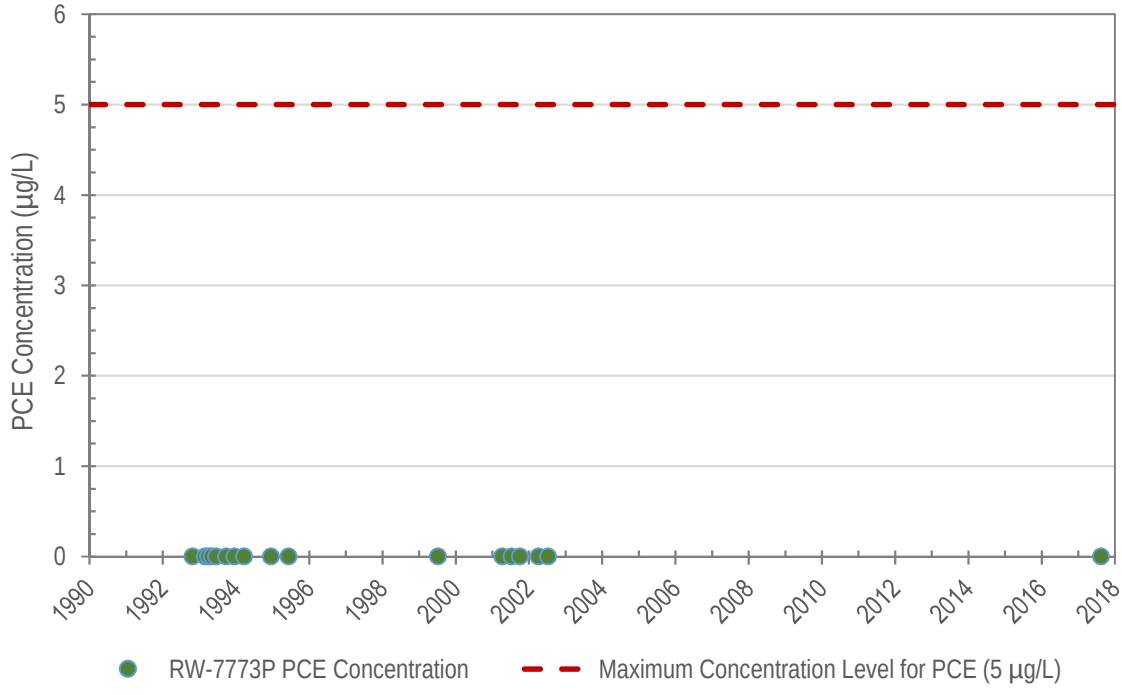
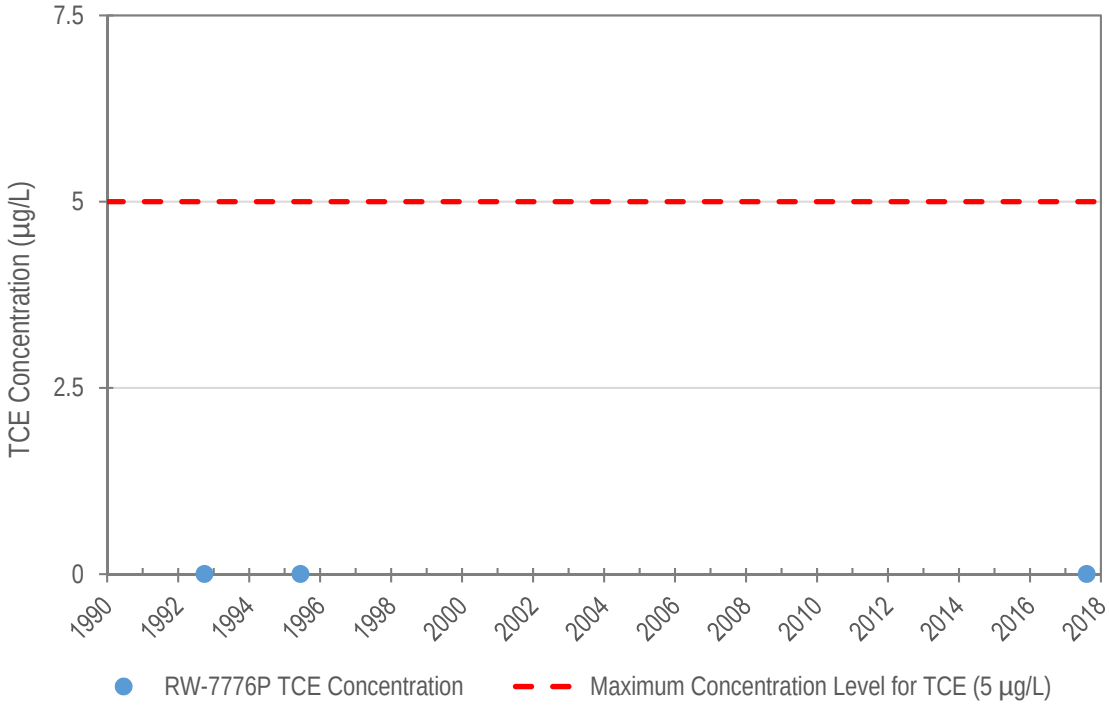


FIGURE E-38
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7773P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7776P



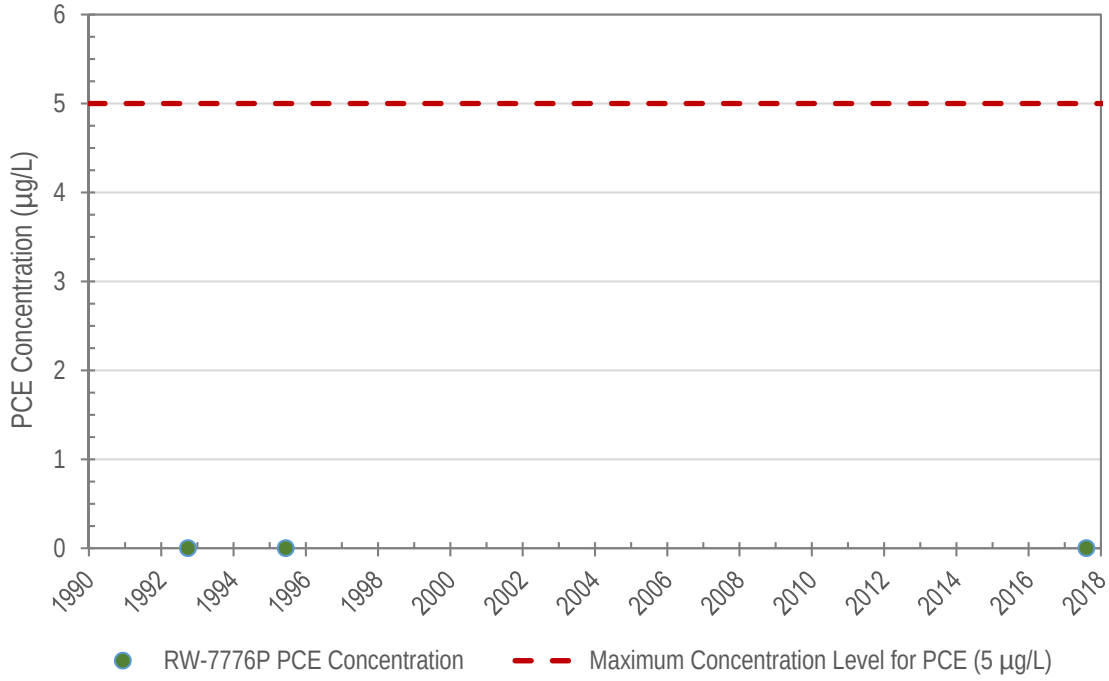
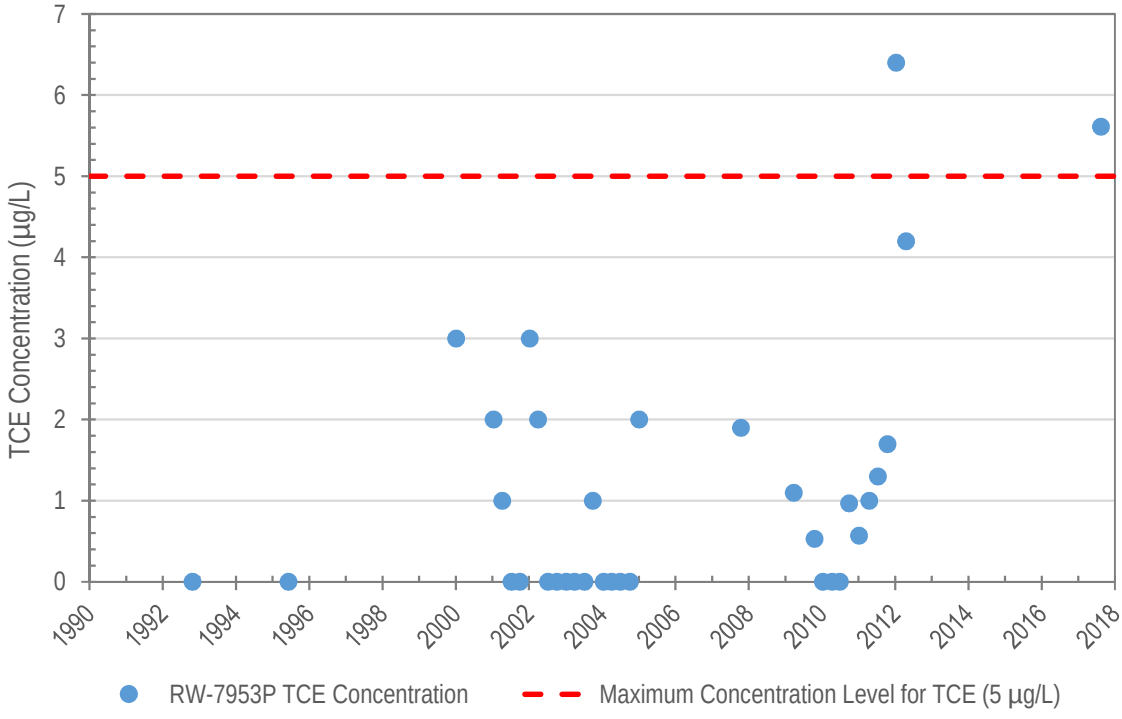


FIGURE E-39
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7776P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-7953P



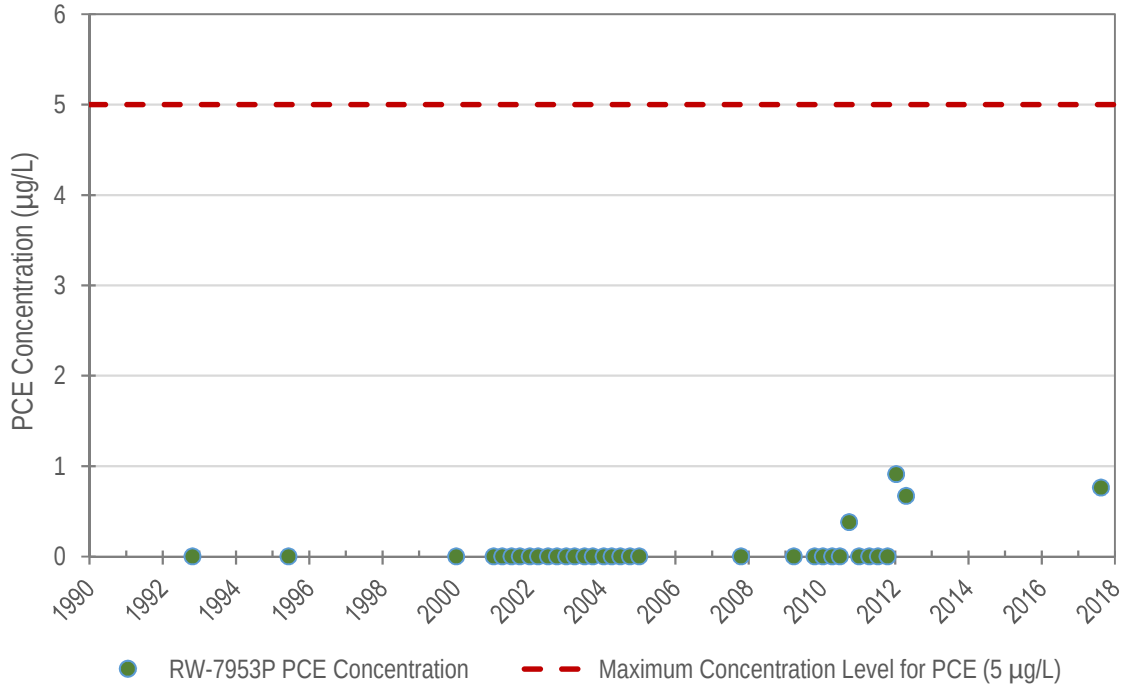
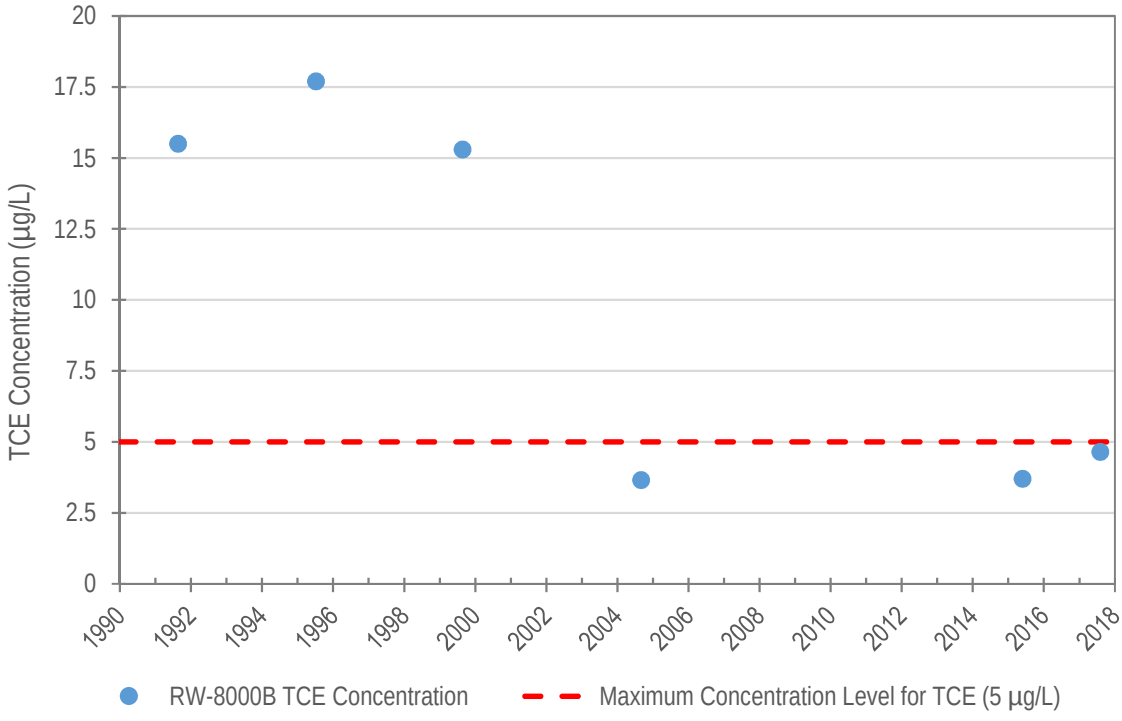


FIGURE E-40
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-7953P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-8000B



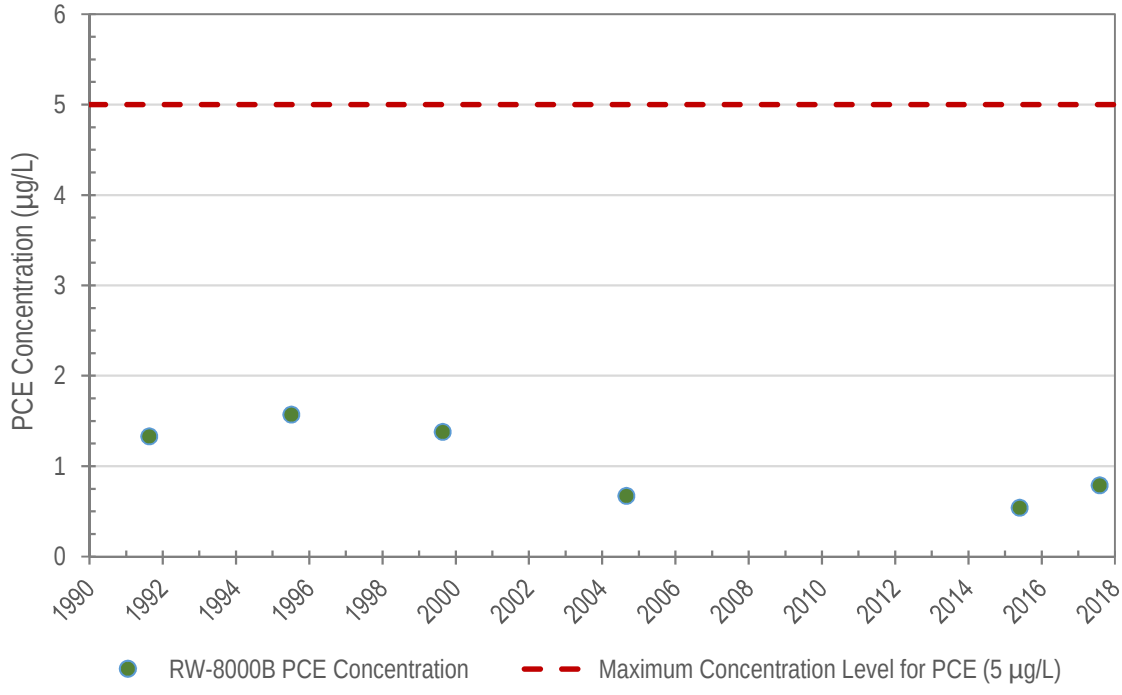
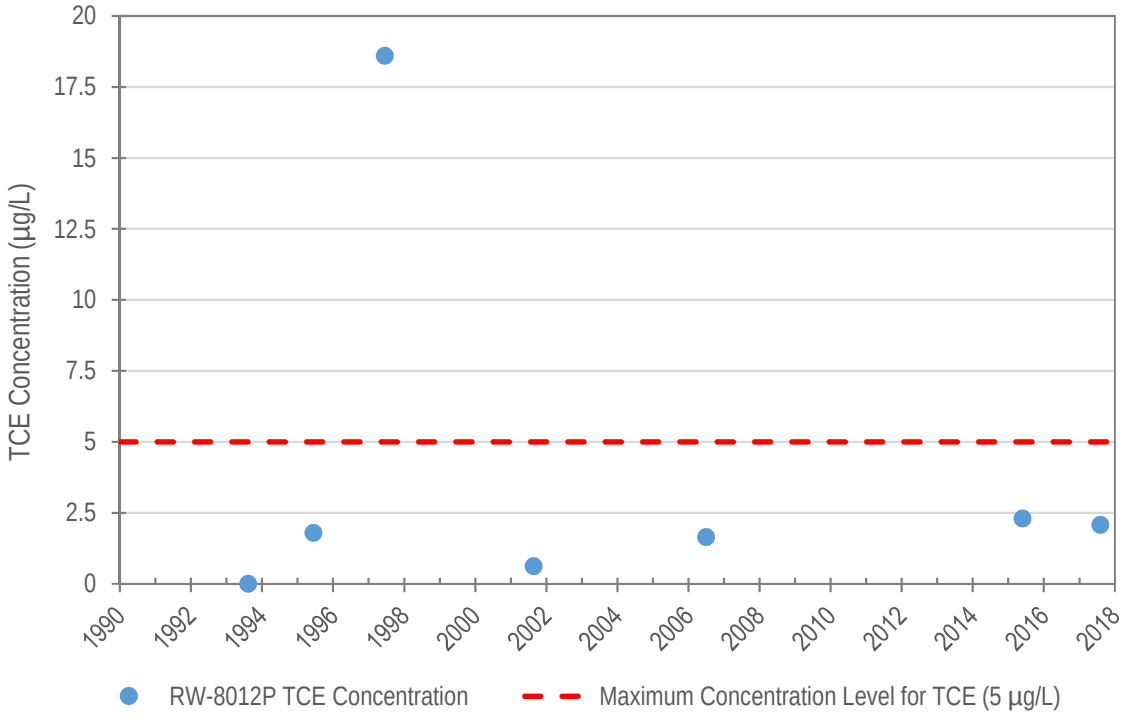


FIGURE E-41
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-8000B
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-8012P



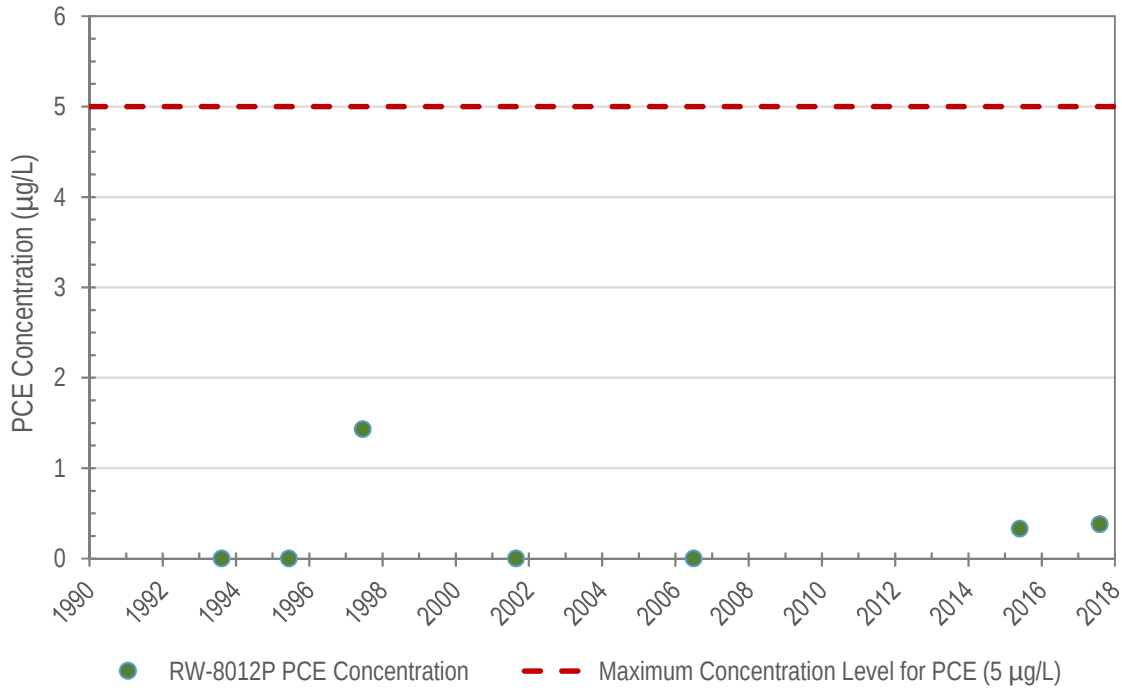


FIGURE E-42
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-8012P
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO

RW-8030P

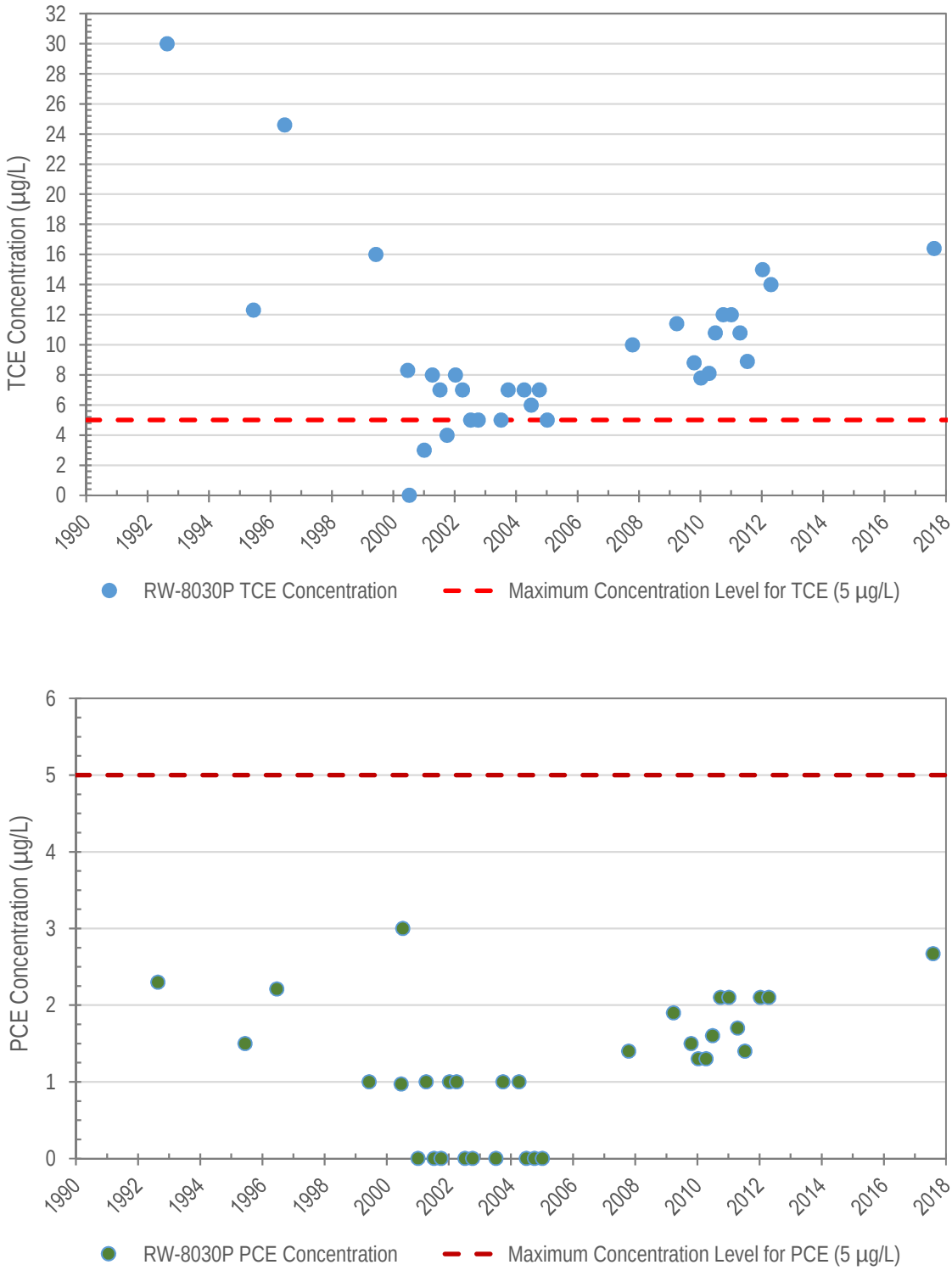


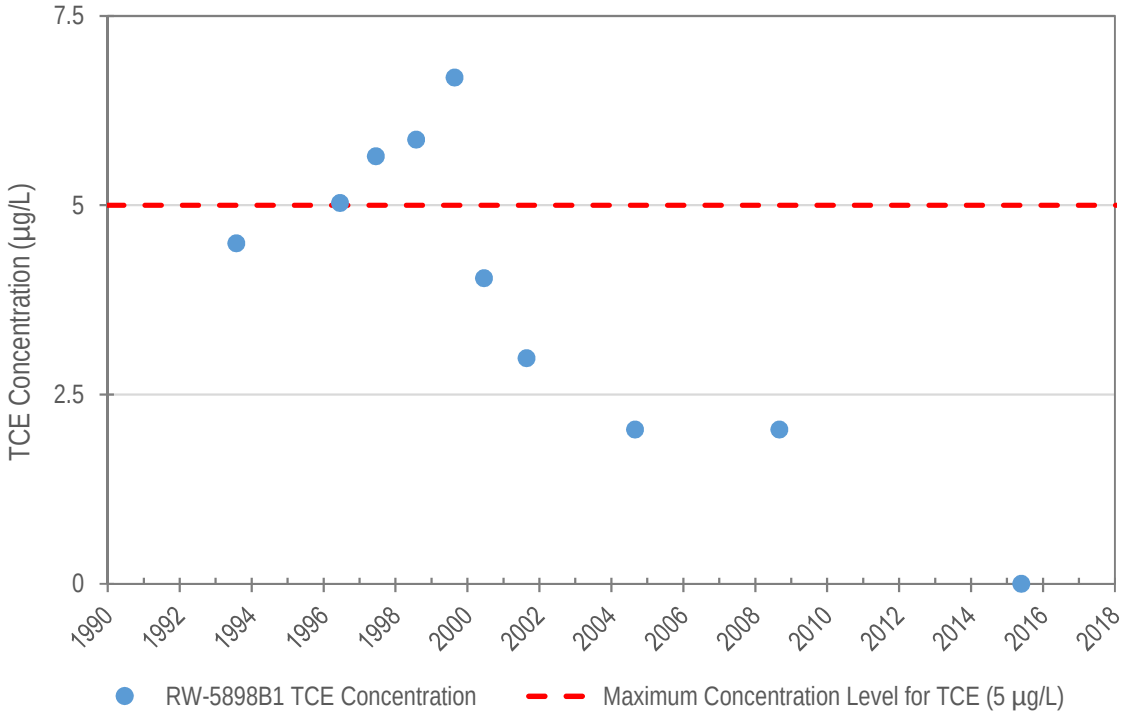
FIGURE E-43

HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-8030P

FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT

BANNOCK COUNTY, IDAHO

RW-5898B1



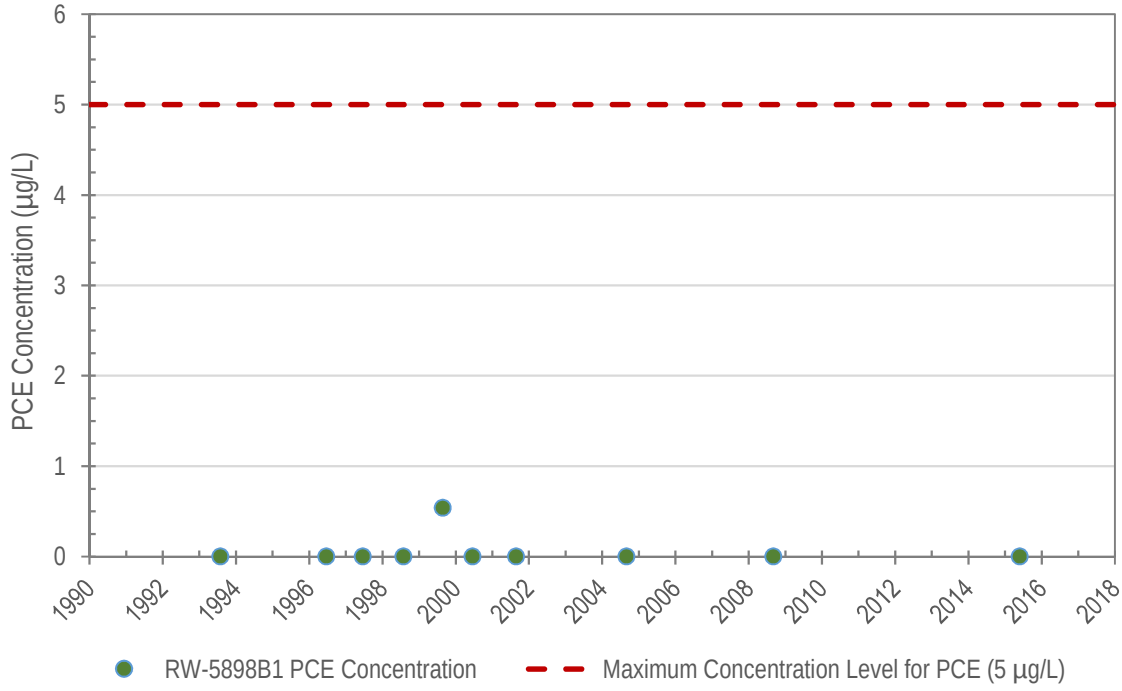


FIGURE E-44
HISTORICAL TCE AND PCE CONCENTRATIONS IN RW-5898B1
FORT HALL MINE LANDFILL OFFSITE GROUNDWATER MONITORING REPORT
BANNOCK COUNTY, IDAHO