By Electronic Mail and Hand Delivery

October 22, 2015

Ms. Betsy Burns
RCRA Project Officer
USEPA Region 8, Montana Operations Office
Federal Building
10 West 15th St., Suite 3200, Mail Code: 8MO
Helena, MT 59626

Dear Betsy:

The Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust (the Custodial Trust), respectfully submits the attached, "*Final Former ASARCO East Helena Facility Corrective Measures Study Work Plan*" (Final CMS WP) to the US Environmental Protection Agency (USEPA), as Lead Agency for the East Helena Site. This Final CMS WP was prepared in accordance with the Custodial Trust's obligations under the Consent Decree and Environmental Settlement Agreement Regarding the Montana Sites and the First Modification to the 1988 Consent Decree (Civil Action No. CV 98-3-H-CCL, US Federal District Court, District of Montana) and to satisfy the conditions cited in the USEPA's letter of conditional approval, dated August 28, 2015. All the conditions were satisfied as directed in EPA's letter. Per our verbal agreement, the information EPA directed to be provided in a work plan addendum (specified in comment numbers 2e, 2f, 4, 4a, 4b, 4c, and 4d) will instead be presented in a CMS Status Update memorandum, which will summarize CMS activities completed through 2015.

Once we have received EPA's final approval, the CMS WP will be posted in electronic form on the Custodial Trust website (http://www.mtenvironmentaltrust.org/).

Thank you for your time and consideration to this important milestone for the East Helena Facility.

Please do not hesitate to contact me with any questions pertaining to this transmittal.

Sincerely,

Montana Environmental Trust Group, LLC

Trustee of the Montana Environmental Custodial Trust

By: Greenfield Environmental Trust Group, Inc., Member

By: Lauri Gorton, Custodial Trust

cc: Without Attachments
Cindy Brooks – Custodial Trust
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Final

Former ASARCO East Helena Facility Corrective Measures Study Work Plan

Prepared for

The Montana Environmental Trust Group, LLC
Trustee of the Montana Environmental Custodial Trust

Draft January 2014
Final October 2015

CH2MHILL®

7 West 6th Avenue Suite 519
Helena, Montana 59601

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Acronyms and Abbreviations

AMSL	above mean sea level
ANPR	Advanced Notice of Proposed Rule-Making
AOC	Area of Contamination
APSD Area	Acid Plant Sediment Drying Area
ASARCO	American Smelting and Refining Company
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BTAG	Biological Technical Assistance Group
CAMU	Corrective Action Management Unit
CEM	conceptual exposure model
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measures Study
COPC	constituent of potential concern
CSM	conceptual site model
ET	evapotranspiration
HDS	high-density sludge
ICP	Institutional Controls Program
ICS	Interim Cover System
IM	interim measure
kV	kilovolt
LOSA	Lower Ore Storage Area
MCL	maximum contaminant level
MCS	media cleanup standard
MDEQ	Montana Department of Environmental Quality
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MPDES	Montana Pollutant Discharge Elimination System
NRD	Natural Resource Damage
MVS	Mining Visualization System
NWE	NorthWestern Energy
OU	Operable Unit
PCEM	preliminary conceptual exposure model
PCSM	preliminary conceptual site model

PRB	permeable reactive barrier
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SLHHRA	Screening-Level Human Health Risk Assessment
SLV	screening-level value
SPHC	South Plant Hydraulic Control
SSL	Soil Screening Level
TPA	Tito Park Area
UCL	Upper Confidence Level
UOSA	Upper Ore Storage Area
U.S.	United States
USEPA	U.S. Environmental Protection Agency
WFDA	West Field Disposal Area
WFDHA	West Field Direct Haul Area
WTP	water treatment plant
yd^3	cubic yards

SECTION 1

Introduction

Submittal of a Corrective Measures Study (CMS) Work Plan is required by paragraph 34 of the First Modification to the 1998 Resource Conservation and Recovery Act (RCRA) Consent Decree (First Modification, 2012) for the East Helena, Montana, facility (Facility). This Draft CMS Work Plan meets applicable regulatory requirements and is consistent with United States (U.S.) Environmental Protection Agency (USEPA) guidance, including the *RCRA Corrective Action Plan* (USEPA, 1994), the Advanced Notice of Proposed Rule-Making (ANPR) (USEPA, 1996); the 1999 RCRA Reforms (USEPA, 2013); *Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action* (USEPA, 2004); and *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (USEPA, 2009a). The CMS Work Plan and CMS focus on cleanup and environmental outcomes rather than on administrative processes.

1.1 Regulatory Background

The Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust (Custodial Trust), has developed and will implement this CMS Work Plan under the oversight of USEPA, as Lead Agency for the Facility and in consultation with the other Beneficiaries of the Custodial Trust (defined hereafter). The operations and activities of the Custodial Trust are governed by the Consent Decree and Settlement Agreement Regarding the Montana Sites, which became effective on December 9, 2009 (Settlement Agreement). Pursuant to the Settlement Agreement, the purpose of the Custodial Trust is *"…to own the Montana Designated Properties, carry out administrative and property management functions…manage and/or fund implementation of future Environmental Actions approved by the Lead Agency…and ultimately to sell, transfer, facilitate reuse of, or otherwise dispose or provide for the long-term stewardship of all or part of the Montana Designated Properties….*" (See Section 5.a of the Settlement Agreement.)

As noted above, USEPA is the Lead Agency for the Facility. The Beneficiaries of the Custodial Trust are the U.S. and the State of Montana. The U.S. is represented by the USEPA, the U.S. Department of Justice, and the U.S. Department of Interior/U.S. Fish and Wildlife Service (USFWS). The State of Montana is represented by the Montana Department of Environmental Quality (MDEQ) and the Montana Department of Justice. Additionally, Custodial Trust activities related to real property that are not Environmental Actions, including East Helena property leasing, conveyance, sale, or other land disposition, must be jointly approved by USEPA and the State. The Custodial Trust must fulfill its responsibilities under the Settlement Agreement consistent with its legal and fiduciary obligations to the Beneficiaries of the Custodial Trust.

1.2 Corrective Action Approach

As part of its fiduciary responsibilities to the Beneficiaries under the Settlement Agreement, the Custodial Trust is responsible for effective, efficient execution of its responsibilities, and therefore seeks to minimize cost and maximize benefit achieved with the finite Custodial Trust resources. Accordingly, the CMS Work Plan and the CMS employ the following approaches to RCRA Corrective Action:

- Focus finite resources on protective measures and meet the remedy performance standards.
- Minimize long-term stewardship costs and obligations.
- Ensure efficient, streamlined processes that support development of a complete administrative record and promote opportunities for input from the public.

The CMS will be completed in phases that emphasize determining what to do next by evaluating existing information, taking obvious or reasonable actions, and then focusing data collection to observe results achieved. Benefits of this approach include saving resources by conducting only focused data collection, and implementing actions as interim measures (IMs) with a strong potential for immediate environmental benefit that also have a strong likelihood of supporting, and are capable of being integrated into, the final remedial options. This CMS Work Plan identifies the decision criteria and overall CMS approach and priorities, and outlines the framework for

identification, evaluation, and proposals of final corrective measures. The CMS approach includes using iterative steps of site characterization, including developing and refining a site conceptual model, identifying and planning for uncertainties in the conceptual model and conceptual remedial actions, and then establishing performance criteria which can be measured to demonstrate effectiveness. The concept of addressing uncertainties as reasonable deviations is a key component of this approach, and provides a framework for determining when existing information is sufficient to make necessary remedial decisions while also creating opportunities for significant efficiency in the scope and execution of investigation and study activities.

1.3 Work Plan Organization

The CMS Work Plan is organized as follows:

- **Section 1: Introduction**.
- **Section 2: CMS Goals, Objectives, and Scope** identifies the purpose of the CMS; establishes the Remedial Action Objectives; describes the geographic boundaries of the CMS; and outlines the decision criteria that will be used to evaluate potential remedial alternatives.
- **Section 3: Preliminary Conceptual Site Models and Conceptual Exposure Models** summarizes existing information about current conditions, and integrates available information about physical conditions, nature and extent, fate and transport, land use, potential receptors, and potentially complete exposure pathways.
- **Section 4: Identification of Conceptual Corrective Measures Alternatives** outlines the remedy concepts that have been developed based on existing information and identifies key technical elements.
- **Section 5: Proposed CMS Approach and Tasks** identifies the outstanding information and activities needed to turn the conceptual remedy proposal into a final recommendation, and also outlines the activities that will be completed within the CMS to develop information necessary to evaluate the corrective measures alternative(s) and to support selection of final remedies.
- **Section 6: CMS Project Management and Public Involvement Plans** outlines how the CMS process will be managed, including public communication and involvement, and provides a schedule that shows the currently anticipated sequence of activities and estimated timeframes.
- **Section 7: References** provides a list of the documents incorporated into, or otherwise considered in the development and implementation of this work plan. As a streamlining measure, this CMS Work Plan will note key points from existing information and will refer the reader to the appropriate source document for details, rather than repeat large blocks of text.

Supporting information is provided in five appendixes. **Appendix A** contains the June 2013 groundwater plume maps. **Appendix B** contains the screening-level human health risk assessment. **Appendix C** is an addendum provided in response to USEPA's conditional approval letter dated August 28, 2015. **Appendix D** contains a technical memorandum documenting the Upper Lake drawdown test results from 2012. **Appendix E** contains a series of figures provided as reference.

SECTION 2

CMS Goals, Objectives, and Scope

This section identifies and describes the CMS goals, objectives, and scope of work.

2.1 CMS Goals

The purpose of a CMS is to identify, evaluate, and propose appropriate remedial actions that will protect human health and the environment. For this project, the primary CMS goals are as follows:

- Meet requirements of the First Modification and all other applicable regulatory and USEPA guidance, including an evaluation of each action, or combination of actions, following the factors set forth in the 1996 ANPR.
- Analyze potential actions with consideration of known risks to actual or potential receptors.
- Include in the evaluation potential actions that will create the greatest net environmental benefit and which are compatible with expected future use, considering finite Custodial Trust funds.

2.2 CMS Objectives

In addition to the remedy performance standards and threshold criteria discussed later in this section, site-specific Remedial Action Objectives (RAOs) have been identified to provide criteria that will be used for remedy evaluation and selection. The RAOs are as follows:

- Minimize long-term stewardship.
- Eliminate the need to manage and treat stormwater.
- Maximize use of sustainable remediation approaches.
- Develop alternatives that allow continued asset recovery from slag pile.
- Develop alternatives that are consistent with the Custodial Trust's purpose to manage or fund implementation of environmental actions, and, ultimately, to sell, transfer, facilitate the reuse of, or otherwise dispose of or provide for the long-term stewardship of the properties.

2.3 CMS Scope

This section describes the geographic boundaries of the CMS, current and reasonably anticipated land and groundwater use, and remedy performance standards.

2.3.1 Geographic Boundaries of CMS

The First Modification establishes the geographic boundaries of the CMS as follows:

- Paragraph 37 requires CMS evaluations to address all former American Smelting and Refining Company (ASARCO) Properties conveyed to the Custodial Trust (hereafter referred to as the "former ASARCO Properties" to be consistent with the First Modification), as well as areas beyond the Custodial Trust's property boundaries where hazardous waste or constituents have "…or may reasonably be expected to have…" migrated from the former Smelter site.
- Paragraph 38 specifies the Custodial Trust-owned parcels which must be addressed by the CMS as Parcels 10, 11, 12, 15, 16, 17, 18, 19, 23, the portion of Parcel 8 west of Route 518, and the portions of Parcel 2 near Prickly Pear Creek). However, for those Custodial Trust-owned parcels not enumerated, paragraph 38 also goes on to state that "Unless significant new information is found, which was not previously considered by EPA…the final corrective measures for the parcels of real property transferred…shall be the measures set forth in the Record of Decision (ROD) for Operable Unit (OU) 2 (OU2 ROD; USEPA, 2009b)…".

To date, no new significant information has been found regarding the former ASARCO Properties not enumerated in paragraph 38. Therefore, the CMS will address the Custodial Trust-owned properties enumerated in paragraph 38 as well as properties not owned by the Custodial Trust where hazardous waste or constituents have, or could reasonably be considered to have migrated (Un-owned CMS Properties). Collectively, these properties will be referred to herein as the "CMS Properties," and are shown in Figure 2-1. Areas where contaminants have migrated in groundwater are shown in the figures provided in Appendix A (June 2013 data).

For remedy identification and evaluation purposes, the CMS Properties have been subdivided into the following parcels on the basis of current and reasonably anticipated future land use:

- Custodial Trust-owned Properties
  - Parcels 16 and 19: Site of ASARCO's now-demolished lead smelter, other historical industrial and manufacturing operations, and materials and waste-handling activities (hereafter referred to as the former Smelter site). Lower Lake and the majority of Tito Park are located here. These parcels have been the focus of the RCRA corrective action work completed to date.
  - Parcel 15: Location of Corrective Action Management Units (CAMUs), Upper Lake, Upper Lake Marsh, a small portion of Tito Park, agricultural lands, and the rodeo grounds.
  - Parcels 17 and 18: Location of the "East Fields" Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) residential soil repository, the former ASARCO Plant Manager's home (lost to fire in 2012) and other employee housing (demolished in 2010).
  - Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518: Areas with historical and current agricultural use.
  - The portions of Parcel 2 near Prickly Pear Creek: Particularly the riparian corridor.
- Un-owned CMS Properties—Areas affected by migration of contaminated groundwater or surface water from the former ASARCO Properties, which are not owned by the Custodial Trust. Based on the most recent groundwater sampling results available (June 2013), the areas affected by constituents of potential concern (COPCs) at concentrations above the maximum contaminant level (MCL) fall within the boundaries of the arsenic and selenium plumes. While other COPCs from historical ASARCO activities are found in groundwater above screening-level values (SLVs), detections at concentrations above the MCL are generally found within the boundaries of the arsenic and selenium plumes.

2.3.2 Current and Reasonably Anticipated Land and Groundwater Use

For the purposes of the CMS, current land and groundwater uses will be the assumed "reasonably anticipated future use" of the former ASARCO Properties (as shown in Table 2-1). The Custodial Trust has investigated potential future use of the Custodial Trust-owned Properties, taking into consideration market conditions, community goals and objectives, and other stakeholder interests.

Ultimately, if properties are not cleaned up to unrestricted residential use levels, institutional controls will be placed to ensure the land use is consistent with site conditions. Two institutional controls are currently in place, and apply to all former ASARCO and CMS Properties:

- East Helena Montana City Code (Title 8, Chapter 8, Section 8.3.7) prohibits the installation of new private water wells in the City limits and the petition for a Controlled Groundwater Area (Hydrometrics, 2014) was submitted to the Montana Department of Natural Resources and Conservation by Lewis and Clark County to restrict future groundwater withdrawals.
- Lewis and Clark County adopted a Soil Ordinance in June 2013 to control soil displacement and disposal activities.

Future property owners/operators will have the option to conduct additional investigations and cleanup if necessary to achieve site conditions that would meet the surface soil cleanup standard associated with the newly intended use.

As part of the CMS, available surface soil data will initially be screened against conservative, risk-based screening levels to determine whether there are unacceptable exposures under a range of future land uses. Where these screening levels are exceeded, remedy evaluations for the CMS Properties will focus primarily on achieving protective conditions and meeting media cleanup standards (MCSs) that are protective for the reasonably anticipated land and groundwater uses described in Table 2-1. As noted in the First Modification, the OU2 ROD remedy will be applied to parcels of the former ASARCO Properties that are not identified in Paragraph 38.

TABLE 2-1
CMS Properties—Land and Groundwater Use Considerations

	Land Use		Groundwater Use	
Parcels	**Historical/Current**	**Reasonably Anticipated Future[a]**	**Current**	**Reasonably Anticipated Future**
Custodial Trust-owned Properties				
16 and 19 (former Smelter site)	Industrial/ Infrastructure and other support for slag reprocessing	Recreational and open space, industrial, commercial, slag reprocessing	There is no use of groundwater on these parcels.	None. An existing City of East Helena municipal ordinance (Title 8, Chapter 8, Section 8.3.7) prohibits private wells. In addition, for all Custodial Trust-owned properties: In areas where groundwater exceeds media cleanup objectives, use will be restricted using deed notices and/or Controlled Groundwater Area requirements **will be implemented** until groundwater cleanup standards are attained.
15	Agricultural, recreational, industrial uses, location of Corrective Action Management Units, a portion of Tito Park, Upper Lake.	Same as historical/current	None	Same as above
17 and 18	CERCLA East Fields soil repository, former residential use (company housing), open space	Recreational and open space, floodplain, enhanced habitat	None	Same as above
10, 11, 12, 23, and the portion of Parcel 8 west of Route 518	Agricultural, industrial (former location of Air Liquide) or open space	State's Natural Resource Damage (NRD) Claim Option, recreation, open space, habitat	None	Same as above
Portions of Parcel 2 near Prickly Pear Creek	Agricultural or open space	Open space, recreation, enhanced habitat, State's NRD Claim Option	None	Same as above

TABLE 2-1
CMS Properties—Land and Groundwater Use Considerations

	Land Use		Groundwater Use	
Parcels	**Historical/Current**	**Reasonably Anticipated Future[a]**	**Current**	**Reasonably Anticipated Future**
Other CMS Properties Not Owned by the Custodial Trust (Un-owned CMS Properties)				
	Residential, agricultural, commercial, industrial, or recreational and open space	Potable, agricultural, and nonpotable use	Multiple private and public water supply and irrigation wells north of Highway 12 are being evaluated on a routine basis.	An existing City of East Helena ordinance prohibits private wells within the City limits. Also, in areas where groundwater exceeds media cleanup objectives, new uses will be restricted via a Controlled Groundwater Area as part of an **institutional controls program** to ensure the protection of public health until groundwater cleanup standards are attained.

Notes:

[a] A variety of ecological receptors are also expected to use all parcels in the future.

2.3.3 Remedy Performance Standards

USEPA has established three performance standards that all final remedies must achieve. These performance standards will be considered the primary criteria for use in remedy evaluation, and are defined for the purposes of the East Helena Facility as follows:

1. Protection of human health and the environment
   a. Human and ecological receptors—No direct contact (dermal, inhalation, or ingestion) with environmental media having concentrations of COPCs exceeding relevant risk-based standards (see Media Cleanup Objectives below).
   b. Protection of the environment will appropriately consider the surrounding ecological setting during remedy alternative evaluation.
   c. Surface water—Prevent groundwater from discharging to surface water at concentrations that would cause the surface water to exceed Montana State Surface Water Standards and/or at concentrations that would degrade surface water quality beyond existing upstream water quality.
2. Source Control
   a. Soil
      i. Prevent migration of contaminated surface soil via wind-blown deposition or surface water runoff.
      ii. Reduce—to the extent practicable—the potential for groundwater to contact soil with COPC concentrations exceeding relevant groundwater protection standards through the following activities
         1) Reducing and/or eliminating to the extent practicable infiltration of stormwater into and through areas of contaminated soil and sediment
         2) Reducing to the extent practicable the amount of contaminated soil in contact with groundwater
         3) Reducing to the extent practicable COPC concentrations or mass where such removal will yield immediate reductions in contaminant loading to groundwater

b. Slag

i. Reduce—to the extent practicable—the potential for groundwater to contact slag through removal and recovery of recyclable slag.

1) Reducing infiltration of stormwater

2) Reducing contact with groundwater

3. Media Cleanup Objectives

a. Soil

i. Surface (0 to 2 feet below ground surface [bgs])

1) Soil cleanup levels based on protection of human health and the environment for current and/or future new land uses (as shown in Table 2-2). Note that if numeric standards cannot be achieved, engineering and/or institutional controls will be implemented to interrupt pathways for exposure and to maintain protective conditions.

ii. At depth (greater than [>] 2 feet bgs)

1) Numeric standards based on protection of groundwater (as shown in Table 2-2), established regional background levels, or

2) Non-numeric/concentration objective(s) based on impracticability associated with addressing large source mass (i.e., reduce toxicity, mobility, or ability of groundwater to come into contact with, leachable contaminant mass).

b. Groundwater

i. Return usable groundwater to maximum beneficial uses wherever practicable, within a time that is reasonable considering all property-specific conditions.

ii. Reduce COPC concentrations in groundwater within the operating facility boundary such that the Montana Numeric Water Quality Standards (as defined in Circular DEQ-7, and hereafter referred to as DEQ-7; MDEQ, 2012) are met at the points of compliance established by USEPA.

iii. Achieve stability and attenuation of offsite plumes downgradient of the former Smelter site such that COPC concentrations can be expected to meet DEQ-7 standards within a reasonable time.

iv. During the timeframe when attainment of the DEQ-7 standards has not been achieved, minimize further migration of the plumes, prevent exposure to the contaminated groundwater, and evaluate further risk reduction approaches. To the extent practicable, control or eliminate other surface water and subsurface sources of contamination to groundwater within control of the Custodial Trust.

c. Surface Water—Meet DEQ-7 standards for surface water bodies contaminated by ASARCO's historical activities, including present migration of existing contamination.

d. Sediment—USEPA Region III's Biological Technical Assistance Group (BTAG) has developed values to be used for the evaluation of sampling data at Superfund sites. Referred to as the Region III BTAG Screening Benchmarks, they represent an appropriate set of screening criteria to evaluate ecological risk in freshwater sediment for the CMS Properties (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm).

Table 2-2 provides a partial list of proposed numeric MCSs for the CMS Properties. The table identifies by media, the COPC, land use, proposed cleanup standard, the basis for the standard, and examples of how each standard would be applied. Key considerations in the identification of numeric standards are summarized as follows:

- Current, risk-based criteria established by USEPA and the State of Montana will be applied for groundwater and surface water (i.e., Montana's DEQ-7 standards, USEPA MCLs).

- The *Supplemental Ecological Risk Assessment for the East Helena Smelter Site* (USEPA, 2005; Hooper et al., 2002) stated that a soil lead level exceeding 650 milligrams per kilogram (mg/kg) may adversely impact passerine insectivores. Based on the Custodial Trust's discussions to date with USFWS, the Baseline Ecological Risk Assessment (BERA; Gradient, 2011) conducted by the Custodial Trust, as well as ecological risk evaluations from other mining sites in Montana (e.g., Anaconda Smelter Superfund Site, Anaconda, Montana), lead is proposed as the primary indicator parameter for surface soil and a soil lead level of 650 mg/kg is proposed as the MCS considered protective of ecological receptors.
- For the purpose of establishing risk-based MCSs for surface soil, protective of human receptors:
  - Lead and arsenic are considered the primary indicator parameters for soil. Existing data and conceptual site models have shown inorganic contaminants from the former Smelter site to be co-located with these COPCs, such that remedial actions taken to address these COPCs can be reasonably expected to address all other site-related COPCs. This is also consistent with findings of the OU2 ROD.
  - The Regional Screening Levels (RSLs) for lead and arsenic levels in soil shown in Table 2-2 are concentration levels currently being applied as MCSs at mining and smelter sites in Montana, and across the country. The Custodial Trust believes that an MCS of 400 mg/kg for lead in surface soil reflects current risk-based practices and is also consistent with the intended outcome of the OU2 ROD, which states that the two-part residential cleanup action level for lead of 1,000 and 500 mg/kg "*… is expected to achieve a community-wide post-cleanup average lead concentration that is substantially less than 500*…".
- USEPA's Soil Screening Levels (SSLs) are proposed as the MCSs for COPCs in subsurface soil to represent soil concentrations considered to be protective of groundwater. However, arsenic is naturally occurring at concentrations which exceed risk-based screening levels (both Preliminary Remediation Goals [PRGs] and the MCL-based SSL of 0.29 mg/kg [USEPA, 2015]). As noted in MDEQ's document *Project Report Background Concentrations of Inorganic Constituents in Montana Surface Soils* (MDEQ, 2013), the mean soil concentration is 22.5 mg/kg and the report text cites a generic action level of 40 mg/kg for residential surface soil. The basis for the 40-mg/kg concentration is presented in the document titled *Montana Department of Environmental Quality Remediation Division Action Level for Arsenic in Surface Soil* (April 2005), which states in Section 2.0, Data Summary and Action Level Calculation "….*DEQ determined that the 95% [Upper Confidence Level] UCL of 40 mg/kg represents an appropriate generic action level for arsenic because* ***it represents native soil concentrations that can reasonably be expected at most facilities***…" (emphasis added). Therefore, because a site-specific background level for arsenic has not been determined, the Custodial Trust proposes using 40 mg/kg as the background level for arsenic, even though its intended use as a generic cleanup level was for residential surface soil.

In addition to the remedy performance standards noted above, the following will be considered in the CMS evaluations:

- Available funds in the East Helena Cleanup Account
- USEPA's "balancing criteria"
- Long-term effectiveness
- Reduction of toxicity, mobility, or volume of wastes
- Short-term effectiveness
- Implementability
- Cost-to-benefit provided by all potential remedial actions
- Community acceptance
- Compliance with applicable standards for waste management under 40 Code of Federal Regulations 264.552

- Other RCRA requirements (e.g., closure requirements, land disposal restrictions), and other legal requirements

TABLE 2-2
Proposed Media Cleanup Standards for Primary Inorganic Constituents in Soil

Media	Constituent of Concern	Land Use	Proposed Cleanup Standard (µg/L groundwater, mg/kg soil)	Basis of Standard	Applications for Standard
Groundwater	Arsenic	All	0.010	MCL	Exceedance MCS indicates need for remedial action and will be considered in identification of areal extent of institutional controls (Controlled Groundwater Area)
	Cadmium		0.005		
	Selenium		0.05		
Surface Soil	Lead	Ecological	650	Concentration established to be protective of ecological receptors (passerines) at other MT remediation sites[a]	Will be applied as a design criterion for IM and final remedy construction (final surface site work associated with Prickly Pear Creek and Tito Park excavation, surface layer of ET Cover System, etc.)
		Residential	400	USEPA RSL[b]	Establishes concentration threshold for remedy implementation on undeveloped properties when land use changes
		Industrial - Commercial	800		
		Recreational	3,245	OU2 ROD	
	Arsenic	Residential	35	Hegeler Zinc ROD[c]	
		Industrial - Commercial	572	OU2 ROD	
		Recreational	794	OU2 ROD	
Soil at Depth	Arsenic		40	(MDEQ, 2013)	Establishes extent of remedial action required to prevent groundwater contact with contaminated soil and to control infiltration
	Cadmium		0.38	USEPA MCL-based SSL[b] (concentration needed to achieve MCLs in groundwater)	
	Selenium		0.26	USEPA MCL-based SSL[b] (concentration needed to achieve MCLs in groundwater)	

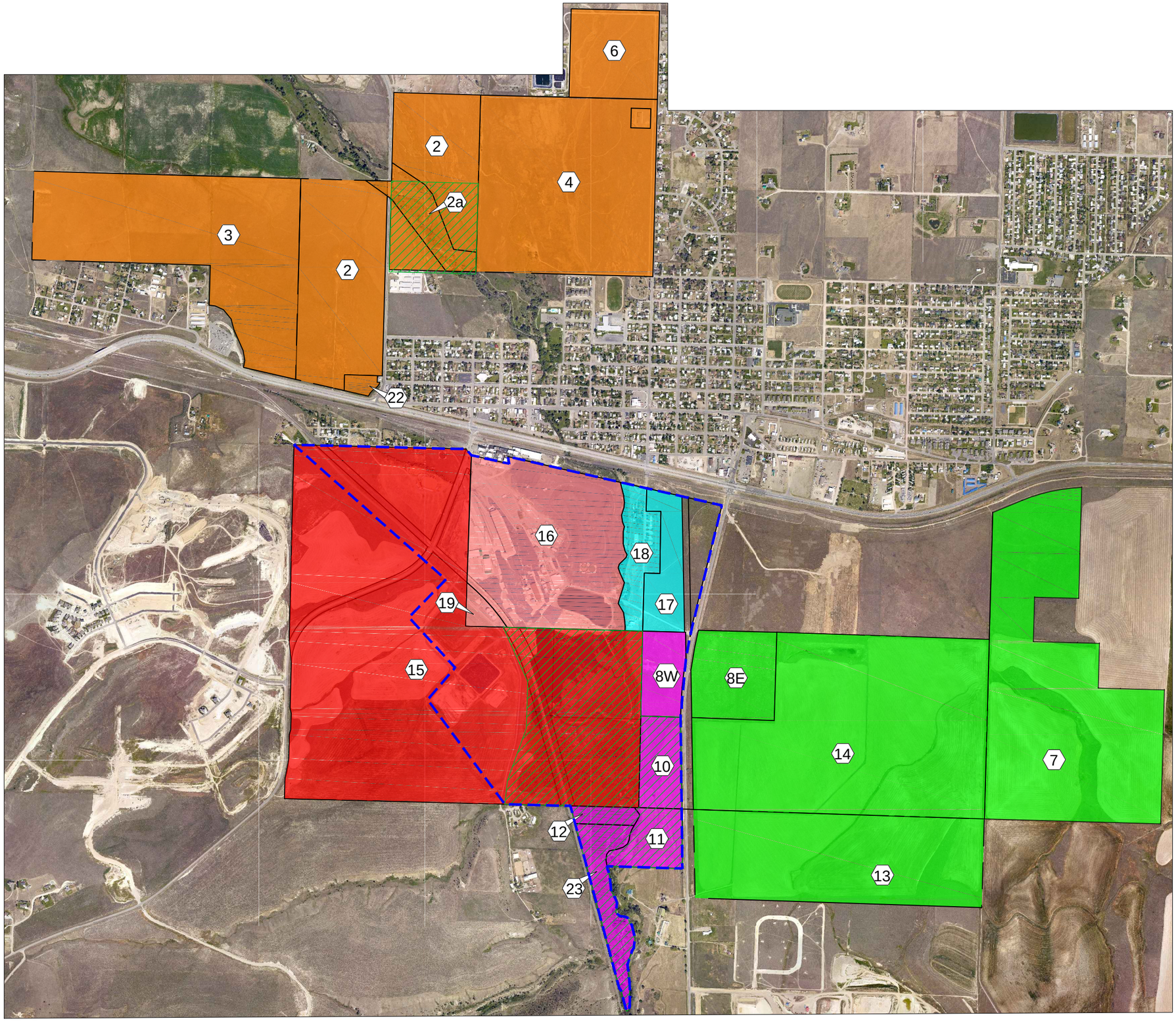
[a] Recommended based on its consistency with action levels developed at other similar smelter/mining sites: OU2 Record of Decision (ROD) East Helena, MT; Anaconda Smelter Superfund Site, Anaconda, MT; Bunker Hill Superfund Site, Coeur d'Alene, ID; and Tri-State Mining District (Oklahoma, Kansas, and Missouri) Superfund Site.

[b] USEPA June 2015 RSL or MCL-based soil screening level (SSL) where indicated

[c] The arsenic cleanup level is recommended based on risk-based concentrations currently being approved by USEPA at former smelter sites and similar facilities across the country. The Hegeler Zinc ROD is cited as an example of current practice (USEPA, 2014).

Abbreviations:

µg/L = micrograms per liter
ET = evapotranspiration
IM = interim measure
MCL = maximum contaminant level
MDEQ = Montana Department of Environmental Quality
mg/kg = milligrams per kilogram
OU2 ROD = Record of Decision for Operable Unit 2
RSL = regional screening level



VICINITY MAP

LEGEND

- Parcel Boundary
- Parcels 2, 2a, 3, 4, 6, and 22
- Parcel 15
- Parcels 16 and 19
- Parcels 17 and 18
- Parcels 7,8E,13,and 14
- Parcels 8W,10,11,12, and 23
- Montana's First Right of Refusal Property
- Approved Area Of Contamination Boundary

N

0 750 1500 2250

1"=750'

Figure 2-1
Corrective Measures Study Parcels
Corrective Measures Study Work Plan Update
East Helena, Montana

CH2MHILL

SECTION 3

Preliminary Conceptual Site Models and Conceptual Exposure Models

Conceptual site models (CSMs) are dynamic tools that present a holistic picture of site conditions for use in the development and evaluation of remedial actions. CSMs are used to: summarize what is known or suspected about a subset area of the site; organize and present the information with respect to site-specific goals; and provide a framework for focusing efforts to identify and obtain additional data needed to make decisions about interim measures (IMs) and final corrective measures.

Preliminary conceptual site models (PCSMs) have been developed as the first step toward integrating existing information about the CMS Properties surrounding the former Smelter site relative to contaminant fate and transport, thus showing the relationships between contaminant sources and fate and transport/migration mechanisms. Preliminary conceptual exposure models (PCEMs) have been developed as part of the Screening-Level Human Health Risk Assessment (SLHHRA; CH2M HILL, 2011) to identify complete or potentially complete exposure pathways and potential receptors. A copy of the SLHRRA is provided in Appendix B, for reference.

This section presents a PCSM for all former ASARCO Properties, and summarizes key existing information about the entire area. Individual PCSMs for the CMS Properties have also been developed to provide additional parcel-specific details for each of the parcel groupings listed in Table 2-1. A CSM for Parcels 16 and 19 has been developed to summarize the existing, significant data and information about site conditions. Primary information sources for all PCSMs, as well as the CSM for Parcels 16 and 19, are the draft *Phase II RCRA Facility Investigation—East Helena Facility* (draft Phase II RFI; GSI Water Solutions, Inc., 2011); the BERA; and the OU2 ROD (USEPA, 2009b), and include PCEMs from the SLHHRA.

Note that the PCSMs summarize information presented in the draft Phase II RFI, which compared sampling and analytical results to conservative, risk-based project SLVs. Key uncertainties in each preliminary model are noted and information to address these uncertainties will be obtained through focused investigations conducted as part of the CMS. These PCSMs will be refined as new information is obtained and developed, and will thereafter be referred to as CSMs to acknowledge the inclusion of a more complete dataset.

3.1 Overall Preliminary Conceptual Site Model for the Custodial Trust-Owned, Former ASARCO Properties

The overall PCSM for the former ASARCO Properties is summarized as follows:

- In general, the former Smelter site is the primary historical and current source of contaminants to the CMS Properties. As found throughout the Helena Valley, naturally occurring arsenic also contributes to the concentrations found at and around the former Smelter site.
- COPCs identified to date are inorganic contaminants associated with former ASARCO operations. The draft Phase II RFI identified arsenic, cadmium, copper, lead, and zinc (based on concentrations) as the primary COPCs for soil; and arsenic and selenium as the primary COPCs for groundwater. Although other COPCs are present in groundwater at concentrations exceeding SLVs, they are generally located within the footprint of the combined arsenic and selenium plume areas. It is reasonable to expect that the concentrations of these COPCs will be addressed while addressing the arsenic and selenium plumes.
- Historical sources associated with former ASARCO operations include dust from stack emissions, materials handling and storage practices, leaks from process water systems (which handled both highly acidic and highly alkaline waters), historical Wilson Ditch operations, and contaminated soil (via infiltration and leaching from precipitation). Transport mechanisms such as aerial deposition, stormwater infiltration and runoff, Wilson Ditch flows (prior to rerouting around the former Smelter site), and groundwater flow beneath the site contributed to the migration of COPCs over time. The active operational sources were eliminated when the ASARCO smelter was shut down in 2001. ASARCO implemented several remedial measures (e.g., soil removal,

slurry wall containment, demolition of structures, installation of temporary covers) to address some known source areas. Although the operational sources have been eliminated, residual contamination in environmental media (primarily onsite soil and sediment) continues to release COPCs to the CMS Properties.

- The most significant current transport mechanism is groundwater flow, which is to the north and west of the former Smelter site. Onsite monitoring wells, piezometers, public water supply wells, and residential wells are monitored under this work plan, with monthly, quarterly, semiannual, and annual sampling events depending on the monitoring objective(s). Recent monitoring results suggest that the extent of the arsenic plume appears to be relatively stable. The areal extent of the selenium plume has been delineated over the past few years, but the period of record for the detailed groundwater selenium dataset (2007 to present) is too short to quantify long-term trends and the current status (for example, stable, advancing, or regressing) of the selenium plume.
- Potential exposure to human receptors at the former Smelter site (Parcels 16 and 19 are currently being addressed through engineered controls (fencing and temporary covers) and institutional controls (including strict compliance with the site-wide Health and Safety Plan). These parcels, particularly the former Smelter site, are being addressed using IMs early in the corrective action process because they represent the areas of the highest potential risk based on existing data. The potential for unacceptable risk associated with human exposures to COPCs at concentrations exceeding risk-based SLVs at the other CMS Properties, including the Un-owned CMS Properties, is considered relatively low based on existing data and the institutional controls implemented to date by the City of East Helena and Lewis and Clark County (prohibition of private wells and soil ordinance, respectively). Potential human exposure at all CMS Properties, however, will continue to be evaluated during the CMS. Appendix C contains the sampling and analysis plan for additional evaluation of all CMS Properties.
- Potential exposures and risk to ecological receptors were evaluated in the BERA for the CMS Properties. The BERA generally concluded the following:
  - The primary COPCs for ecological receptors are arsenic, cadmium, copper, mercury (and methyl mercury), lead, and selenium.
  - The areas noted to have the most existing habitat available for aquatic and terrestrial communities (Prickly Pear Creek, Upper Lake, Upper Lake Marsh) were characterized with either “minimal” or “low to moderate” potential risk. Wilson Ditch was also characterized with “low to moderate” potential risk, but provides habitat only during irrigation season (approximately April to September).
  - The highest potential risks to aquatic and terrestrial communities were identified at the areas referred to in the BERA as the “East and West Perimeter CSM units.” As their name indicates, these areas are located at the perimeter of the former operating areas on the edges of Parcels 16 and 19. Lower Lake and Tito Park were also found to have significantly elevated COPC concentrations in the aquatic and terrestrial communities, although minimal habitat is available.

3.2 Parcels 16 and 19 (Former Smelter Site)

Parcels 16 and 19 encompass approximately 129 acres and have been the focus of numerous investigations, characterization activities, and remedial actions under both CERCLA and RCRA programs; thus, significant information exists regarding site conditions. Although CSMs have been presented in previous documents (including the draft Phase II RFI), they have focused primarily on hydrogeology and groundwater and have not integrated information about source areas and receptors.

3.2.1 Background and Land Use

ASARCO’s Smelter began operating in 1888 and shut down in April 2001. The majority, if not all, of the plant site operations occurred within the boundaries of Parcels 16 and 19. Although lead bullion was the primary product, the Smelter also produced zinc (from 1927 to 1982), sulfuric acid, and matt- and copper-enriched speiss. The waste products produced by the former Smelter site included stack emissions, fugitive emissions from smelting

operations, slag, acid plant sludge, and wastewater from scrubber systems. Historical operations were the original sources of contamination to soil, surface water, and groundwater. The sources included stack emissions, materials handling and storage, waste disposal practices, leaks from process water systems, and infiltration from dust suppression activities. These operational sources were eliminated when Smelter operations ceased in 2001.

3.2.2 Conceptual Site Model of Contaminant Distribution, and Fate and Transport

Much of the overall PCSM for the former ASARCO Properties described in Section 3.1 applies to Parcels 16 and 19 (Figure 3-1). This section reiterates the relevant aspects described in Section 3.1 and supplements the conceptual understanding of contaminant distribution, and fate and transport at Parcels 16 and 19:

- Historical operations at the former Smelter site were the original sources of contamination to soil, surface water, and groundwater. The sources included stack emissions, materials handling and storage, waste storage and disposal practices, and leaks and spills from process water systems. These operational sources were eliminated when Smelter operations ceased in 2001.
- Surface and subsurface soil contaminant concentrations are elevated throughout the former Smelter site, although concentrations vary significantly from area to area. Throughout much of the site, contaminant concentrations are orders of magnitude higher than levels considered protective of human and ecological receptors.
- Current contaminant sources to groundwater are attributable to residual contamination left by historical operations. As detailed in the draft Phase II RFI, COPCs in site soil and/or groundwater include antimony, arsenic, cadmium, copper, lead, selenium, and zinc. Based on extensive soil and groundwater quality sampling, arsenic and selenium have been identified as the two primary COPCs in groundwater and represent effective surrogates for identifying the distribution, fate, and transport of all COPCs.
- Detailed soil sampling at the former Smelter site shows that contaminant concentrations in soil are generally greatest near ground surface and near the groundwater table. Between ground surface and the water table, and below the water table, contaminant concentrations generally decrease with depth.
- A three-dimensional model of soil contamination was prepared using Mining Visualization System (MVS) software to help visualize subsurface soil conditions using existing soil data. Soil contaminant distributions were generated with the aid of kriging, an industry standard geostatistical technique for data interpolation between soil data points. The MVS model results are presented for arsenic and selenium (Figures 3-2, 3-3, 3-4, and 3-5), the two primary COPCs in groundwater.
- ASARCO completed numerous remedial actions before and after the 2001 plant shutdown. A detailed summary of remedial actions dating back to 1977 is provided in Table 2-A-1 of the draft Phase II RFI. Remedial actions completed prior to the shutdown focused on process circuit features such as Thornock Lake, the Acid Plant water treatment facility, Speiss/Dross settling pond and granulation pit, plant water circuit piping improvements, Acid Plant Sediment Drying Area (APSD Area), and Lower Lake. Remedial activities included replacement of Thornock Lake with a 93,000-gallon steel tank; replacement of the Acid Plant settling pond with a new water reclamation facility; excavation of contaminated soil from Thornock Lake, the Speiss settling pond, the Speiss granulating pit, and the Acid Plant; and dredging of sediments from Lower Lake. These activities, conducted from 1977 through 1996, resulted in improvements to groundwater quality although contaminant concentrations remained high in groundwater. Other pre-closure activities included replacement of the Wilson Ditch open channel with a buried pipe through the former Smelter site, later routing the Wilson Ditch pipeline around the site, and startup of a high-density sludge (HDS) water treatment plant (WTP) for treatment of process waters in 1994. These activities are described in the Current Conditions/Release Assessment report (Hydrometrics, 1999).
- Remedial activities completed since the Smelter shut down included construction of slurry walls around two areas of contaminated soil, the APSD Area and the Speiss/Dross area. Both slurry walls have resulted in reduced leaching of contaminants from soil and improved groundwater quality.

- The current sources of arsenic and selenium contamination to groundwater at the former Smelter site include contaminated soil, buried debris such as wood and bricks, slag, and possibly Lower Lake sediment, although Lower Lake sediment was addressed, at least in part, during the dredging activities completed in 1996.
  - Contaminated soil is the most significant, ongoing source of arsenic and selenium loading to groundwater. Although some of the contaminated soil has been addressed through ASARCO's remedial actions, contaminated soil (and intermixed debris and other wastes) continues to have a significant effect on groundwater quality.
  - Although residual impacted soil is a primary source of selenium loading to groundwater, other factors such as resolubilization of selenium-containing secondary minerals within the aquifer matrix, possibly in response to changing groundwater pH or other geochemical conditions, may also impact groundwater quality in localized portions of the former Smelter site.
  - The slag pile, a partially vitreous byproduct of the smelting process, occupies the northeastern portion of the former Smelter site. Numerous studies and tests have been completed to assess the leachability of the slag pile and potential effects on groundwater quality. These studies are summarized in the draft Phase II RFI. Older studies conducted in the 1980s and 1990s, such as the Comprehensive Remedial Investigation/Feasibility Study (Hydrometrics, 1990) and Phase I RFI (Asarco Consulting, Inc., 2005), focused on slag as a potential source of arsenic loading to groundwater while the more recent Phase II RFI studies examined the potential for slag to act as a source of both arsenic and selenium. In all cases, the leachability of the slag and the forms or phases of contaminants (as determined through sequential extraction testing) were found to vary in different portions of the slag pile. The Phase II RFI studies showed that the younger unfumed slag, produced after shutdown of the Zinc Plant in the early 1980s, has the greatest potential to leach arsenic and selenium, as compared to the older fumed and unfumed slag. The potential for the slag pile to act as an ongoing source of contaminant loading to groundwater will be further evaluated as part of the overall CMS.
  - Lower Lake sediments contain arsenic and selenium from historical operations that may impact groundwater through seepage. Based on the current distribution of contaminants in groundwater, Lower Lake sediments do not appear to be a primary source of groundwater contamination.
- The most significant mechanisms for leaching and transport of inorganic contaminants from soil to groundwater include, in order of importance: leaching of contaminants from soil to groundwater within the saturated zone; seasonal fluctuation in the water table (and capillary fringe), and infiltration of surface precipitation. As noted above, some of the highest constituent concentrations occur at the water table, where periodic wetting and drying is believed to increase the contaminant leaching rate.

  Findings of the Upper Lake drawdown test (Hydrometrics, 2012) (Appendix D) have provided additional insight into the leaching and transport of contaminants in the saturated zone. The drawdown test confirmed that Upper Lake is a significant source of recharge to the former Smelter site groundwater system, with the lake level having a strong influence on site groundwater levels. Leakage from Upper Lake recharges the groundwater system at the extreme southern (upgradient) end of the site, from where it flows northward through the main plant site. This groundwater flow pattern and interaction of groundwater with contaminated soil is a main driver in development of the arsenic and selenium groundwater plumes. The Upper Lake drawdown test also showed that groundwater flow follows two main pathways from Upper Lake, one originating from the northwestern corner of Upper Lake and flowing northwestward through the former APSD Area and western portion of the main plant site, and the second flowing northward through Tito Park toward Lower Lake. From Lower Lake, the water flows either westward to the main plant site, or eastward toward Prickly Pear Creek. Test results show groundwater flow from Lower Lake to the north (beneath the slag pile) is minimal. Understanding the specific groundwater flow paths, and how elimination of Upper and Lower Lakes may alter these patterns, allows for better assessment of current and potential contaminant loading to groundwater within the saturated zone after the implementation of South Plant Hydraulic Control (SPHC). In any event, lowering groundwater levels at the main plant site will reduce the interaction of

groundwater with contaminated soil, and contaminant loads in groundwater onsite and downgradient of the site.

The conceptual exposure model (CEM) for this area is presented as Figure 3-1 of the SLHRRA and indicates that potentially complete exposure pathways for onsite workers and trespasser receptors are present for surface soil and surface water (fishing in Prickly Pear Creek). However, the former Smelter site currently is fenced and unauthorized access is forbidden.

Based on the CSM and the CEM, the remedy targets to be considered in the CMS for the former Smelter site are as follows:

- Areas of surface soil (including creek banks) with concentrations of COPCs exceeding levels that would be protective of human health under industrial/commercial and recreational land uses
- Sediment and surface water in Prickly Pear Creek, with concentrations of COPCs exceeding levels that would be protective of human health under industrial/commercial and recreational land uses

Additional information on soil and groundwater contamination is presented in the *Former ASARCO East Helena Facility Interim Measures Work Plan—2013* (hereafter referred to as the IM Work Plan 2013) (CH2M HILL, 2013a).

3.2.3 Uncertainties in Conceptual Site Model and Information Needed to Address

The CSM for Parcels 16 and 19 was prepared based on significant information available regarding conditions at the former Smelter site. The CSM provides a robust framework for making decisions about IMs and final corrective measures. To aid in the decision-making process, as described in Section 5.3, Develop Numerical Groundwater Model, the Custodial Trust has prepared a numeric groundwater flow model, which has been used in technical remedy evaluations as well as IM design work to predict flow patterns. Modifications to the groundwater flow model are currently being conducted using available data to refine the understanding of fate and transport. There are currently no uncertainties or data gaps to this CSM. The Custodial Trust may identify and implement focused data collection efforts in the future.

3.3 Parcel 15

3.3.1 Background and Land Use

This parcel borders the south and west sides of the former Smelter site and encompasses 486 acres. Historical and current use of the majority of this parcel has been agricultural, with areas of limited recreational uses (Rodeo Grounds) or open space and habitat, particularly in and near Upper Lake and Upper Lake Marsh. There is no residential use on Parcel 15, nor is residential use reasonably anticipated to be a future use based on the preliminary results of property development and market analyses performed by the Custodial Trust.

CAMUs I and II, and a small portion of Tito Park (an upland area between Upper and Lower Lake), are also located on Parcel 15. Even though extensive source removal is expected to occur at Tito Park, these areas in Parcel 15 are expected to be restricted to an industrial land use category in the future. The two CAMUs have been approved, constructed, and filled. Final closure notification of CAMUs I and II was provided by USEPA on January 18, 2002, and January 14, 2015, respectively.

3.3.2 Preliminary Conceptual Site Model of Contaminant Distribution, and Fate and Transport

Site conditions and conceptual fate and transport mechanisms are illustrated in Figure 3-6 and summarized as follows:

- Historical ASARCO operations are expected to have affected surface soil on Parcel 15, primarily through airborne particulate deposition:
  - 2010 soil sampling results presented in the draft Phase II RFI for locations along the western perimeter of the former Smelter site show exceedances of SLVs for most site-related COPCs.

  - The OU2 ROD noted that existing data from throughout the East Helena area showed that surface soil concentrations of lead were highest in soil closest to the former Smelter site (in the 0- to 0.5-mile distance), decreasing significantly as distance increased with each 0.25-mile increment. Based on this transport model and the projected iso-concentration lines shown in Figures 5.3 and 5.4 of the OU2 ROD, it is expected that surface soil across the majority of Parcel 15 could have lead at concentrations above 1,000 mg/kg and the eastern half of Parcel 15 could have arsenic exceeding 100 mg/kg.
  - Because the majority of Parcel 15 has been actively farmed and tilled, current COPC concentrations in Parcel 15 surface soil may be lower than historical concentrations due to mixing with deeper, less contaminated soil.

- Current groundwater monitoring data show that the arsenic and selenium plumes extend westward from the former Smelter site beneath Parcel 15 (as illustrated in the Appendix A figures). The selenium plume is restricted to the extreme northeastern portion of Parcel 15, with concentrations in the 0.05 to 0.10 milligram per liter (mg/L) range. The arsenic plume shows a much different configuration, with the highest concentrations (0.01 to 0.02 mg/L) occurring in the southwestern portion (near the CAMUs) and western portion of Parcel 15. However, based on several lines of evidence (groundwater potentiometric maps; water level hydrographs; differences in groundwater chemistry between the former Smelter site, Parcel 15, and surrounding groundwater; arsenic concentrations in groundwater upgradient of Parcel 15), it appears that multiple sources (including naturally occurring arsenic) contribute to the arsenic concentrations observed at Parcel 15.
- The Phase II RFI Work Plan (Hydrometrics, 2010) provides a detailed discussion of the geochemistry and status of the groundwater plumes as of 2009. Figure 2-3-13 of the Work Plan compares the 10-mg/L and 0.010-mg/L groundwater iso-concentration contours from November 2002 (after the Smelter was shut down) and May 2009. The downgradient margins of the arsenic plume (represented by the 0.010-mg/L contour) show very little change over that period, while the higher concentration portion of the plume, represented by the 10-mg/L contour, shows a slight contraction. The relative stability of the downgradient arsenic plume and the slight contraction of the higher concentration plume closer to the historical source areas is consistent with both (1) the removal or other mitigation of identified sources that has occurred at the former Smelter site, and (2) the ongoing arsenic attenuation at the plume front through adsorption and/or coprecipitation mechanisms. Similar comparisons of the 2002 and 2009 arsenic plume to 2012 and 2013 plume geometry support the conclusion that the arsenic plume is currently stable or in a state of equilibrium. Similar comparisons are not possible for selenium due to the limited period of record for the monitoring data, especially north of the site near the selenium plume front. However, selenium concentrations do show some apparent temporal trends on portions of the plant site, particularly in the western portion of the site near the former Thawhouse, most likely due to resolubilization of previously precipitated or adsorbed selenium from the aquifer matrix due to changing pH and redox conditions in groundwater. Both the arsenic and selenium plumes will continue to be evaluated for current and projected future trends.
- Upper Lake was identified in the draft Phase II RFI as a potential area of concern for surface water, based on exceedances of SLVs for arsenic, cadmium, copper, lead, and selenium. No COPCs at concentrations exceeding SLVs were found at Wilson Ditch south of Highway 12.
- Upper Lake also was identified as a potential area of concern for sediment, with antimony, arsenic, cadmium, copper, lead, manganese, mercury, silver, and zinc at concentrations above SLVs protective of benthic invertebrates. Upper Lake Marsh samples from the banks and perimeter also show exceedances of SLVs in sediments. The BERA generally characterized risks to ecological receptors as “low-to-moderate” for these areas.
- Historical mining activities upstream of Parcel 15 are known to have contributed metals to Prickly Pear Creek and the surface water bodies created by diversion of the creek, including Upper Lake.
- Based on analytical results from two sampling locations, the primary COPCs in Wilson Ditch are lead and mercury, detected in sediment at 1,100 and 650 times their SLVs, respectively. In general, COPC

concentrations from the sample near the property line between Parcel 15 and the Manlove Addition are less than those in the sample at the upstream end of Wilson Ditch (proximal to where it daylights on the west side of the former Smelter site), but results show that antimony, arsenic, cadmium, copper, lead, manganese, mercury, silver, and zinc exceed SLVs at both the upstream and downstream sampling locations. Wilson Ditch has been dry since November 2011 and will not be used as a flow conveyance system for irrigation water, but will continue to be a stormwater management feature.

The CEM for this area, presented as Figure 3-2 of the SLHHRA (Appendix B), indicates there are potentially complete exposure pathways for current and future human receptors associated with surface soil, surface water, and sediment.

Based on exceedances of SLVs described in the PCSM and the potentially complete exposure pathways identified in the CEM, the portions of Parcel 15 for which the CMS will consider remedies are as follows:

- Areas of surface soil with concentrations exceeding levels that would be protective of human health under agricultural, recreational, or open space land use
- Surface water in Upper Lake
- Sediment in Upper Lake, Upper Lake Marsh, and Wilson Ditch
- Groundwater in the northeasterly corner of Parcel 15

3.3.3 Uncertainties in Preliminary Conceptual Site Model and Information Needed to Address

Key uncertainties associated with the Parcel 15 PCSM are the nature and extent of COPCs, and associated potential risk to human and ecological receptors for the following:

- Surface soil
- Upper Lake surface water
- Upper Lake Marsh and Wilson Ditch sediment

These uncertainties will be addressed in the CMS through the following activities:

- Reviewing historical CERCLA files and other past studies (including Montana State University work) to determine whether relevant surface soil data of appropriate quality (i.e., data not included in the RCRA database) exist for this area.
- Performing sampling and analytical work with appropriate data quality objectives to obtain data on surface soil quality if existing data are found to be insufficient to evaluate potential risk.
- Evaluating how the SPHC study and proposed IMs will affect Tito Park, Upper Lake, and Upper Lake Marsh, and determining whether further characterization of the nature and extent of contamination is necessary to evaluate potential risk to human or ecological receptors. These two evaluations are central to the SPHC evaluations which have been underway since 2012 (and are further outlined in Section 5.4).
- The scope of and need for remediation of the portions of the Wilson Ditch channel bed located on Parcel 15 will be evaluated as part of the CMS and may be considered as a potential IM in 2014.
- Establishing priorities for remedial actions to address ecological receptors.

Sediment and surface water quality in Upper Lake and Upper Lake Marsh, as well as soil in the southern portion of Tito Park, have not been completely characterized in previous investigations. Consequently, there is uncertainty as to the nature and extent of contamination in these areas, as well.

3.4 Parcels 17 and 18

3.4.1 Background and Land Use

Parcels 17 and 18 encompass approximately 55 acres located adjacent to the former Smelter site, on the east side of Prickly Pear Creek. Parcels 17 and 18 extend easterly from Prickly Pear Creek to Route 518.

Historically, Parcel 18 was a residential area, with company housing for ASARCO employees, the Assistant Plant Manager, and the Plant Manager. The former ASARCO housing on S. Montana Avenue, including the Assistant Plant Manager's house, were demolished in 2010. The former ASARCO Plant Manager's house was destroyed in a fire in 2012. Demolition activities included abating asbestos, preparing documentation for historical recordation efforts, cleaning and donating all usable fixtures for recycling by Habitat for Humanity, removing and properly disposing of all household hazardous wastes, demolishing all structures to grade, and backfilling basements with clean fill. Demolition debris was disposed of in accordance with the exemption for residential debris at the City-County Sanitation Landfill located in Jefferson County, off Route 518. While surface soil was disturbed during demolition activities, no soil removal or remediation was conducted.

Portions of Parcel 17 have also been used for agricultural purposes and as a repository for soil removed during CERCLA cleanup actions. The areas referred to by ASARCO as the West Field Direct Haul Area (WFDH) and the West Field Disposal Area (WFDA) are located here. A figure produced by ASARCO, titled "Figure 4-1—East Fields Residential Soil Disposal Area," indicates that the WFDA was covered with a "15-inch cap from stockpile and seeded," while the WFDH was "capped and seeded." Appendix E contains a copy of this figure.

Future use of Parcel 18 currently is anticipated to be recreational/open space. After fire destroyed the ASARCO Plant Manager's house, the remaining onsite structures were used for emergency response training. Potential future uses for Parcel 17, as envisioned in the conceptual land use plans developed for the Custodial Trust by CTA Architects and Engineers, include the potential for commercial and light industrial developments. Because portions of these areas are a CERCLA soil repository, any future development should consider methods for controlling potential unacceptable exposures to soil with inorganic contaminants.

3.4.2 Preliminary Conceptual Site Model of Contaminant Distribution, and Fate and Transport

The current understanding of parcel conditions and the conceptual fate and transport model are based on information presented in the draft Phase II RFI and the OU2 ROD. This information is summarized as follows and shown in Figure 3-7 of this CMS Work Plan:

- This area is immediately downwind of the former Smelter site and historical ASARCO operations have affected surface soil in this area, primarily through airborne particulate deposition. Stack emissions were the main source of airborne particulates while the smelter was in active operations. Those sources were eliminated when the facility was shut down in 2001. The extent to which particulates may have migrated to surface soil from the slag pile is unknown. The Phase II RFI surface soil sampling results in this area showed:
  - Arsenic and lead are present at concentrations exceeding all SLVs, including those established for protection of groundwater.
  - Cadmium is present at concentrations below the industrial land use screening level, but above residential and protection of groundwater screening levels.
  - Selenium is present at concentrations exceeding screening levels established for protection of groundwater.
- Parcels 17 and 18 are generally upgradient of the former Smelter site with respect to groundwater flow. The two wells located in Parcels 17 and 18 show minimal effects. Phase II RFI groundwater data were screened against SLVs (Table 7-6 of the draft Phase II RFI). Manganese was not detected at upgradient well DH-7. However, an exceedance of manganese was reported at DH-11; concentration in this well is elevated compared to background concentrations of manganese.

- The reach of Prickly Pear Creek adjacent to Parcels 17 and 18 (approximately Stream Segment 5, from SG-07 to SG-08; Appendix C) is shown as a gaining section, but was not identified as an area of potential concern for surface water or sediment in the draft Phase II RFI.
- The BERA characterized potential risks to ecological receptors in riparian areas of Prickly Pear Creek as low, noting that the area of the creek most affected was the reach adjacent to the former Smelter site located on Parcel 18.
- The Phase II RFI showed that several COPCs exceeded SLVs in upstream sediment reference samples, including antimony, arsenic, copper, lead, silver, and zinc, which demonstrates that mining activities upstream of the former Smelter site have affected sediment quality. It should also be noted that BERA analyses of 2003 and 2010 sediment samples from Prickly Pear Creek showed that contaminant concentrations have decreased by approximately an order of magnitude during that timeframe, indicating that natural processes are effectively reducing contaminant levels. It is possible that sediment could be deposited on surface soil during flooding events; however, the concentrations of COPCs in sediment are much lower than those seen in surface soil and this source and transport mechanism are not expected to contribute significantly to potential human exposure risks.

The CEM for Parcels 17 and 18 is presented as Figure 3-4 of the SLHHRA (Appendix B) and indicates that potentially complete exposure pathways are limited to surface soil for current and future recreational and trespasser receptors.

Based on the PCSM and the CEM, the primary remedy target to be considered in the CMS for Parcels 17 and 18 is expected to be surface soil with concentrations exceeding levels that would be protective of human health under agricultural, recreational, or open space land use.

Under this PCSM, corrective measures for surface water in Prickly Pear Creek would not be necessary because the surface water has not been identified as posing an unacceptable risk to human or ecological receptors and the water quality in this area will be improved by the remedial actions to be taken at Upper and Lower Lake. Further, upstream mining sources unrelated to former ASARCO operations continue to contribute contaminants to Prickly Pear Creek.

3.4.3 Uncertainties in Preliminary Conceptual Site Model and Information Needed to Address

The key uncertainties associated with the PCSM for Parcels 17 and 18 are as follows:

- The nature and extent of COPCs in surface soil
- Whether windblown particulate from the slag pile is contributing significant levels of COPCs to surface soil

These uncertainties will be addressed in the CMS through the following activities:

- Reviewing historical CERCLA files, as well as relevant data from other studies, to determine whether additional surface soil data (i.e., data not included in the RCRA database) exist for this area.
- Acquiring and reviewing historical data from an air monitoring station proximal to the slag pile to evaluate whether airborne deposition of slag particles is a transport mechanism of significance.
- Performing sampling and analytical work with appropriate data quality objectives to obtain data on surface soil quality and assess potential risk under current and reasonably anticipated future land use. CMS work will be coordinated with any follow-up work associated with the BERA.

3.5 Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518

3.5.1 Background and Land Use

Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518 are located to the south and east of Parcel 15. Combined, they consist of approximately 85 acres of Custodial Trust property, and are at least

one-quarter mile away from the perimeter of the former Smelter site. Historical and current use of these areas has been agricultural, recreational, or open space. Limited industrial activities (primarily associated with Air Liquide operations) have occurred here. The Air Liquide facilities were decommissioned and demolished in 2012 in preparation for the PPC temporary bypass construction.

3.5.2 Preliminary Conceptual Site Model of Contaminant Distribution, and Fate and Transport

The current understanding of parcel conditions and conceptual fate and transport mechanisms is based on information presented in the OU2 ROD. This information is summarized as follows and shown in Figure 3-8 of this CMS Work Plan:

- Although not immediately downwind of the former Smelter site, estimated deposition patterns for airborne particulates shown in the OU2 ROD suggest that surface soil in the northerly portion of this area may have lead or arsenic present at concentrations greater than 1,000 mg/kg and 100 mg/kg, respectively. If present, these concentrations would exceed SLVs for protection of human health and groundwater.
- Because this area is upgradient of the former Smelter site, migration of contaminated groundwater from the former Smelter site would not be expected to affect groundwater quality in this area. Even though it is possible that arsenic and lead levels could be present in surface soil at concentrations exceeding levels protective of groundwater, the potential contaminant mass present in surface soil would not be expected to significantly affect groundwater quality. Therefore, groundwater is not a medium of concern for these parcels.
- Similarly, the reaches of Prickly Pear Creek running through these parcels are upstream of the former Smelter site, and would not have been affected by former ASARCO operations. To date, COPCs detected in surface water and sediment in Prickly Pear Creek on these parcels have been attributed to past and current upstream mining, and the potential for ongoing contributions of COPCs to Prickly Pear Creek will continue as long as upstream sources are not removed. Therefore, surface water and sediment for these parcels are not media of concern for the Custodial Trust.

The CEM for this area is presented in the SLHHRA (Appendix B) as Figure 3-3 and indicates that potentially complete exposure pathways are limited to surface soil, for current and future rancher/agricultural, recreational, and trespasser receptors.

Based on the PCSM and the CEM, the remedy targets to be considered in the CMS for Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518 are areas of surface soil with concentrations exceeding levels that would be protective of human health under rancher/agricultural, recreational, or open space land use.

3.5.3 Uncertainties in Preliminary Conceptual Site Model and Information Needed to Address

The key uncertainty associated with the PCSM for Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518 is the nature and extent of COPCs in surface soil. This uncertainty will be addressed in the CMS through the following activities:

- Reviewing historical CERCLA files, as well as relevant information from other studies, to determine whether additional surface soil data (i.e., data not included in the RCRA database) exist for this area.
- Performing sampling and analytical work with appropriate data quality objectives to obtain data on surface soil quality—if existing data are insufficient to evaluate potential risk.

3.6 Portions of Parcel 2 Near Prickly Pear Creek

3.6.1 Background and Land Use

This area is located north of U.S. Highway 12, and the objective of CMS work is this area will be to evaluate whether the riparian habitat may have been affected by contamination from the historical ASARCO operations. The First Modification does not specify the exact area to be included, saying only *"… portion of 2 near Prickly Pear Creek…."* For the purposes of the CMS, the area to be evaluated will be within the 100-year floodplain boundary

and the riparian corridor, the extent being defined by existing habitat vegetation as shown in Figure 2-1. Historical and current land use within this area has been either agricultural or open space.

3.6.2 Preliminary Conceptual Site Model of Contaminant Distribution, and Fate and Transport

The current understanding of parcel conditions and conceptual fate and transport mechanisms is based on information presented in the draft Phase II RFI and the OU2 ROD. This information is summarized as follows and shown in Figure 3-9 of this CMS Work Plan:

- Historical ASARCO operations may have affected surface soil in this area through airborne particulate deposition. Estimated deposition patterns in the OU2 ROD show that the area on Parcel 2 is within the zone where the estimated distribution of total soil lead is greater than 1,000 mg/kg. The entire area is outside the zone where there was more than a 2.5 percent probability that soil arsenic would exceed the 100-mg/kg ecological risk-based concentration. This suggests that surface soil concentrations of lead could exceed SLVs.
- Slag and other debris have been observed along the banks of the Creek in this area.
- Groundwater exceeds the 0.01-mg/L screening level for arsenic, but only at the southerly portion of Parcel 2 on either side of the creek.
- Based on the 2010 surface water sampling results presented in the draft Phase II RFI, no COPCs were detected above screening levels.
- The reach of Prickly Pear Creek through Parcel 2 was identified as Stream Segment 8 in the draft Phase II RFI and has been characterized as a losing section of the creek, suggesting that groundwater-surface water interface is not a migration pathway of concern.
- Particulate transport by flowing water and bank scour in Prickly Pear Creek has the potential to carry contaminants within the channel and also onto the creek banks during flooding events. Key elements of the PCSM related to sediment are as follows:
  - Sediment contaminant concentrations in this reach of the creek are similar to those in upstream reaches, including reaches upstream of the former Smelter site.
  - It is reasonable to expect that some level of particulate transport will continue to occur for as long as contaminants are present, or are being added from non-ASARCO sources upstream.
  - The 2010 BERA concluded that although concentrations of ASARCO-related contaminants were present in sediment at levels that exceeded ecological screening levels, there was no unacceptable risk to ecological receptors and this reach of Prickly Pear Creek was not retained as an area of concern.

The CEM for this area is presented as Figure 3-5 of the SLHRRA and indicates that potentially complete exposure pathways for recreational and trespasser receptors are present for surface soil, surface water, and sediment.

Based on the PCSM and the CEM, the remedy targets to be considered in the CMS for the portions of Parcel 2 near Prickly Pear Creek are as follows:

- Areas of surface soil (including creek banks) with concentrations of COPCs exceeding levels that would be protective of human health under agricultural or recreation/open space land use
- Sediment and surface water in Prickly Pear Creek with concentrations of COPCs exceeding levels that would be protective of human health under agricultural or recreation/open space land use

3.6.3 Uncertainties in Preliminary Conceptual Site Model and Information Needed to Address

The key uncertainty associated with the PCSM for Parcel 2 is the nature and extent of COPCs in surface soil. This uncertainty will be addressed in the CMS through the following activities:

- Reviewing historical CERCLA files and other studies with relevant information to determine if additional surface soil data (i.e., data not included in the RCRA database) exist for this area.
- Performing sampling and analytical work with appropriate data quality objectives to obtain data on surface soil and sediment quality—if existing data are found not to be sufficient to evaluate potential risk.
- Monitoring and evaluating surface water quality. If surface water quality downstream of the former Smelter site is found to be consistent with the quality of water upstream, this will demonstrate that water quality is being affected by the upstream, non-ASARCO, mining activities and no further action will be taken under the RCRA program.

3.7 Un-Owned CMS Properties

RCRA and CERCLA site investigations confirm that contaminants have migrated from the former Smelter site in groundwater, surface water, sediment, and air to properties that are not owned by the Custodial Trust. Surface soil on "Un-owned CMS Properties" has been or will be addressed under CERCLA. The CMS will address the Un-owned CMS Properties affected by migration of hazardous waste or hazardous constituents from the former Smelter site in groundwater, surface water, or sediment.

Historical and current land use of these properties has included multiple land uses, including residential, industrial, commercial, municipal, agricultural, and recreational or open space.

3.7.1 Preliminary Conceptual Site Model of Contaminant Distribution, and Fate and Transport

The current understanding of site conditions and conceptual fate and transport model, summarized as follows, is based on information presented in the draft Phase II RFI, and the OU2 ROD (USEPA, 2009b):

- Extensive and ongoing groundwater monitoring was, and still is, conducted in these areas and is discussed in detail in the draft Phase II RFI. Current monitoring results for the arsenic and selenium plumes are shown in Appendix A. Key points associated with groundwater are as follows:
  - All locations of COPC exceedances are found within the footprint of the combined arsenic and selenium plume boundaries.
  - The arsenic plume appears to be relatively stable, suggesting that attenuation may be occurring at the outer edges of the plume.
- Prickly Pear Creek and Wilson Ditch are the other mechanisms with the potential to transport COPCs to Un-owned CMS Properties.
  - Prickly Pear Creek flows through several Un-owned CMS Properties on both sides of Highway 12. Existing data indicate this is not a primary area of concern.
    - The draft Phase II RFI did not find Prickly Pear Creek to be a primary area of potential concern for surface water or sediment.
    - The BERA characterized potential ecological risks associated with Prickly Pear Creek as "minimal."
  - Wilson Ditch daylights on the west side of the former Smelter site and flows as an open channel across Parcel 15, through the Manlove Addition, and continues under Highway 12 to the northwest. There are three surface water monitoring and three sediment sample locations in Wilson Ditch downstream of Parcel 15. Data from these locations indicate the following:
    - Surface water is not an area of potential concern because, with the exception of a single exceedance of cadmium in the northwest portion of Lamping Field, there were no exceedances of SLVs.
    - Sediment samples in Wilson Ditch downstream of Parcel 15 show primary COPCs as lead and mercury, which were detected at 1,100 and 650 times their SLVs, respectively. Sampling results show that antimony, arsenic, cadmium, copper, lead, manganese, mercury, silver, and zinc all exceed SLVs based

on protection of benthic receptors. The BERA characterized the potential risks to ecological receptors as low to moderate, and noted that Wilson Ditch provided limited habitat due to seasonal irrigation demands that dry out the ditch.

The CEM for these areas is presented in Figure 3-6 of the SLHHRA (Appendix B) and indicates that there are potentially complete exposure pathways for current and future human receptors associated with groundwater, and the surface water and sediment in Wilson Ditch.

Based on the PCSM and the CEM, the remedy targets to be considered in the CMS for the Un-owned CMS Properties are as follows:

- Groundwater with arsenic or selenium concentrations exceeding MCSs. Appendix A contains plume maps of June 2013 data that show where groundwater has arsenic or selenium concentrations exceeding MCSs. Note that the area affected by these combined plumes encompasses areas where other COPCs exceed MCSs, and therefore represents the full area affected by migration of contaminated groundwater. Remedial actions being evaluated for the former Smelter site (as discussed further in Sections 4 and 5) are expected to address many of the groundwater issues through source control and mass reduction.
- Wilson Ditch sediments with COPC concentrations exceeding SLVs. The Custodial Trust is working with USEPA to coordinate remediation of the portions of Wilson Ditch on Un-owned CMS Properties with CERCLA, consistent with previous ditch remediation in East Helena that has been conducted to date under CERCLA.

3.7.2 Uncertainties in Preliminary Conceptual Site Model and Information Needed to Address

Significant information exists about the nature and extent, and fate and transport of COPCs in groundwater based on past and current investigations. The CSM of groundwater flow and contaminant fate and transport is continually being updated as new information and data become available. The significant changes occurring in the former Smelter site hydrologic system, including dewatering of Upper Lake and lowering of Prickly Pear Creek, are providing new insight into the hydrogeologic system onsite and around the site. Information continues to be gathered through an extensive monitoring program, which includes sampling of onsite and offsite monitoring wells, nearby residential and public water supply wells, and surface water as outlined in annual field sampling and analysis plans. Additional information regarding the feasibility and effectiveness of proposed remedial actions to address groundwater contamination will be developed as part of the groundwater modeling work and the SPHC measures, both of which are described further in Section 4.

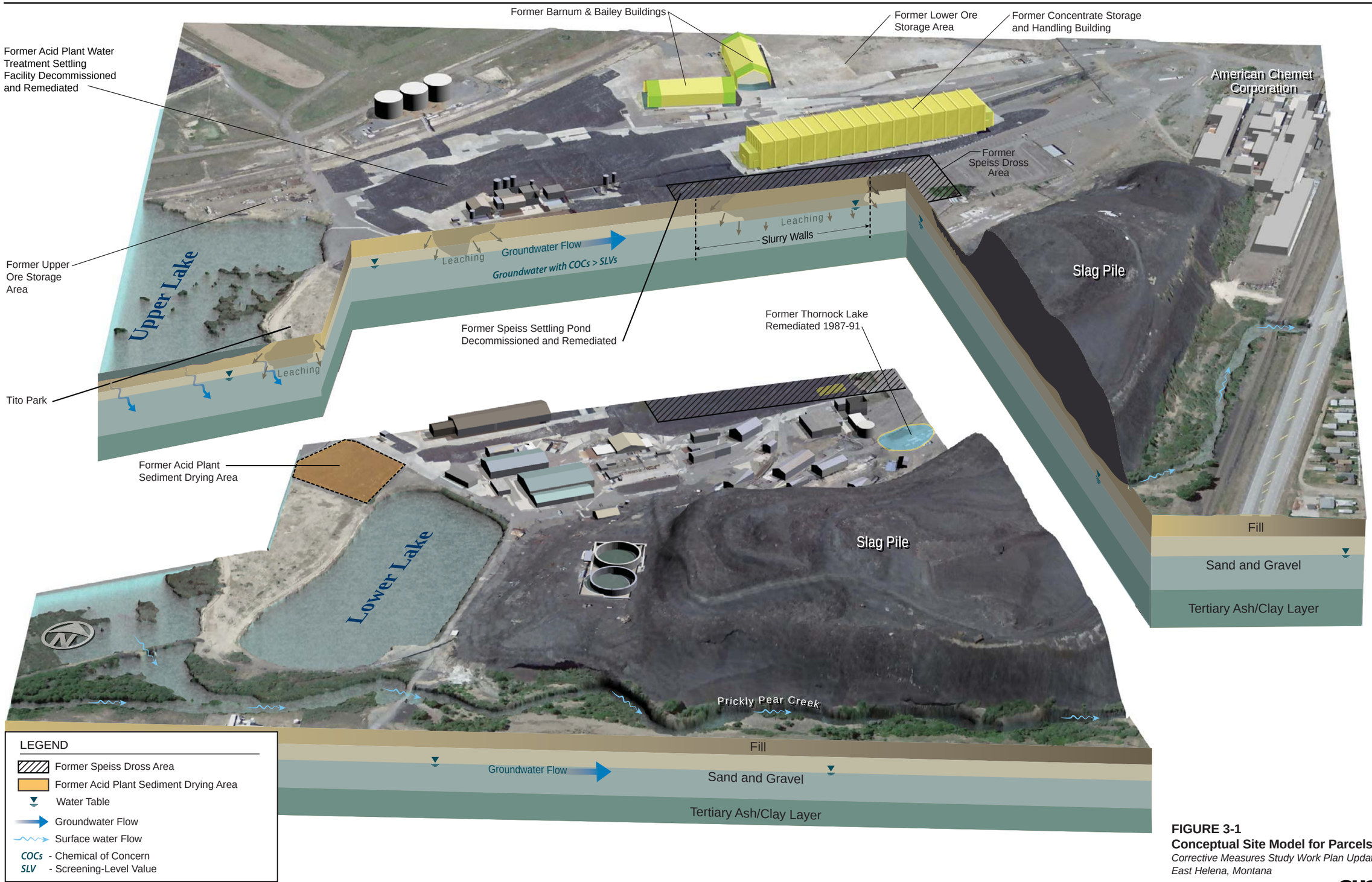
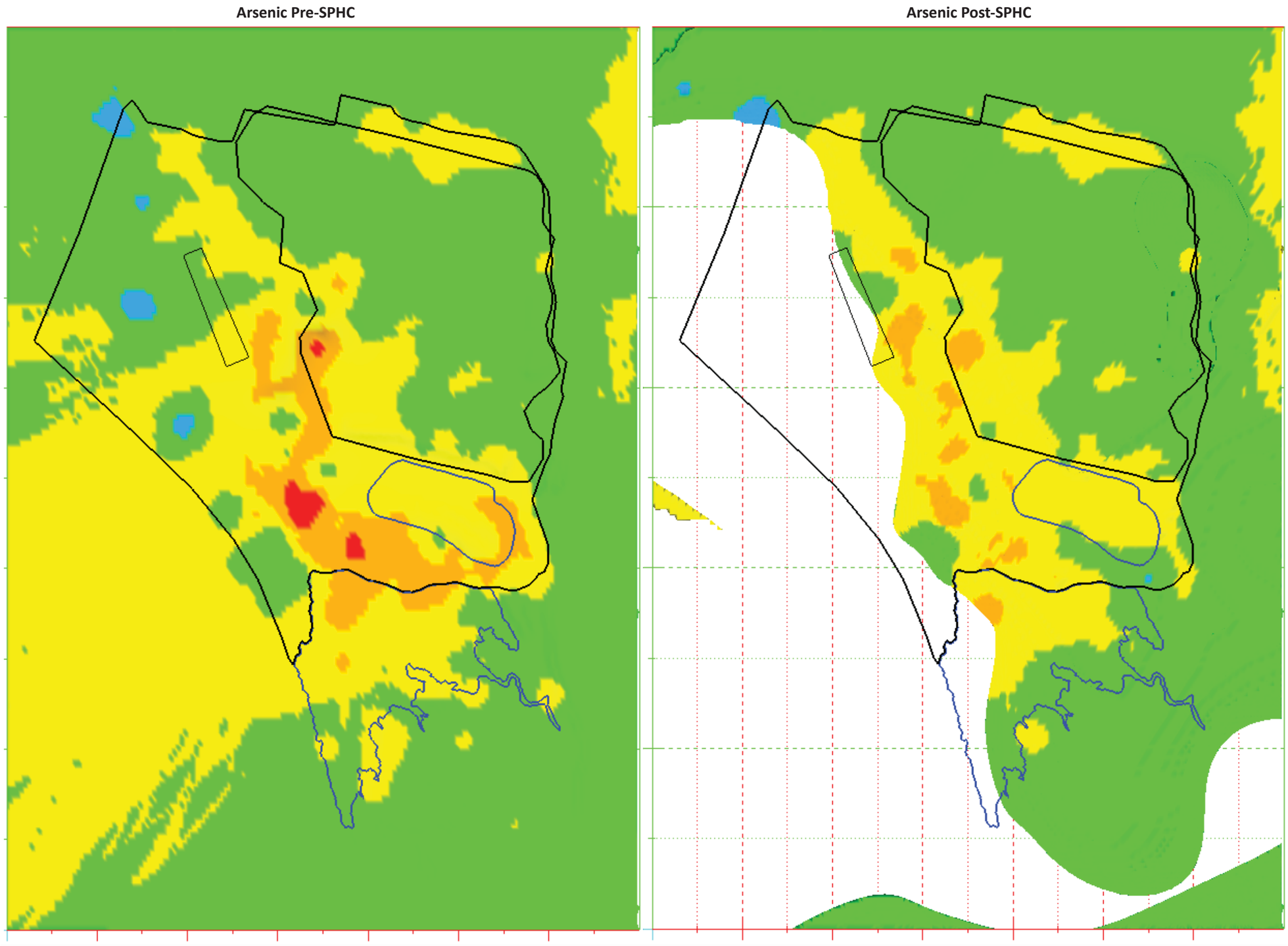


FIGURE 3-1
Conceptual Site Model for Parcels 16 and 19
Corrective Measures Study Work Plan Update
East Helena, Montana

CH2MHILL



LEGEND

Arsenic Concentrations

- Dark Blue: <0.29 mg/kg
- Light Blue: 0.29 - 2.9 mg/kg
- Green: 2.9 - 40 mg/kg
- Yellow: 40 - 290 mg/kg
- Orange: 290 - 2,900 mg/kg
- Red: >2,900 mg/kg

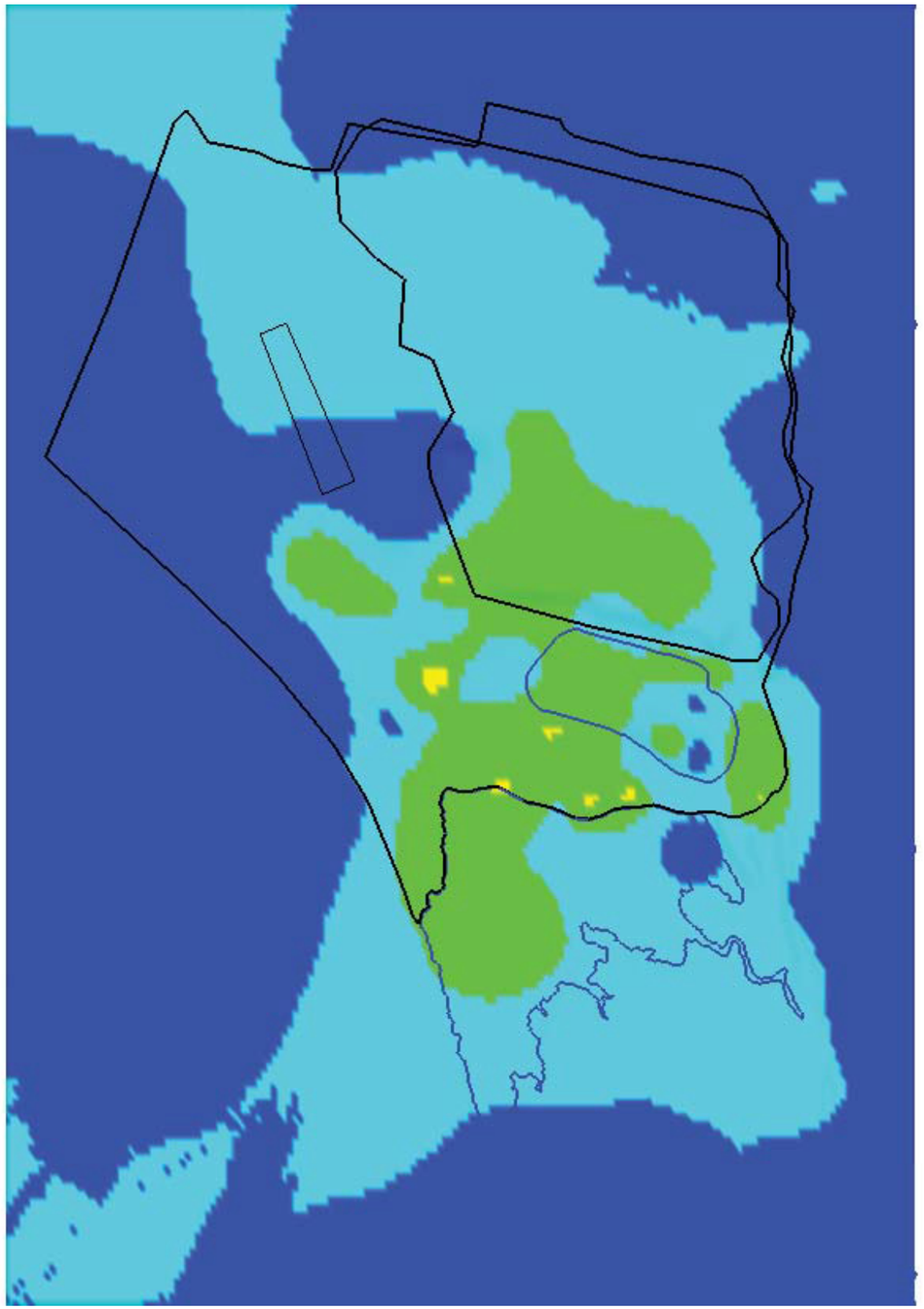
Abbreviations:
mg/kg = milligrams per kilogram
SPHC = South Plant Hydraulic Control

Notes:

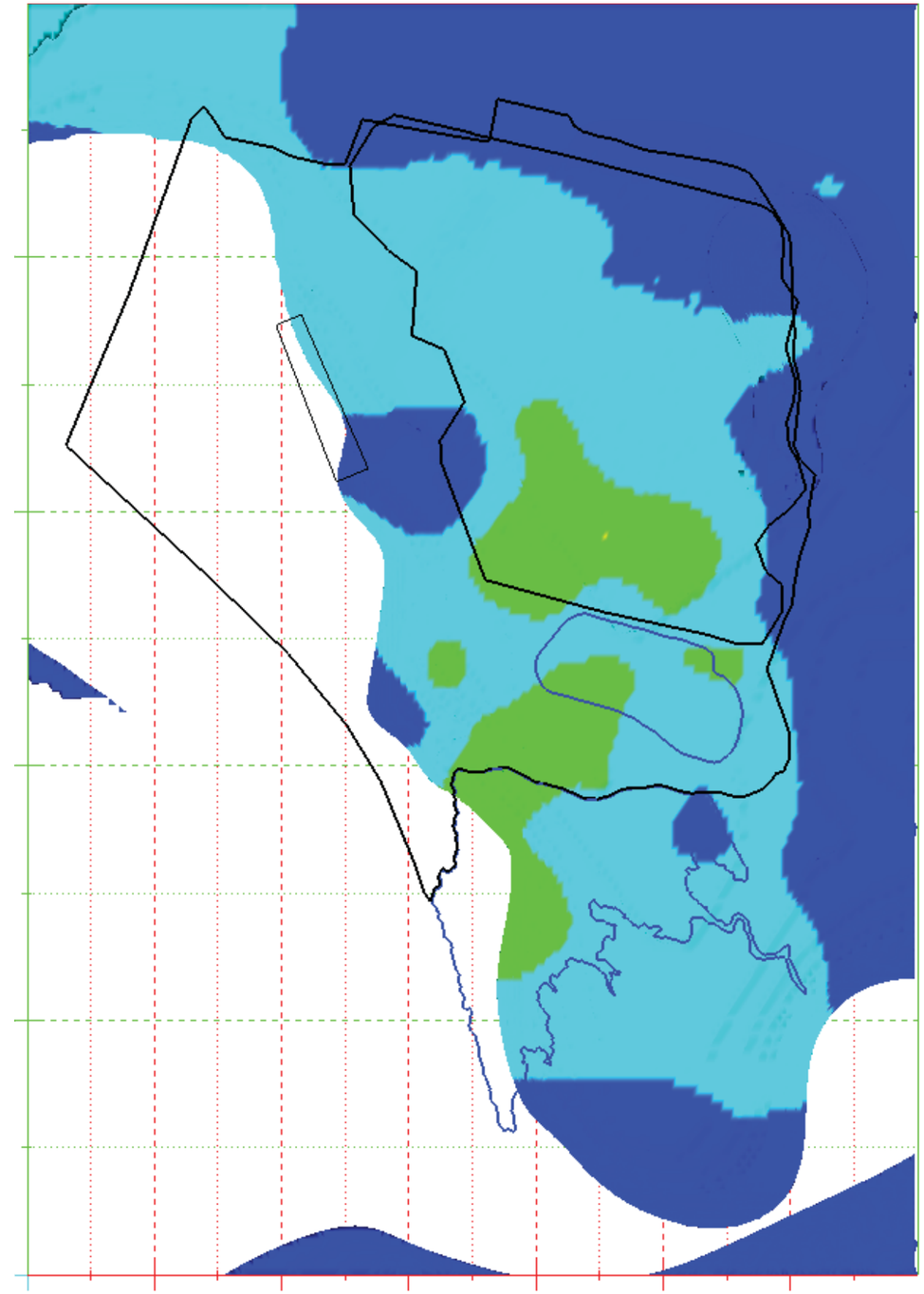
1) Bottom of the MVS Model is the Tertiary ash/clay layer.
2) White areas of the figure correspond to the Tertiary ash/clay layer.

FIGURE 3-2
Arsenic Contamination in Soil at the Groundwater Interface – Pre- versus Post-SPHC Groundwater Surface
Corrective Measures Study Work Plan Update
East Helena, Montana

Selenium Pre-SPHC



Selenium Post-SPHC



LEGEND

Selenium Concentrations

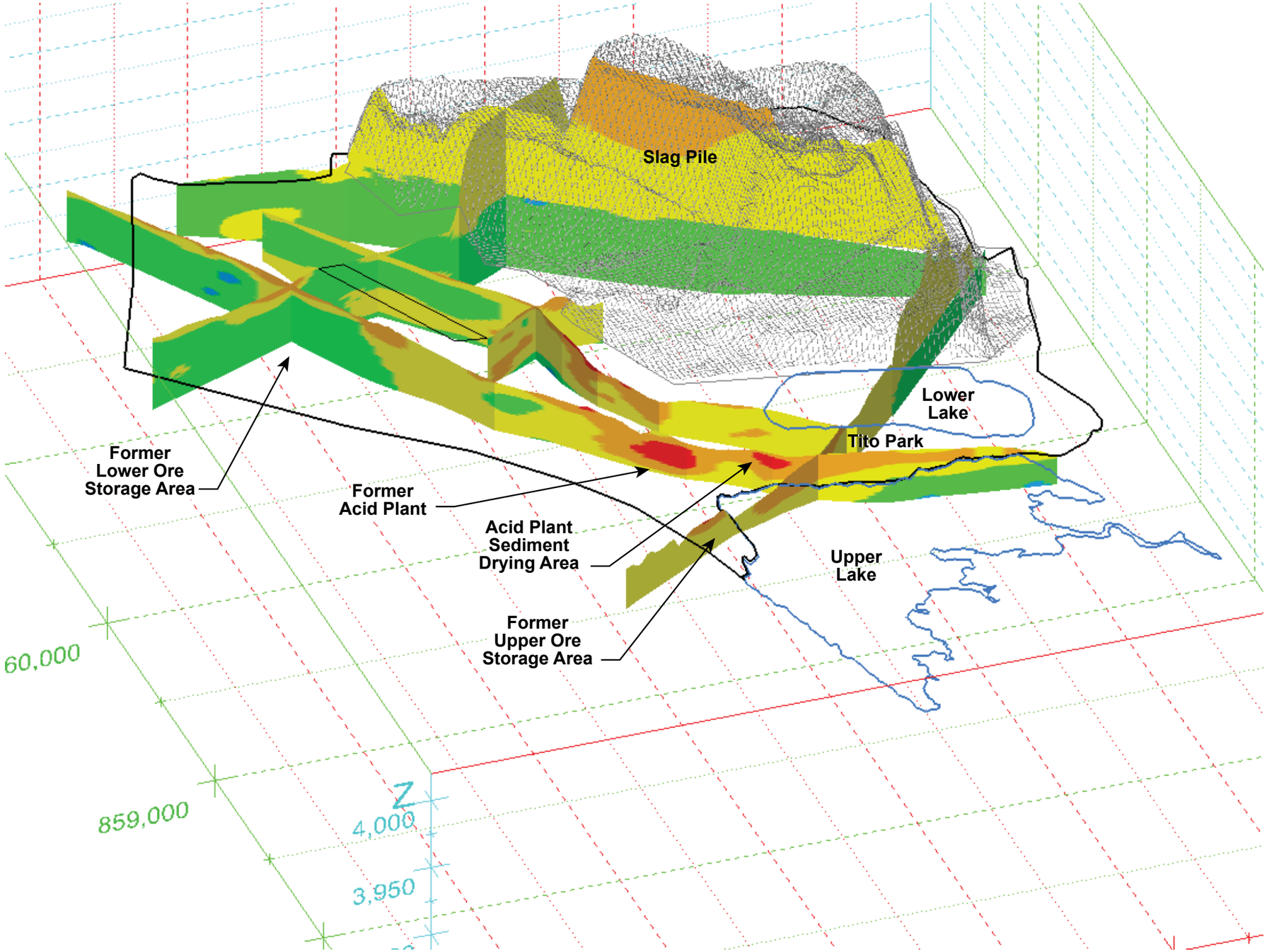
- Dark Blue: <0.26 mg/kg
- Light Blue: 0.26 - 2.6 mg/kg
- Green: 2.6 - 26 mg/kg
- Yellow: 26 - 260 mg/kg
- Orange: 260 - 2,600 mg/kg

Abbreviations:
mg/kg = milligrams per kilogram
SPHC = South Plant Hydraulic Control

Notes:

1) Bottom of the MVS Model is the Tertiary ash/clay layer.
2) White areas of the figure correspond to the Tertiary ash/clay layer.

FIGURE 3-3
Selenium Contamination in Soil at the Groundwater Interface – Pre- versus Post-SPHC Groundwater Surface
Corrective Measures Study Work Plan Update
East Helena, Montana



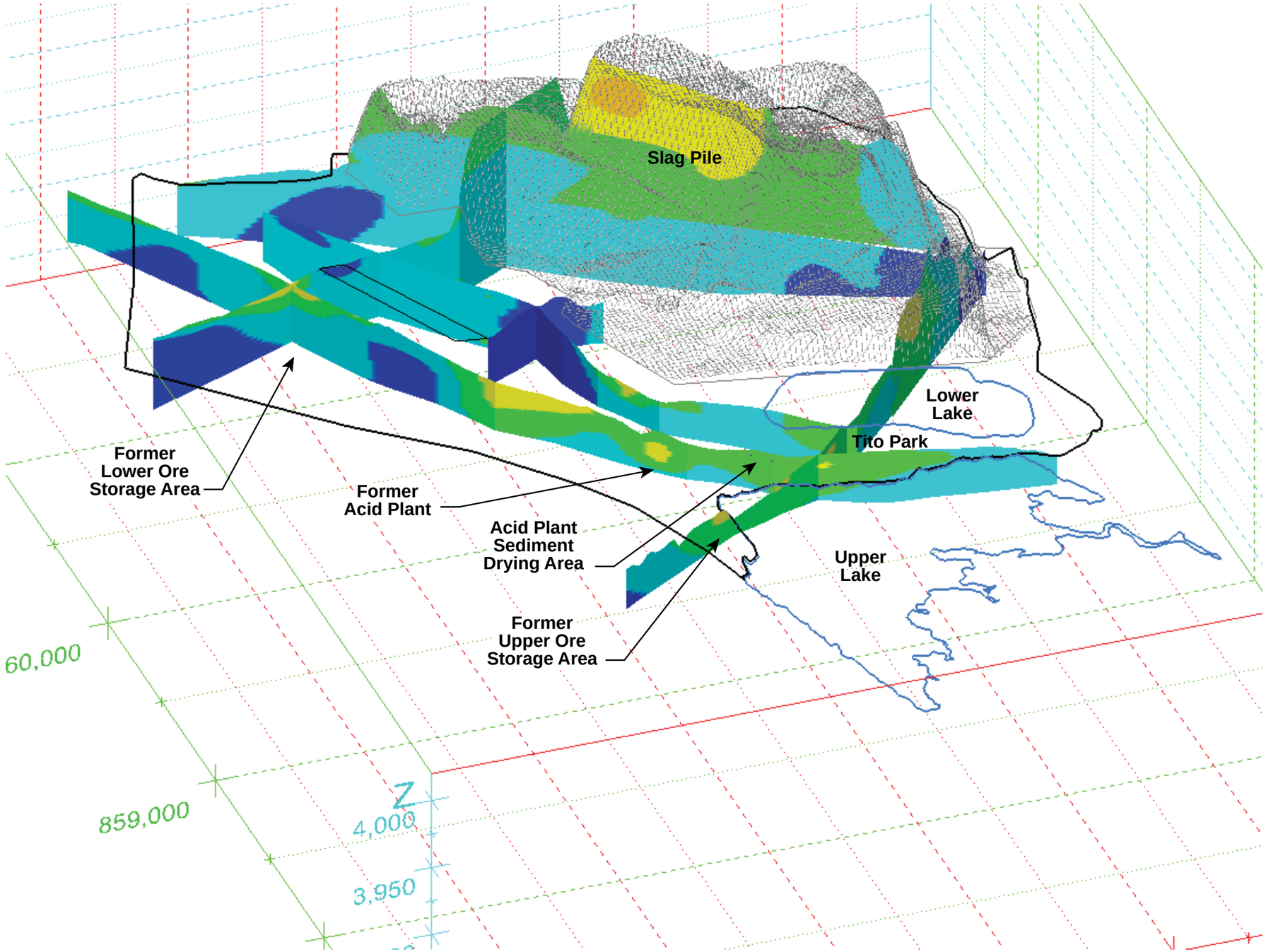
LEGEND

Arsenic Concentrations

- Dark Blue: <0.29 mg/kg
- Light Blue: 0.29 - 2.9 mg/kg
- Green: 2.9 - 40 mg/kg
- Yellow: 40 - 290 mg/kg
- Orange: 290 - 2,900 mg/kg
- Red: >2,900 mg/kg

Abbreviation:
mg/kg = milligrams per kilogram

FIGURE 3-4
Arsenic Contamination in Soil –
Surface to Top of Tertiary Ash/Clay Layer
Corrective Measures Study Work Plan Update
East Helena, Montana



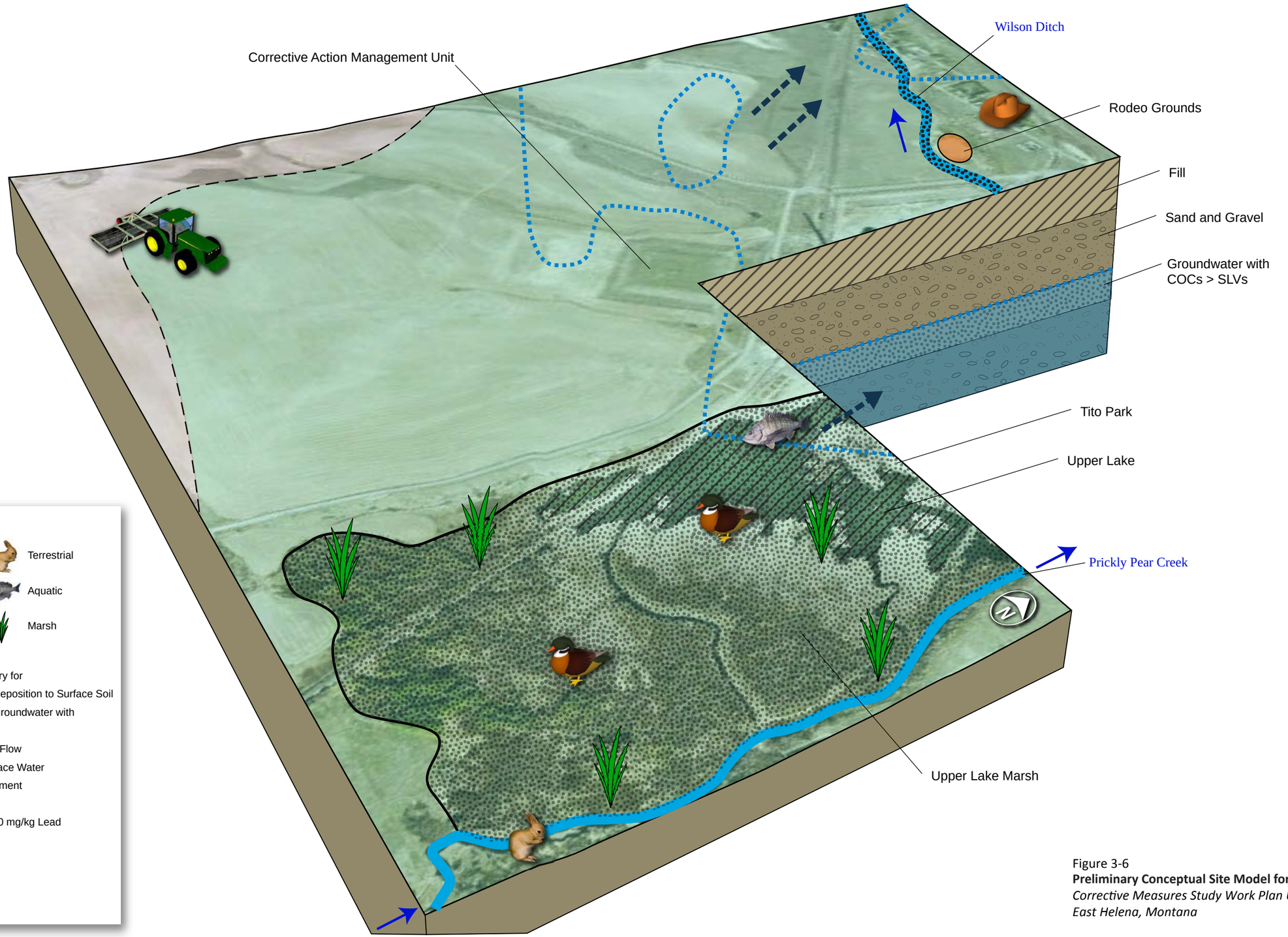
LEGEND

Selenium Concentrations

- Dark Blue: <0.26 mg/kg
- Light Blue: 0.26 - 2.6 mg/kg
- Green: 2.6 - 26 mg/kg
- Yellow: 26 - 260 mg/kg
- Orange: 260 - 2,600 mg/kg

Abbreviation:
mg/kg = milligrams per kilogram

FIGURE 3-5
Selenium Contamination in Soil – Surface to Top of Tertiary Ash/Clay Layer
Corrective Measures Study Work Plan Update
East Helena, Montana



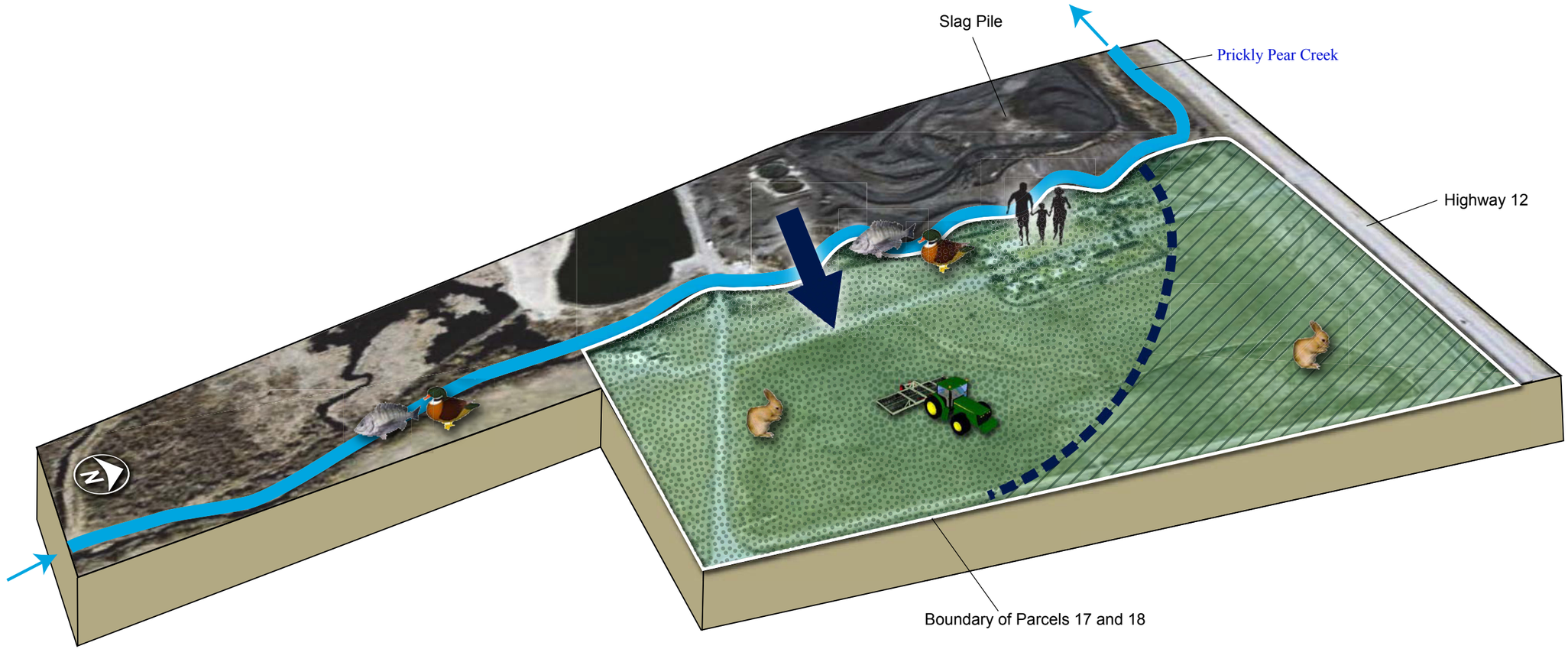
LEGEND

- Agricultural
- Terrestrial
- Recreation
- Aquatic
- Avian
- Marsh
- Area OU2 ROD Projected Boundary for Lead>1000 mg/kg from Airborne Deposition to Surface Soil
- Approximate plume boundary for groundwater with arsenic > SLVs
- General Direction of Groundwater Flow
- Area of Potential Concern for Surface Water
- Area of Potential Concern for Sediment
- Stream Flow
- OU2 ROD Isocontour Line for 1000 mg/kg Lead

Abbreviations:
mg/kg = milligrams per kilogram
COCs = Constituents of Concern
ROD = Record of Decision
SLV = Screening-Level Value

Figure 3-6
Preliminary Conceptual Site Model for Parcel 15
Corrective Measures Study Work Plan Update
East Helena, Montana

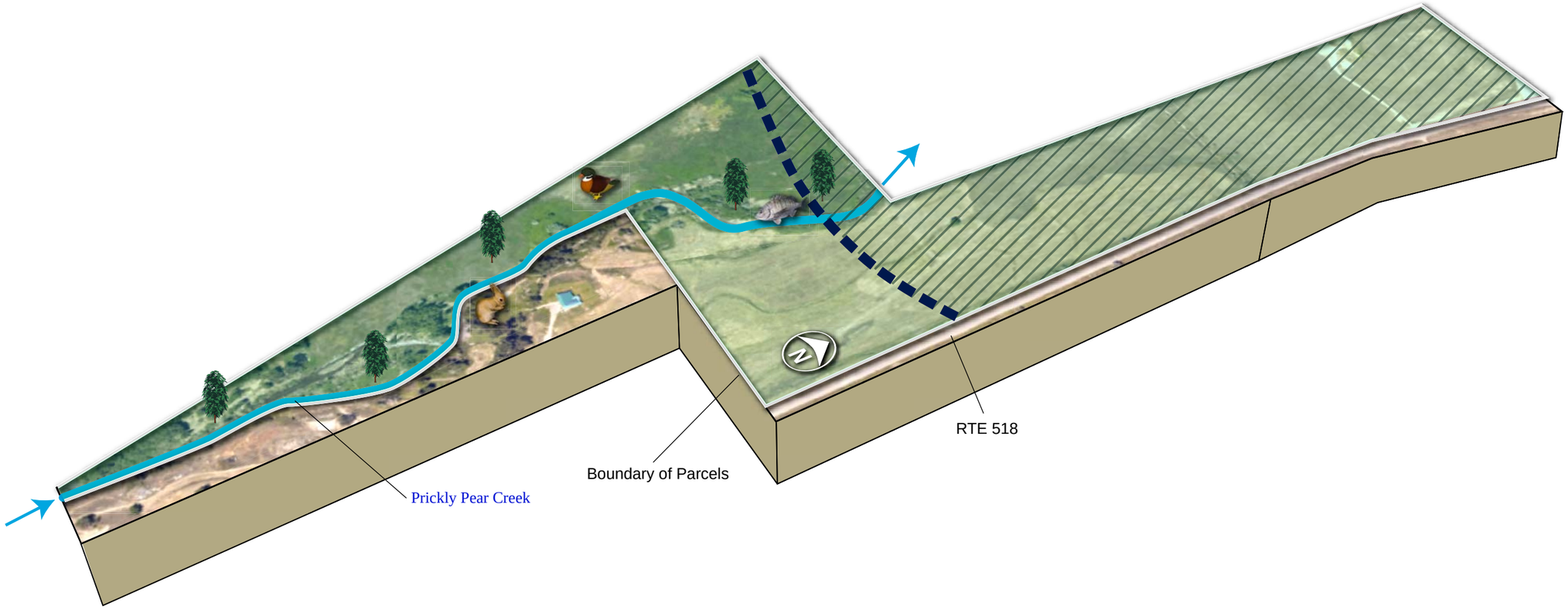
CH2MHILL



LEGEND

- Terrestrial
- Aquatic
- Avian
- Potential Future Recreational Use
- Estimated 176 milligrams per kilogram (mg/kg) Soil Arsenic Contour From OU2 Record of Decision
- Lead in Surface Soil > 1000 mg/kg
- Estimated Soil Arsenic > 100 mg/kg
- Estimated Soil Arsenic > 176 mg/kg
- Windblown Particulate Reposition

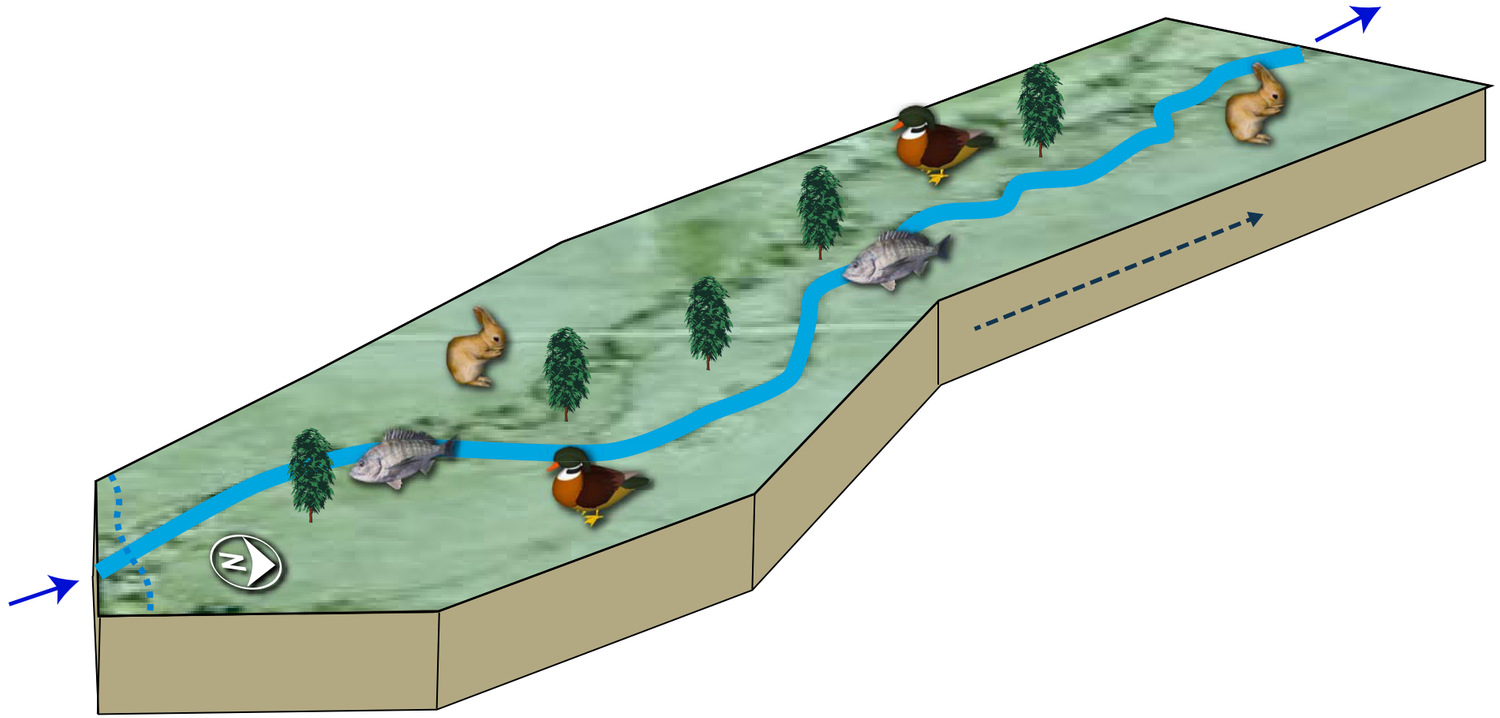
Figure 3-7
Preliminary Conceptual Site Model for Parcels 17 and 18
Corrective Measures Study Work Plan Update
East Helena, Montana



LEGEND

- Terrestrial
- Aquatic
- Avian
- Estimated 100 milligrams per kilogram (mg/kg) Soil Arsenic Contour From OU2 Record of Decision
- Lead in Surface Soil > 1000 mg/kg
- Estimated Soil Arsenic > 100 mg/kg

Figure 3-8
Preliminary Conceptual Site Model for Parcels 10, 11, 12, 23, and Portion of Parcel 8 West of Route 518
Corrective Measures Study Work Plan Update
East Helena, Montana



LEGEND

- Terrestrial
- Aquatic
- Avian
- Approximate plume boundary for groundwater with arsenic > SLVs
- General Direction of Groundwater Flow
- Stream Flow

Abbreviations:
mg/kg = milligrams per kilogram
COCs = Constituents of Concern
ROD = Record of Decision
SLV = Screening-Level Value

Note:
The entire area of the Portion of Parcel 2 near Prickly Pear Creek is located within the project boundary identified in the Operable Unit -2 ROD as having lead in surface soils present at concentrations greater than 1,000 mg/kg.

Figure 3-9
Preliminary Conceptual Site Model for Portion of Parcel 2 Near Prickly Pear Creek
Corrective Measures Study Work Plan Update
East Helena, Montana

SECTION 4

Identification of Conceptual Corrective Measures Alternatives

Pursuant to USEPA guidance, the CMS alternatives analysis need not address all potential remedies, but rather can focus on one or more measures appropriate for site-specific conditions. Conceptual corrective measures alternatives have been identified to focus CMS efforts on remedial actions that are most likely to achieve protective, sustainable, and cost-effective results. The conceptual alternatives described herein have been identified based on a comprehensive review of more than 20 years of data, studies and analyses, and IMs implemented at the former Smelter site. This focused CMS effort allows the scope and substance of the CMS to be effective and efficient, and is consistent with the Corrective Action Plan and the ANPR.

The conceptual corrective measures for those CMS Properties surrounding the former Smelter site are based on the PCSMs, and have been developed recognizing the uncertainties noted in Section 3. As part of the CMS, information will be obtained to validate and refine these PCSMs before any further evaluation or other actions are taken regarding conceptual corrective measures.

As discussed in Section 5, some of the corrective measures alternatives identified for study during the CMS already are being implemented as interim measures. Detailed information about each such measure can be found in the 2012, 2013, 2014, and 2015-2016 IM Work Plans.

The overall remedial approach to the CMS Properties is summarized as follows:

- Focus on and prioritize action at the former Smelter site and those areas posing highest risk to human health and the environment. Corrective measures to be evaluated in the CMS include:
  - Source control measures:
    - Changing site hydraulics (lowering groundwater, reducing surface water discharge to groundwater) to control the primary contaminant transport pathway (migration of contaminated groundwater).
    - Addressing soil that represents an ongoing source of contamination to groundwater. The net environmental benefit of localized excavation and onsite consolidation to reduce the “footprint” of contamination has been evaluated and is discussed further in Section 5.6.
    - Construction of a site cover and regrading to reduce the opportunity for clean stormwater to contact (either as surface runoff or through infiltration) contaminated soil. This includes evaluating construction of an ET cover, which would create a clean surface area and require less active maintenance over time than an engineered cover.
  - Institutional controls to further reduce or eliminate unacceptable exposures to current and future receptors
- The remedial actions to be taken at the former Smelter site are anticipated to be the core corrective measures for the surrounding CMS Properties as well. By addressing the remaining source areas and areas of highest risk at, and from, the former Smelter site, contaminant migration pathways will be controlled or significantly reduced. Reductions in contaminant mass in contact with groundwater also can enhance the rate of natural attenuation.
- Additional corrective measures which may be evaluated in the CMS for the surrounding properties include:
  - Institutional controls to support or allow for limitations on land and groundwater uses that prevent completion of pathways for exposure and are thus protective of human health
  - Monitored natural attenuation to evaluate the effectiveness of the remedies implemented at the former Smelter site, and to confirm that contaminant concentrations are dropping at acceptable rates and at the points of compliance

- Deep tilling, which was identified in the OU2 ROD as an acceptable final remedy for properties considered at the time to be “undeveloped properties”
- Localized removal actions and/or cover construction, most of which are likely to be completed in conjunction with future property improvements and which may be conducted by the Custodial Trust or subsequent owners or operators

Conceptual corrective measures alternatives have been developed for each subarea of the CMS Properties (shown in Table 2-1). The alternatives are presented in Tables 4-1 through 4-6 in tabular form to show the media being addressed, and how the conceptual alternatives align with proposed remedy performance standards.

One of the corrective measures presented in Tables 4-1 through 4-6 is the implementation of institutional controls. A portion of this work has already been completed with the implementation of the Soil Ordinance implemented by Lewis and Clark County in June of 2013. This ordinance was established as part of USEPA’s ongoing CERCLA work associated with OU2. All of the CMS Properties fall within the proposed administrative boundaries of the Institutional Controls Program (ICP), as can be seen in the draft figure titled “Figure 1, East Helena Superfund Site (OU2) Proposed ICP Boundary” (a copy of which is included in Appendix E).

As noted in the First Modification, the final corrective measures for the former ASARCO Properties currently owned by the Custodial Trust, and not enumerated as CMS Properties, will be the measures set forth in the OU2 ROD. No significant new information has been generated regarding the condition of these parcels to warrant USEPA reevaluation of the OU2 ROD findings and decision.

TABLE 4-1
Conceptual Corrective Measures for Parcels 16 and 19 (Former Smelter Site)

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
1. Source control: Reduce, to the extent practicable, the potential for groundwater to contact soils with COPC concentrations exceeding relevant protection of groundwater standards.	Soils Groundwater	• SPHC measures to significantly reduce groundwater recharge on the south end of the former Smelter site and lower groundwater elevations to reduce the volume of soil with concentrations of inorganic contaminants exceeding MCSs in contact with groundwater. • Removal of contaminated soil and sediment from the Tito Park Area (TPA).	Groundwater actions are being proposed for implementation as part of the SPHC IM. Performance criteria and monitoring plans will be developed as part of final IM design in order to measure and evaluate their effectiveness. The Upper Lake Drawdown testing has provided initial data demonstrating the ability to lower groundwater elevations and the CMS schedule incorporates sufficient time for evaluation of additional corrective measures if ongoing monitoring indicates performance criteria will not be met. Localized excavation and consolidation of soil is being evaluated as part of the Source Removal IM. Removal of Tito Park and consolidation of this material onsite within the Area of Contamination (AOC) has been approved for implementation. Additional localized excavation activities have been considered as part of the Soil Removal Evaluation discussed in Section 5.6.
2. Reduce surface water recharge to groundwater from water bodies on the south side of the plant.	Groundwater (both on- and offsite) Surface Water	SPHC measures to significantly reduce groundwater recharge on the south end of the former Smelter site, including: • Realign Prickly Pear Creek to eliminate recharge from Upper & Lower Lakes. This will result in dewatering of Upper Lake, permanently reducing the water level and returning it to pre-ASARCO operation conditions. • Demolish Wilson Ditch intake structure. This will reduce leakage from Wilson Ditch and subsequent groundwater recharge. • Remove Smelter Dam (including sediment management). • Dewater Lower Lake.	These actions have been proposed for implementation as IMs. Performance criteria and monitoring plans will be developed as part of the final IM design in order to measure and evaluate their effectiveness. The CMS schedule incorporates this monitoring period and sufficient time will be provided to allow for evaluation of additional corrective measures if the IM performance does not meet the remedy threshold criteria.

TABLE 4-1
Conceptual Corrective Measures for Parcels 16 and 19 (Former Smelter Site)

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
3. Minimize stormwater infiltration to groundwater. 4. Surface water runoff meets appropriate water quality standards.	Surface Soil Groundwater (both on- and offsite) Surface Water	Engineered systems designed to eliminate contact between stormwater and contaminated soil and minimize infiltration, with particular attention to source areas where contaminant concentrations in soil are and are likely to remain highest, including possible combinations of: • Demolition of site infrastructure • Grading, and installation of ET Cover System to promote "positive" drainage and provide barrier between rain water and contaminated soil • Installation of appropriate storm drainage systems	An ET Cover System is proposed for implementation as an IM. The ET Cover System will be implemented in phases to allow runoff to be shed offsite without treatment and to allow phase-out of the HDS plant operation. As with the other IMs, performance criteria and monitoring plans will be developed as part of the final IM design.
5. Reduce mass and mobility of contaminants in soil.	Onsite Soil Groundwater (both on- and offsite) Surface Water	• Primary measures are SPHC, ET Cover System and removal of soil and sediment from the TPA; expected to reduce the mass and mobility of contaminants in soil by reducing the amount of groundwater in contact with contaminated soils and reducing infiltration. • Contingent measures may include use of engineered systems to control constituent leaching from the soil column. May include existing slurry wall containment systems, permeable reactive barrier (PRB) walls, deep soil excavation, and deep soil mixing	Primary measures will be evaluated in the CMS. Contingent measures may be evaluated based on the conceptual site models, information from the Groundwater Model and the performance of the IMs noted above. These evaluations would be conducted if necessary as the final phase of the CMS.
6. Reduce mass and mobility of contaminants in groundwater.	Groundwater (both on- and offsite)	• Primary measures are SPHC and ET Cover System; expected to reduce the mass and mobility of contaminants in groundwater by reducing the amount of groundwater in contact with contaminated soils and reducing leaching from soils in the vadose zone to groundwater by minimizing infiltration. • Contingent measures may include localized groundwater extraction and treatment system focused on areas with highest potential risk and/or concentration of contaminants in groundwater or PRBs.	Primary measures will be evaluated in the CMS. Contingent measures may be evaluated based on the CSMs, information from the Groundwater Model, and the performance of the IMs noted above. These evaluations would be conducted if necessary as the final phase of the CMS.
7. Prevent potential human exposure to contaminated environmental media.	All media	**Engineered Controls** • Primary measures are the ET Cover System over the former processing areas at the plant site and removal of soil and sediment from the TPA. • Fencing to prohibit public access. • Physical barriers between human receptors and contaminated media (forms can be, and are likely to be, coordinated with future site use and could include building construction, paving, topsoil and planting, etc.) **Institutional Controls**	The effectiveness of existing engineered controls will be documented in the CMS Report. The use of physical barriers will be evaluated as part of the ET Cover System design, and with consideration to current concepts for future passive recreational use of the former Smelter site. Institutional controls will be coordinated with those implemented under CERCLA and their effectiveness will be evaluated and documented in the CMS Report.

TABLE 4-1
Conceptual Corrective Measures for Parcels 16 and 19 (Former Smelter Site)

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
		• Soil ordinance established by Lewis and Clark County in June 2013. • Deed restrictions specifying allowable land use. • Establishment of a Controlled Groundwater Area, per MCA 85-2-506 to prohibit groundwater use for as long as contaminants in groundwater exceed MCSs. • Redevelopment guidelines to specify proper soil management and safe worker practices to prevent subsurface construction worker exposures.	
8. Reduce contaminant mass and potential future contaminant migration.	Slag pile	• If possible, sell slag that is marketable for metals recovery or reuse. This will address only a portion of the significant volume of slag present. • Implement post-recycling restoration activities to ensure no airborne slag particulate matter and/or groundwater infiltration.	The progress and environmental benefits associated with the slag recycling operations will be documented in the CMS Report.

TABLE 4-2
Conceptual Corrective Measures for Parcel 15

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
1. Reduce surface water recharge to groundwater from water bodies on the south side of the plant.	Groundwater (both on- and offsite) Surface Water	Primary measure is SPHC, including: • Removal of Upper Lake Diversion Structure • Realignment of Prickly Pear Creek	These actions are being proposed for implementation as IMs. Performance criteria and monitoring plans will be developed as part of final IM design in order to measure and evaluate their effectiveness. The CMS schedule incorporates this monitoring period and sufficient time will be provided to allow for evaluation of additional corrective measures if the IM performance does not meet the remedy threshold criteria.
2. Protect human health by controlling exposure to environmental media containing COPCs at concentrations exceeding MCSs.	Surface soil	Evaluate appropriateness of implementing the OU2 ROD remedial approach for undeveloped properties and implement institutional controls, such as: • Soil Ordinance adopted by Lewis and Clark County in June 2013 to control potential unacceptable direct contact exposures to inorganic contaminants in surface soils. • Deed notice restricting land use to agricultural or recreational/open space, with provision that allows a potential future owner to change land use contingent on updated site characterization and implementation of remedial measures to ensure that the remedy remains protective under the proposed next use. Establishment of a controlled groundwater area, per MCA 85-2-506 to prohibit groundwater use for so long as contaminants in groundwater exceed MCSs.	This conceptual corrective measure will be evaluated after additional information is developed to refine the PCSM for Parcel 15 (including the consideration of soil sampling work done by the U.S. Department of Agriculture in 2011).
3. Control or eliminate ongoing sources of COPCs to groundwater and surface water.	Soil in portions of TPA	• Primary measure is removal of soil from the TPA.	Primary measure will be evaluated in the CMS.
4. Protect human health by controlling exposure to environmental media containing COPCs at concentrations exceeding MCSs.	Groundwater	**Monitored Natural Attenuation** • Continue to monitor groundwater quality to evaluate the effectiveness of remedies implemented upgradient at the former Smelter site, and the rate of natural attenuation/recovery. **Institutional Controls** • Deed notice and/or Controlled Groundwater Area established to prohibit groundwater use as long as contaminants in groundwater exceed MCSs.	Data collected during ongoing groundwater monitoring events will be evaluated and documented as part of the CMS Report to be prepared by the Custodial Trust in accordance with the First Modification. Institutional controls are expected to be part of the final remedy for the CMS Properties and will be evaluated and documented in the CMS Report.
5. Improve surface water quality such that potential risk to ecological receptors is reduced over time.	Surface Water in Upper Lake	Possible mitigation for SPHC to replace lost open water functions, which could occur as part of the final corrective measures	To be addressed as part of the SPHC IM.

TABLE 4-2
Conceptual Corrective Measures for Parcel 15

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
6. Reduce COPC concentrations in sediment such that potential risk to human and ecological receptors is reduced over time.	Sediment in Upper Lake Marsh Sediment in Wilson Ditch	• Regrade Upper Lake Marsh during implementation of SPHC IM, reestablish wetland habitat as part of the PPC Realignment project • Remove contaminated sediment from Wilson Ditch • Perform site-specific risk evaluations and evaluate localized sediment removal if warranted based on unacceptable exposure risk.	To be addressed as part of SPHC IM. Existing contamination from the former Smelter site would be addressed as part of the SPHC IM. If remediation of Wilson Ditch is necessary to meet risk-based goals, cleanup actions on CMS Properties may be conducted as an IM.

TABLE 4-3
Conceptual Corrective Measures for Parcels 17 and 18

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
1. Protect human health by controlling exposure to environmental media with COPCs at concentrations exceeding MCSs.	Surface soil	• Evaluate appropriateness of implementing the OU2 ROD remedial approach for undeveloped properties. • Backfill soil against the slag pile as part of the PPC Realignment project. **Institutional Controls** • Soil Ordinance implemented by Lewis and Clark County in June 2013 to control potential unacceptable exposures to surface soils. • Deed notice restricting land use to agricultural or recreational/open space, with provision that allows a potential future owner to change land use contingent on updated site characterization and implementation of remedial measures if required to be protective under the proposed use. • Redevelopment guidelines to specify proper soil management and safe worker practices to prevent subsurface construction worker exposures.	Additional soil sampling is anticipated to occur as part of the SPHC IM implementation and PPC realignment. This information will be used to update the PCSM for these parcels and the need for and scope of additional measures will be evaluated at that time. Institutional controls are expected to be a part of the final remedy and will be evaluated and documented in the CMS Report to be prepared by the Custodial Trust in accordance with the First Modification.
2. Protect human health by controlling exposure to environmental media with COPCs at concentrations exceeding MCSs.	Groundwater	**Monitored Natural Attenuation** • Continue to monitor groundwater quality to evaluate the effectiveness of remedies implemented upgradient at the former Smelter site and the rate of natural attenuation/recovery. **Institutional Controls** • Deed notice and/or Control of Groundwater Area established to restrict groundwater use as long as contaminants in groundwater exceed MCSs.	Data collected during ongoing groundwater monitoring events will be evaluated and documented as part of the CMS Report. Institutional controls are expected to be part of the final remedy for the CMS Properties and will be evaluated and documented in the CMS Report.

TABLE 4-4
Conceptual Corrective Measures for Parcels 10, 11, 12, 23,and the Portion of Parcel 8 West of Route 518

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
1. Protect human health by controlling exposure to soil containing COPCs at concentrations exceeding MCSs.	Surface soil	Evaluate appropriateness of implementing the OU2 ROD remedial approach for undeveloped properties. **Institutional Controls** • Deed notice restricting land use to agricultural or recreational/open space, with provision that allows a potential future owner to change land use contingent on updated site characterization and implementation of remedial measures if required to be protective under the proposed use. • Soil Ordinance adopted by Lewis and Clark County in June 2013 to control potential unacceptable direct contact exposures to inorganic contaminants in surface soils. • Establishment of a Controlled Groundwater Area, per MCA 85-2-506 to prohibit groundwater use for as long as contaminants in groundwater exceed MCSs.	These evaluations will be done after additional information is developed to refine the preliminary conceptual site model and perform appropriate risk evaluations. Institutional controls are expected to be part of the final remedy and will be evaluated and documented in the CMS Report to be prepared by the Custodial Trust in accordance with the First Modification.

TABLE 4-5
Conceptual Corrective Measures for Portions of Parcel 2 Near Prickly Pear Creek

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
1. Protect human health by controlling exposure to media with COPCs at concentrations exceeding MCSs.	Surface soil Groundwater	**Surface soils will be addressed in a manner consistent with CERCLA work done in surrounding areas.** **Monitored Natural Attenuation** • Continue to monitor groundwater quality to evaluate the effectiveness of remedies implemented upgradient at the former Smelter site and the rate of natural attenuation/recovery. **Institutional Controls** • Soil Ordinance adopted by Lewis and Clark County in June 2013 to control potential unacceptable direct contact exposures to inorganic contaminants in surface soils. • Deed notice restricting land use to agricultural or recreational/open space, with provision that allows a potential future owner to change land use contingent on updated site characterization and implementation of remedial measures if required to be protective under the proposed use. • Deed notice and/or establishment of a Controlled Groundwater Area per MCA 85-2-506 to prohibit groundwater use for as long as contaminants in groundwater exceed MCSs.	Data collected during IM performance monitoring and ongoing groundwater monitoring events will be evaluated and documented as part of the CMS Report to be prepared by the Custodial Trust in accordance with the First Modification. Institutional controls are expected to be part of the final remedy for the CMS Properties and will be evaluated and documented in the CMS Report.

TABLE 4-6
Conceptual Corrective Measures for Un-Owned CMS Properties

Remedy Performance Standard(s)	Environmental Media Addressed	Conceptual Corrective Measures Alternatives	Proposed Corrective Measures Study Evaluation Approach
1. Reduce concentrations of COPCs over time.	Groundwater	**Monitored Natural Attenuation** • Continue to monitor groundwater quality to evaluate the effectiveness of all groundwater remedies implemented upgradient at the former Smelter site and the rate of natural attenuation/recovery.	Data collected during IM performance monitoring and ongoing groundwater monitoring events will be evaluated and documented as part of the CMS Report to be prepared by the Custodial Trust in accordance with the First Modification.
2. Protect human health by controlling exposure to media containing COPCs at concentrations exceeding MCSs.	Groundwater	**Engineered Controls** • Existing residential drinking water wells will be replaced with connections to the City of East Helena's potable water system • Consistent with previous CERCLA actions, if remediation of Wilson Ditch is necessary, cleanup actions will be taken under CERCLA. **Institutional Controls** • Soil Ordinance adopted by Lewis and Clark County in June 2013 to control potential unacceptable direct contact exposures to inorganic contaminants in surface soils. • Establishment of a Controlled Groundwater Area per MCA 85-2-506 to prohibit groundwater use for as long as contaminants in groundwater exceed MCSs.	The need for engineered controls will be evaluated during IM performance monitoring when additional data on groundwater plume stability are developed. Institutional controls are expected to be part of the final remedy for the CMS Properties and will be evaluated and documented in the CMS Report.
3. Reduce COPC concentrations in sediment to protective levels over time	Sediment in Wilson Ditch	• Excavation of sediment from Wilson Ditch on Un-owned CMS Properties, if required, will be completed under the CERCLA program. • Site-specific risk evaluation. Evaluate localized removal if warranted based on unacceptable exposure risk.	The potential need for, and scope of, corrective measures for Wilson Ditch will be evaluated based on refinement of the PCSM.

SECTION 5

CMS Tasks Proposed and Summary of Work to Date

This section outlines the objectives and anticipated components of the CMS tasks currently envisioned and provides a summary of information that has been developed to date from technical evaluations that have either been completed or are underway and will be incorporated into the CMS Report. Figure 5-1 provides an overall view of the CMS framework and approach, and the alignment of tasks. In keeping with the inherent flexibility of RCRA Corrective Action, which allows for efficient adaptation as new information is developed, the initial tasks may be revised or new tasks added based on information developed concurrent with, and during implementation of, this Work Plan. The information in this section will be used to guide the development of detailed scopes of work.

The USEPA has approved three IMs that have been presented in IM Work Plans submitted from 2012 through 2014 (IM Work Plan 2012, CH2M HILL, 2012a; IM Work Plan 2013, CH2M HILL, 2013a; and IM Work Plan 2014, CH2M HILL, 2014). The activities described in the work plans were shared for public comment and subsequently approved by USEPA. Future activities proposed as IMs will be described in the IM Work Plans which, along with other major scopes of work, may be shared with the public for consideration and comment to USEPA, prior to USEPA approval.

5.1 Develop/Refine Conceptual Site Models

The objective of this task is to develop the information needed to complete CSMs for the former Smelter site, and to refine the PCSMs for the other CMS Properties. As shown in Figure 5-1, the information integrated into the CSMs will serve as the basis for subsequent corrective measure identification and evaluation tasks, as well as the design of IMs. To date, the Custodial Trust has gained sufficient conceptual understanding of Parcels 16, 17, and 18, including the following specific areas within the former Smelter site: Lower Ore Storage Area (LOSA) and Adjacent Features; APSD Area; Tito Park/Lower Lake/Upper Ore Storage Area (UOSA); and Speiss Dross/Thornock Lake/Zinc Plant. The MVS model (Figures 3-2, 3-3, 3-4, and 3-5) provides a three-dimensional visualization tool to aid in the refinement of the CSMs. The Custodial Trust continues to review historical use, process information, and site-specific investigation data as needed. This information will be used and supplemented to refine the PCSMs described in Section 3 as well as for the slag pile. Scopes of work will be developed for these activities, which follow the basic data quality objective process and identify the questions to be answered and the data necessary to do so.

These CSMs will function as key tools in the remedy identification and evaluation process, inform the design and performance evaluation of IMs, and be used along with groundwater modeling data during multiple CMS activities.

5.2 Conduct Leachate and Stormwater Management Evaluation

Effluent from the HDS WTP is currently discharged to Lower Lake in accordance with an MDEQ Individual Montana Pollutant Discharge Elimination System (MPDES) permit (MT0030147). More stringent final effluent limits under the current permit went into effect on August 1, 2015. The HDS WTP cannot treat leachate and stormwater in compliance with the final limits without extensive, cost-prohibitive changes to the plant. Furthermore, because Lower Lake will be dewatered by implementation of the SPHC IM, decommissioning of the HDS WTP or implementation of an alternative point of discharge from the HDS WTP effluent will be required. Because of this, the CMS will need to evaluate alternatives to the onsite HDS WTP currently being used to manage CAMU leachate and stormwater, because of pending changes in the location and permitting of system discharge.

The objectives of this task are to identify and evaluate options for leachate and stormwater management that will accomplish the following goals:

1. Allow the existing HDS WTP to operate after August 2015, to coordinate with ongoing IM implementation and potential CMS source control/removal evaluations in 2016 and beyond.
2. Meet the overall remedy performance standards identified in Section 2.3.3 of this CMS Work Plan.
3. Be implemented as part of other corrective measures, as independent actions, or as part of future site redevelopment activities.

Leachate and stormwater management will be a significant component of the final remedy because, as shown in the draft Phase II RFI, surface soil across the former Smelter site has COPCs at concentrations that exceed all SLVs. A combination of the following general corrective measures will be evaluated:

- Removal of contaminated soil (see Section 5.6 below)
- Construction of an ET Cover System to minimize precipitation infiltration and to provide a clean surface and barrier to underlying contaminated soil. The use of an ET cover has been evaluated through modeling and preliminary engineering design and at present is the preferred remedial alternative because it appears highly likely to be both protective and sustainable over the long term.

The need for, and management options related to, collection, treatment, and disposal of leachate and stormwater runoff will be evaluated. This evaluation will be completed with consideration given to the planned implementation of IMs at the former Smelter site. Elements currently envisioned for this task include the following:

- Evaluation of the existing runoff collection and storage system to define necessary engineering requirements that integrate the existing sumps, conveyance systems, and storage tanks into the interim cover and final ET Cover System.
- Design of interim cover and final ET Cover System that appropriately sequence construction such that existing runoff will be appropriately managed while facilitating the discharge of clean runoff to offsite drainages.
- Coordination with MDEQ regarding MPDES permit modifications that facilitate decommissioning of the HDS WTP in sequence with interim and final cover construction requirements.
- Development of options to the HDS WTP for long-term leachate management solutions. Options intended to provide protective and compliant leachate management and utilize easily managed storage and evaporation processes will be considered.
- Development of phased integrated water management solutions that incorporate decisions regarding leachate and runoff management with remediation waste management considerations discussed in Section 5.7 below.

5.3 Develop Numerical Groundwater Model

Groundwater modeling started in 2012, and is informing several CMS evaluations and IM designs. Modeling is one of the primary CMS tools used to predict and evaluate the effectiveness of the SPHC activities, as well as other IMs focused on source control and the reduction of ongoing contamination to groundwater. A calibrated numerical groundwater flow model has been developed. The groundwater flow model can be used to inform the following CMS activities:

- Evaluate changes in groundwater elevations, flow directions, and hydraulic gradients.
- Evaluate potential changes in plume migration that may result from remedial actions.
- Evaluate changes in the interaction between groundwater and surface water.
- Provide estimates of groundwater flux and estimates of advective transport rates.

The potential value of developing a groundwater flow and transport model is currently being considered to:

- Predict how hydrologic conditions and groundwater quality may change over time in response to remedial actions.
- Design effective long-term groundwater monitoring efforts.

5.4 South Plant Hydraulic Control Assessment

The SPHC IM concept was proposed as a source control measure by the Custodial Trust in the *Former ASARCO East Helena Facility Interim Measures Work Plan – Conceptual Overview of Proposed Interim Measures and Details of 2012 Activities* (CH2M HILL, 2012a; hereafter referred to as the IM Work Plan 2012). The overall goal of the SPHC IM is to reduce both the mass and rate of migration of inorganic contaminants (primarily arsenic and selenium) in groundwater leaving the former Smelter site. Specific objectives include: (1) lowering groundwater levels beneath the former Smelter site to reduce the volume of contaminated soil in contact with, and leaching contaminants to, site groundwater; and (2) reducing the groundwater flux (i.e., gallons/day) through the former Smelter site by reducing both the aquifer saturated thickness and hydraulic gradient if possible. Reducing contaminant leaching to groundwater as well as the groundwater flux through the site will result in a reduction in contaminant mass loading from the site to the downgradient Helena Valley aquifer.

Elements of the SPHC IM implemented to date, pursuant to the USEPA-approved IM Work Plan 2012 and IM Work Plan 2013, are as follows:

- Partial dewatering of Upper Lake: Upper Lake is situated at the southern end of the former Smelter site and is recognized as a primary source of recharge to the site's groundwater system. Seepage from Upper Lake flows northward through the site as groundwater, leaching metals from contaminated site soil. This process is responsible, in part, for the arsenic and selenium plumes observed within and north of the site. A key component of the SPHC IM is to eliminate Upper Lake and the associated seepage and contaminant leaching.

  Starting in November 2011, surface water inflow from PPC to Upper Lake was reduced by closing the diversion head gate. Since then the Upper Lake water level has steadily dropped due to natural leakage and evaporation, and periodic pumping from the lake. The Upper Lake stage is approximately 3,916 feet above mean sea level (AMSL) (December 2013), as compared to a pre-November 2011 stage of about 3,920 feet AMSL. The overall site groundwater levels have declined by up to 6 feet. Elimination of flow through Wilson Ditch since November 2011 has contributed to the groundwater level declines, specifically in the northwestern portion of the site. Results of the Upper Lake drawdown test are presented in a technical memorandum (Hydrometrics, 2012) (Appendix D). Upper Lake was further drained through breaching of a containment berm in fall 2013 as part of the PPC diversion activities described below.

- Groundwater Flow Model Development: In conjunction with the Upper Lake drawdown test and hydrologic monitoring programs, a three-dimensional numerical groundwater flow model was developed for the former Smelter site and surrounding area. The groundwater flow model is being used in planning and design of the SPHC IM, as well as for predictive analyses of post-SPHC hydrologic conditions. The groundwater flow model has been and will continue to be a valuable tool for planning and design of all IM and corrective measure activities proposed and/or implemented at the site.

- PPC Temporary Bypass Construction: A temporary bypass channel to convey PPC surface water around Smelter Dam was completed in December 2013. Bypass operation was initiated on October 29, 2013. Construction of the bypass channel was required to dewater the South Plant area and enable demolition of Smelter Dam, removal of the TPA, and reconstruction of the PPC channel in mostly dry conditions. Bypassing water around Smelter Dam eliminates the impoundment of water behind the dam and is expected to lower the creek stage by about 10 feet adjacent to the South Plant area, thereby reducing leakage from the creek to the site groundwater system. Note that the greatest drop in water levels is anticipated to occur once the bypass is in place.

- Site Access Improvements: A number of site access and infrastructure improvements were completed in 2013 to facilitate implementation of the SPHC IM. Smelter Dam was retrofitted with a steel deck to provide access for heavy construction vehicles and equipment across PPC. Likewise, a heavy-duty bridge was placed across

the temporary bypass channel to facilitate vehicle access to the main plant site from the east. The main water supply line to the site was demolished and utilities in the East Bench area were relocated to facilitate the SPHC construction activities. Additional utility and infrastructure modifications will be made in preparation for or as part of the SPHC activities.

- Hydrologic Monitoring: In order to support SPHC IM planning and design efforts, an extensive hydrologic monitoring program was implemented onsite and around the site. The monitoring program includes groundwater and surface water level monitoring, stream flow monitoring, and water quality monitoring to document the hydrologic system response to dewatering of Upper Lake and lowering of Prickly Pear Creek. The resulting information is being used to better characterize the site groundwater system and better assess the long-term hydrologic response to the SPHC IM activities.

In addition to the completed activities outlined above, engineering evaluations and designs of the SPHC IM currently underway include:

- Planning and design for future flood control and compatibility with potentially affected existing downstream water rights holders
- Design for construction of a realigned PPC channel and associated riparian area/wetlands
- Planning and design for removal of Smelter Dam as part of the PPC realignment process

5.5 Demolish Structures at Former Smelter Site

As originally described in the USEPA-approved IM Work Plan 2012, demolition of structures at the facility is required before construction of the interim cover and final ET Cover System begins. Demolition is anticipated to be completed in three phases. Phase 1 demolition, completed in July 2013, encompassed the Ore Storage and Handing Building, the Barnum and Bailey Buildings, and several smaller structures in the vicinity of these buildings. Phase 2 demolition, completed in October 2013, encompasses most of the remaining structures onsite with a few notable exceptions including the change house, HDS WTP, certain utilities needed to service remaining structures, and stormwater runoff collection and management facilities. Demolition Phase 3 is expected to be completed in 2015. The exact dates and elements of the Demolition Phase 3 work will be determined consistent with ET Cover construction requirements and the stormwater evaluation work described in Section 5.2 above.

Demolition and relocation of the existing NorthWestern Energy (NWE) 69-kilovolt (kV) transmission line and related substation is the primary significant work activity that remains to be defined under this task. NWE is negotiating with the Custodial Trust to decommission and demolish the substation and to relocate the 69-kV transmission line. This work will remove the transmission line that interferes with the ET Cover System before construction of phase 2 of the interim cover scheduled for 2015 and final ET Cover System scheduled for 2016.

5.6 Evaluate Source Control and Removal Options

This task has focused on subsurface soil at the former Smelter site and has evaluated the SPHC IM, the ET Cover System IM, and post-IM source removal actions with respect to the remedy performance standards cited in Section 2 for source control. For the purpose of this evaluation, “source” is defined as soil with inorganic COPC concentrations that exceed levels protective of groundwater (e.g., SSLs), in other words, soil that could leach COPCs to groundwater at levels that would exceed an MCL. The proposed approach to this evaluation is summarized as follows:

1. Estimate the source control expected to be achieved by the SPHC IM and ET Cover System IM.
2. Evaluate the potential benefit and practicability of removing materials that are not addressed by the SPHC and ET Cover System IMs and have the potential to be significant ongoing sources of contamination to groundwater.
3. Determine the need to evaluate additional source control measures (e.g., permeable reactive barriers, in situ treatment) based on their potential to achieve MCLs and estimated cost-to-benefit ratio.

5.6.1 Estimated Source Control Provided by the SPHC IM and ET Cover System IM

To estimate the total volume of source material (i.e., inorganic contaminants in soil) at the former Smelter site, as well as the volume and distribution of contaminant mass to be addressed by each IM, the Custodial Trust updated the CSM of this area. The update used the three-dimensional MVS software, data in the existing soil database, and the results of the Upper Lake drawdown test (Hydrometrics, 2012) (Appendix D) to estimate soil volumes and pre- and predicted post-SPHC groundwater elevations. The soil data were developed during the Phase II RFI and previous site investigations. The accuracy of the MVS distribution model is a function of the density and distribution of data. The existing soil data for the former Smelter site are biased toward the locations of known source areas and the initial COPCs. Data in other areas of the former Smelter site and selenium concentrations in soil are more limited in comparison.

The source mass volumes are based on the estimated volumes of soil that contain arsenic at greater than 40 mg/kg or selenium greater than 0.26 mg/kg. The arsenic concentration of 40 mg/kg was selected to reflect the fact that arsenic is a naturally occurring constituent and present at concentrations which are orders of magnitude higher than the SSL. MDEQ's guidance (MDEQ, 2013) cited 40 mg/kg as a reasonable background concentration for arsenic in the Helena Valley. The SSL of 0.26 mg/kg was used for selenium.

The results of this first evaluation show that up to 90 percent of the source mass of arsenic and selenium currently in contact with groundwater or subject to leaching contaminants to groundwater as precipitation infiltrates, will be controlled by the SPHC and ET Cover System IMs. Although temporary cover systems installed by ASARCO have controlled infiltration to date, they were designed to have a limited functional life and are beginning to fail. In summary:

- The majority of contaminant mass at the former Smelter site is present in the vadose zone, above groundwater and this source material will be addressed by the ET Cover System. Mass in the vadose zone is subject to contaminant leaching from vertical infiltration of water from precipitation and other sources. Based on MVS model estimates, approximately 60 percent of total arsenic and 75 percent of total selenium mass are present in vadose zone soil. The ET Cover System will effectively isolate the contaminant mass in the vadose zone by minimizing infiltration of precipitation. For the purpose of this screening-level evaluation, the mass estimates were calculated with the simplifying assumption that the capillary fringe is not significant, and therefore negligible mass is associated with the capillary fringe.
- The remaining 40 percent of the total arsenic contaminant mass is present in saturated zone soil and subject to leaching from direct contact with groundwater and will be partially addressed by the SPHC IM. Implementation of the SPHC IM will lower existing groundwater levels, particularly in the southern portion of the former Smelter site and reduce the amount of contaminant mass leaching to groundwater. Based on projected groundwater levels pre- and post-SPHC IM implementation and MVS model estimates, the majority of mass present in the saturated zone soil (approximately 30 percent of total arsenic and 15 percent of total selenium) no longer comes in contact with groundwater. In other words, the ET Cover System in combination with the SPHC IM is estimated to control approximately 90 percent of the arsenic and 90 percent of the selenium in soil that are currently a source of contamination to groundwater.
- Therefore, the Source Removal IM would address the remaining mass in saturated zone soil after the implementation of the SPHC IM. Based on MVS model estimates, approximately 10 percent of both the total arsenic and total selenium mass would remain in the saturated zone following SPHC IM implementation and be subject to leaching from contact with groundwater.

To evaluate the potential benefit and practicability of source removal, the updated CSM and MVS model was used to estimate the locations, volumes, and contaminant mass in soil. Four different scenarios were considered:

1. Removal of TPA soil and Lower Lake sediment
2. Shallow soil that could be excavated and consolidated in order to reduce source areas and therefore the size of the ET Cover System IM

3. Two post-SPHC IM saturated zone soil removal alternatives:
   - Alternative A would address the saturated zone soil generally underlying former process areas which have been identified as the primary source areas and are assumed to be the areas where the highest contaminant concentrations are present in soil.
   - Alternative B would address the saturated zone soil for a majority of the main plant site. This alternative was considered to evaluate whether it was practicable to remove sufficient mass to meet MCLs in groundwater. Alternative B would still leave a significant volume of soil with COPC concentrations exceeding SSLs (i.e., eliminate the possible need for other source control measures and reduce long-term monitoring and stewardship requirements).

The initial source mass estimates focus on arsenic and selenium in soil because they are the primary COPCs for groundwater. This evaluation has concluded that soil removal actions undertaken to address these constituents would also remove other soil COPCs such as cadmium and lead. As previously noted, arsenic soil data are more available than selenium soil data, and groundwater plume maps suggest that selenium sources may be present at the former Smelter site that have not been identified by soil data. Therefore, the volumes cited herein for selenium may represent under-estimates of the source mass volume.

5.6.1.1 Removal of Tito Park Area Soil and Lower Lake Sediment

Three options for removal of TPA soil and Lower Lake sediment were evaluated to estimate their potential benefits and practicability. Each of the three options could meet the grading requirements associated with the PPC Realignment, but they considered a range of removals:

- Option 1 removed the least amount of material from TPA, an estimated 33,000 cubic yards (yd^3). This included removal of the upper 1 foot of sediment in Lower Lake, but did not address soil in the UOSA or the APSD Area.
- Option 2 removed approximately 124,000 yd^3. This option removed the upper 10 feet of soil from TPA, the upper 1 foot of sediment from Lower Lake, and the UOSA material. The APSD Area soil would remain within the slurry wall.
- Option 3 removed the most material, approximately 238,000 yd^3. This option removed the upper 2 feet of sediment from Lower Lake and all the soil in the TPA, the UOSA, and the APSD Area to the projected post-SPHC groundwater level.

On June 18, 2013, the Custodial Trust recommended implementation of Option 3 to USEPA. After consideration of input by other beneficiaries, USEPA transmitted its approval to the Trust by e-mail communication on July 29, 2013 (Appendix C). The recommendation for Option 3 was based on the following estimated benefits:

- Removal of the largest volume of source materials from the floodplain
- Reduced potential for erosion and leaching of contaminated soil during flood events
- Elimination of the need to extend the ET Cover System over the TPA, the UOSA, and the APSD Area

5.6.1.2 Shallow Soil Excavation

The evaluation process for the shallow soil used the MVS model to identify candidate areas for soil excavation and consolidation, based on the estimated depth and volume of soil with COPC concentrations that exceeded SSLs.

Results of evaluations to date (CH2M HILL, 2013b) indicate that the only candidate area for shallow excavation and consolidation would be an area of approximately 5.5 acres located at the western portion of the former LOSA (Figure 5-2). This area was selected because it was the only area where COPCs exceeding SSLs were present at depths of less than 6 feet bgs. Areas with deep soil contamination that would require containment beneath the ET Cover System even if a soil scrape were conducted were not considered. This alternative is technically feasible because the excavation, consolidation, and backfill activities would employ readily available earthwork techniques. Because the work involves soil at depths generally 6 feet deep or less, only minor construction dewatering and treatment of the water would be necessary.

However, groundwater data in this portion of the LOSA show concentrations of selenium in groundwater that are much higher than would be expected based on the existing near-surface soil data. Given this uncertainty regarding the source of selenium, controlling infiltration in this area with the ET Cover System is considered to be a more protective action than a shallow soil removal.

The Custodial Trust will document the results of this evaluation in the CMS Report to be prepared in accordance with the First Modification (see Section 5.9 below).

5.6.2 Saturated Zone Soil Excavation Evaluation

The evaluation process for the two saturated zone soil excavation alternatives used the MVS model to estimate the volume and mass of contaminated soil targeted for excavation, as well as the volume of overburden soil to be excavated in order to reach the contaminated soil excavation zone. Based on MVS model results (Figure 5-3), a preliminary conceptual excavation plan (Figure 5-4) for removal of the saturated zone soil was prepared to estimate these volumes and evaluate constructability issues. The results of source removal evaluations to date indicate both alternatives involve extensive excavation of overburden to reach the underlying saturated soil and are therefore not practicable. The initial evaluations can be summarized as follows (details are provided in the technical memorandum titled *Summary of Soil Removal Alternatives Evaluation at the East Helena Former ASARCO Smelter Site* [CH2M HILL, 2013b]):

- Alternative A, the localized removal of saturated soil beneath six areas based on soil concentration of arsenic >290 mg/kg (MDEQ action level for arsenic in subsurface soil is 300 mg/kg, which is based on MDEQ, 2009) as defined by the MVS model, would require excavation of approximately 400,000 yd^3 of overburden in order to remove 78,000 yd^3 of contaminated soil in the saturated zone. It should be noted that the source materials within the overburden soil would be controlled by the IM implementation, so there is no net benefit to excavating these materials. Removal of source materials from the post-SPHC saturated zone is estimated to result in an additional 1 percent reduction in total arsenic mass. Figure 5-5 provides typical cross-sectional views of two of the excavation areas.
- Alternative B, removal of all post-SPHC saturated soil exceeding the naturally occurring levels (>40 mg/kg) of arsenic would require excavation of a minimum of approximately 1,500,000 yd^3 of overburden in order to remove 600,000 yd^3 of contaminated soil in the saturated zone. This removal alternative would result in an estimated additional 8 percent reduction in total arsenic mass.

5.6.3 Summary of Conclusions to Date

The technical evaluations completed to date indicate the following:

- There is tangible economic benefit in the removal of TPA soil and Lower Lake sediment beyond the minimum necessary to facilitate the realignment of PPC, but evaluations indicate that additional removal of materials from the post-SPHC saturated zone is not practicable: removing soil from 20 feet to 40 feet below the current ground surface would require significant construction work, with risk and cost increasing with depth. In addition to the large volume of overburden that must be removed to reach this soil, other constructability issues include:
  - Removal of remaining foundations/slabs/footings of structures in the main plant site that could otherwise remain in place following demolition of the onsite structures; their removal would not be required to construct the ET Cover System
  - Shoring/sheet pile installation for trench and sidewall stabilization, excavation, and stockpiling
  - Construction dewatering required for removal of all soil from the saturated zone, as well as treatment before discharge
  - Encumbering large areas of the former Smelter site required as staging and consolidation areas for the excavated materials, as well as stockpile areas for imported backfill materials

- Current characterization data are sufficient to support the evaluation and design of remedies that will be applied site-wide, such as the SPHC and ET Cover System IMs. However, current data are not sufficient to support a detailed evaluation of localized source removals. Site investigations to date focused primarily on former process areas where releases to the environment were known to occur, and have not fully delineated the nature and extent of contamination in the remaining areas. Good decisions on localized source removal would require a significant amount of additional characterization data, because under-estimates of source mass and volume would result in over-estimates of potential benefit and under-estimates of cost.
- The incremental benefit to groundwater of source removal in addition to the IMs is difficult to quantify, given the uncertainties associated with the site characterization data noted above and the complex geochemistry in the subsurface. Additional site investigations, evaluation, and modeling efforts would be required, and in combination with the significant cost associated with removal of soil at depth and treatment of groundwater that is dewatered during construction, the additional cost is expected to be disproportionate to the incremental benefit.
- Implementation of the SPHC and ET Cover System IMs is estimated to effectively control approximately 90 percent of the total source mass at the former Smelter site currently in direct contact with or leaching contaminants to groundwater. In combination with the institutional controls of a Controlled Groundwater Area, these remedies will control unacceptable risks to human health. The incremental benefit of source removal from a risk-management perspective is negligible.

Based on the evaluations outlined herein, removal actions for source materials in the post-SPHC saturated zone will not be evaluated further in the CMS. The Custodial Trust will document the evaluation of these saturated zone soil excavation alternatives and include the results in the CMS Report to be prepared in accordance with the First Modification.

5.7 Refine Strategy for Remediation Waste Management

The strategy the Custodial Trust has developed for management of remediation waste was presented in the IM Work Plan 2012 and incorporates USEPA's AOC policy. This approach to management of remediation waste is protective, meets all regulatory requirements, and provides the best cost-to-benefit ratio of alternatives such as construction of another CAMU or offsite disposal.

As approved by USEPA, remediation waste will be consolidated within the boundaries of the AOC shown in Figure 2-1. Remediation waste in the form of contaminated soil from excavation activities will generally be consolidated onsite with like materials and ultimately covered by the planned ET Cover System. Inert materials such as concrete and asphalt will be crushed and reused onsite as subgrade and backfill materials. Recyclable materials from demolition activities, such as scrap steel, will be processed at local offsite recycling facilities. CAMU-eligible materials not appropriate for consolidation will be placed in CAMU 2.

Decontamination water, purge water from monitoring wells, and similar waters will be combined with collected runoff from the plant site and treated in the HDS WTP in accordance with the existing MPDES industrial general permit until the HDS WTP is decommissioned, at which time alternative management methods will be instituted.

Toxic Substances Control Act regulated materials, universal wastes, ozone-depleting substances, and other environmentally regulated materials will be disposed of offsite in approved facilities.

5.8 Implement Interim Measures

As previously noted, the Custodial Trust outlined the concepts for three IMs in the IM Work Plan 2012: the SPHC IM, the ET Cover System IM, and a Source Removal IM. The use of IMs is consistent with the First Modification, which contemplates the implementation of IMs and defines them, in part, as "… those actions which can be, or are, initiated in advance of implementation of the final Corrective Measures for the ASARCO Properties." USEPA conceptually approved the three IMs on August 28, 2012.

Implementation of the three IMs is occurring in phases over a number of years. The following phases were proposed and implemented in 2012 and 2013:

- ET Cover System IM: Phase 1 and Phase 2 demolition of the buildings and infrastructure on the former Smelter site. This work was required to help clear the site in preparation for future construction of the ET Cover System. Phase 1 demolition was completed in July 2013 and Phase 2 demolition was completed in October 2013.
- SPHC IM: Relocation of utilities located on the East Bench, including the City of East Helena water main, the NWE distribution line, and the CenturyLink communications cable in order to construct the PPC Temporary Bypass. Construction of the PPC Temporary Bypass was required to route Prickly Pear Creek flow around Smelter Dam, thereby dewatering the South Plant area and enabling demolition of Smelter Dam, removal of the TPA, and reconstruct the Prickly Pear Creek channel in mostly dry conditions. Construction of the PPC Temporary Bypass began in July 2013 and was completed in October 2013.

USEPA approved the work described in IM Work Plan 2013 on January 21, 2013.

The following IM phases were proposed for 2014:

- Source Removal IM: TPA Removal. This work will remove contaminated soil from the TPA, consisting of Tito Park, UOSA, APSD Area, and Lower Lake, and consolidate this material within the onsite AOC, which was approved by USEPA as part of the IM Work Plan 2012. The earthwork will remove contaminated soil from an area that is susceptible to inundation and erosion due to potential future Prickly Pear Creek flooding. In addition, removal of materials from the TPA is necessary to meet the functional needs of the PPC Realignment, support the development of wetland habitat in the Prickly Pear Creek floodplain, and reduce the overall footprint of the final ET Cover System.
- ET Cover System IM: Interim Cover System (ICS) Construction. The ICS serves as a required foundation layer for the final ET Cover System. Engineered fill placed for the ICS establishes grade for the ET Cover System and will protectively manage soil and sediment removed from the TPA and East Bench areas consolidated within the AOC. The ICS will be capped with native soil to prevent stormwater from contacting contaminated soil and enable runoff to be shed offsite to perimeter drainages. The ICS will be constructed in two phases, with ICS 1 occurring in 2014 and ICS 2 in 2015 to help balance material haul requirements, and successively reduce the quantity of contaminated “contact” stormwater that is currently collected and treated onsite. This will result in cost savings associated with reduced stormwater treatment. Relocation of the existing NWE 69-kV power transmission line, demolition of the associated substation, and decommissioning of selected monitoring wells will be coordinated with ICS construction.

The work described above and detailed in IM Work Plan 2014 (CH2M HILL, 2013c) is currently undergoing public review. USEPA approval is anticipated in February 2014.

The overall objective for all IMs is to implement actions that will provide immediate environmental benefit, with the additional benefit of also providing site-specific remedy performance information. The CMS schedule allows time to monitor the effectiveness of the IMs and consider that information in the final remedy proposal and selection. If the IMs meet their associated performance criteria, they will be recommended as final measures in the CMS Report to be prepared in accordance with the First Modification. If monitoring shows that performance criteria are not met, there will be sufficient time to either augment the measure or identify alternatives as needed to achieve the desired levels of protectiveness.

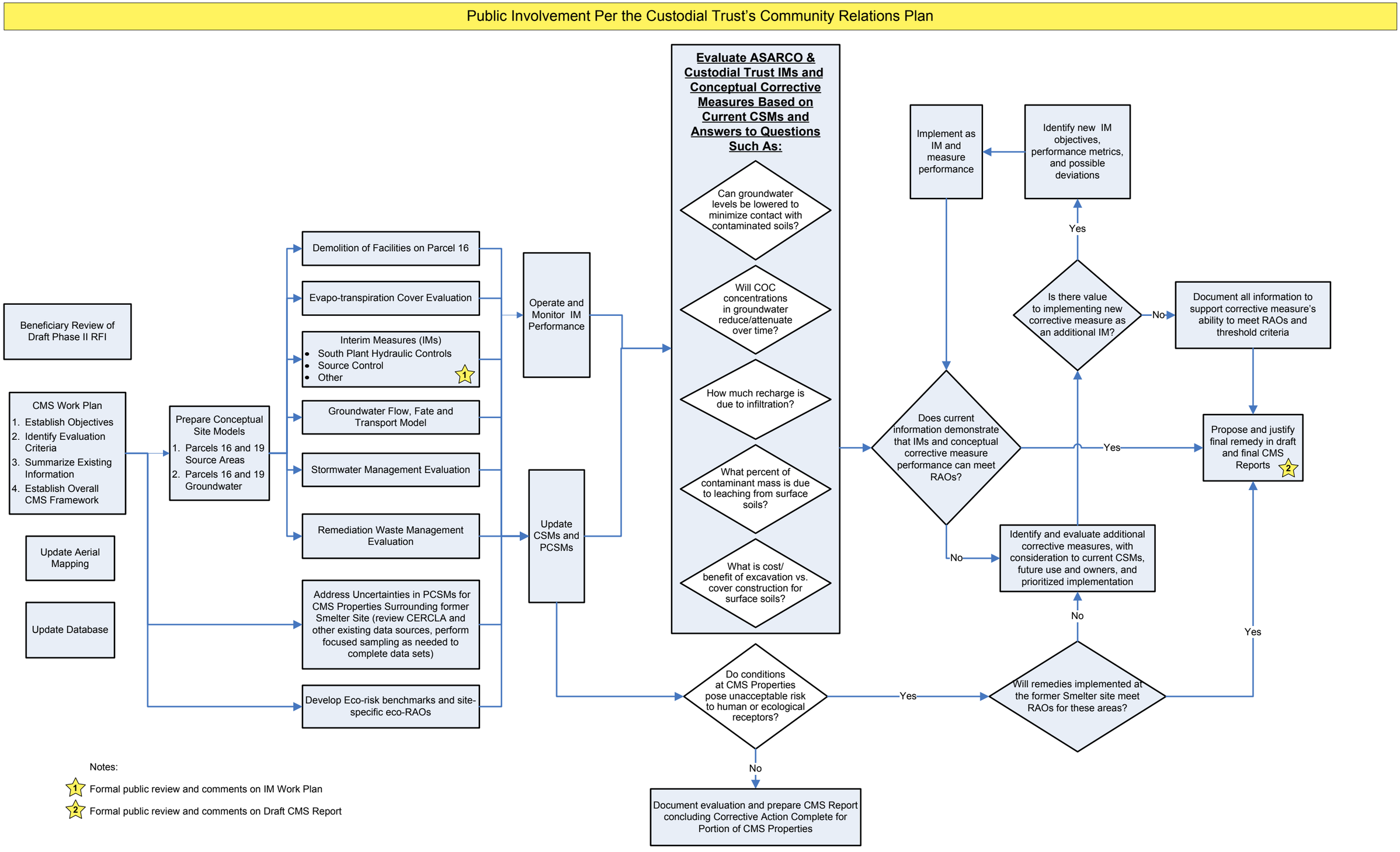
5.9 Prepare Corrective Measures Study Report

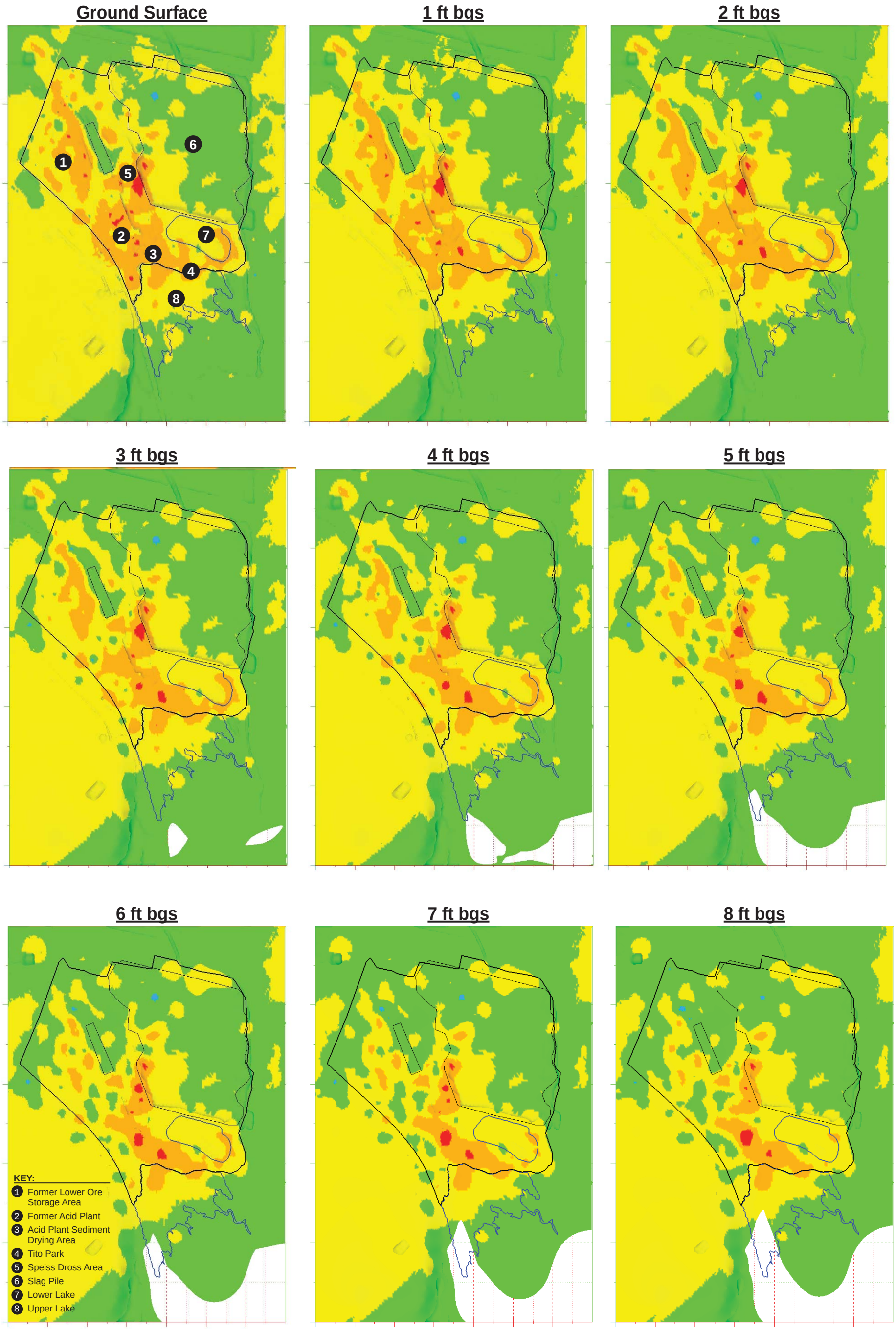
Pursuant to Paragraph 39 of the First Modification, the final CMS task is to prepare a draft CMS Report. This report will document the CMS evaluations and present the recommended final remedies, with supporting technical justification. The CMS Report will follow this general outline:

1. Introduction and Purpose
2. Corrective Action Objectives
3. Updated Conceptual Site Models
4. Summary of Interim Measures

5. Identification, Development, and Evaluation of Corrective Measures Alternatives
6. Proposed Final Corrective Measures
7. Public Involvement Plan

Figure 5-1
Proposed Corrective Measures Study Framework





LEGEND

Arsenic Concentrations

- Dark Blue: <0.29 mg/kg
- Light Blue: 0.29 - 2.9 mg/kg
- Green: 2.9 - 40 mg/kg
- Yellow: 40 - 290 mg/kg
- Orange: 290 - 2,900 mg/kg
- Red: >2,900 mg/kg

bgs - below ground surface

ft - foot/feet

mg/kg - milligram per kilogram

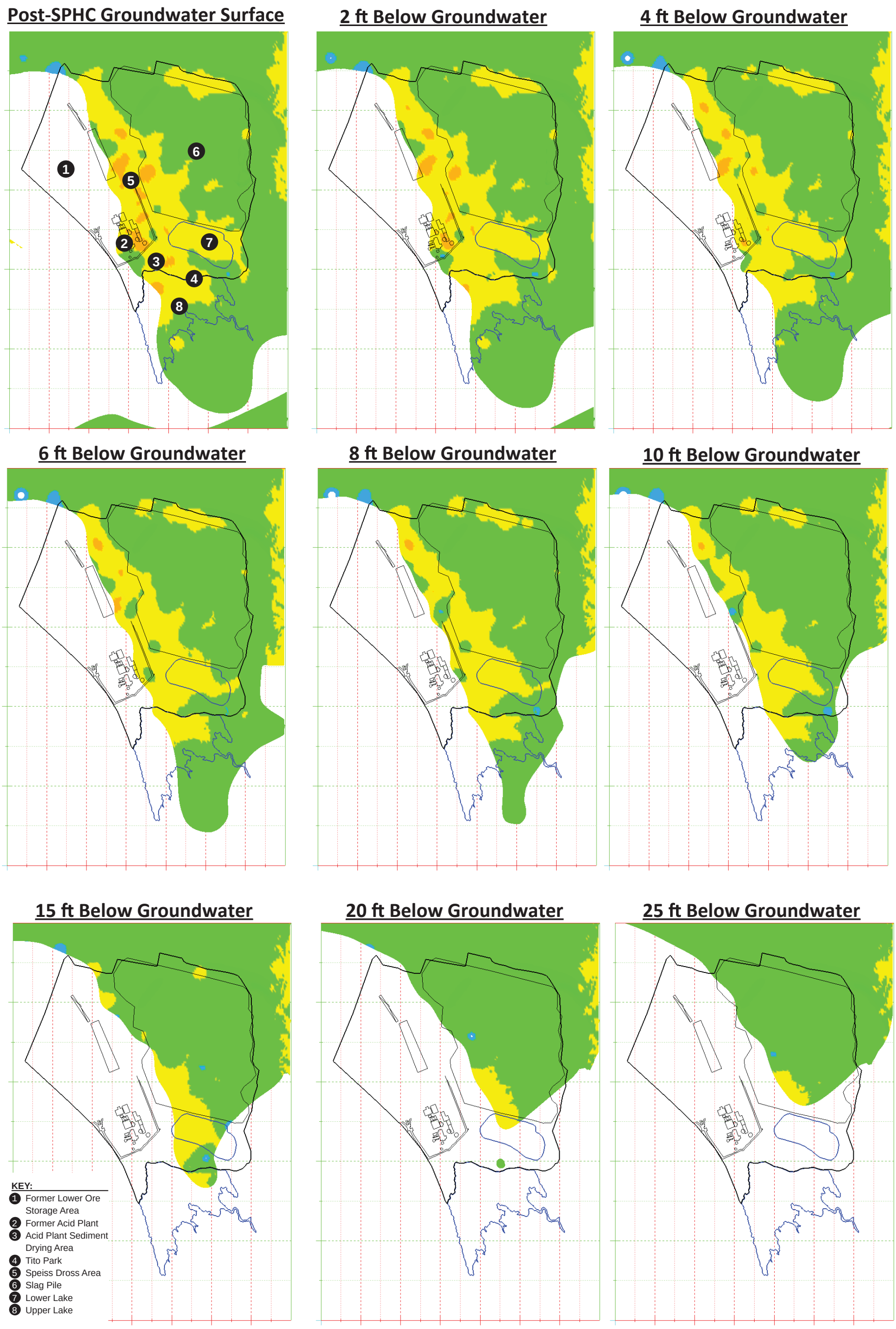
Notes:

1) Bottom of the MVS Model is the Tertiary ash/clay layer.
2) White areas of the figure correspond to the Tertiary ash/clay layer.

FIGURE 5-2
Arsenic Contamination, Ground Surface to Depth of 8 Feet
Corrective Measures Study Work Plan Update
East Helena, Montana

CH2MHILL®

Note: White area of 3-ft bgs to 8-ft bgs figures corresponds to the Tertiary ash/clay layer.



LEGEND

Arsenic Concentrations

- Dark Blue: <0.29 mg/kg
- Light Blue: 0.29 - 2.9 mg/kg
- Green: 2.9 - 40 mg/kg
- Yellow: 40 - 290 mg/kg
- Orange: 290 - 2,900 mg/kg
- Red: >2,900 mg/kg

Notes:
1)SPHC = South Plant Hydraulic Control
ft = feet
mg/kg = milligrams per kilogram
2) Results are for saturated zone soil.
3) Bottom of the MVS Model is the Tertiary ash/clay layer. White areas of the figure correspond to the Tertiary ash/clay layer.

FIGURE 5-3
Arsenic Contamination, Post-SPHC Saturated Zone Soil
Corrective Measures Study Work Plan Update
East Helena, Montana

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Jay Dehner
JD
PJK
PK

METG
Michael Environmental Tech Group

CH2MHILL

FIGURE 5-4
Conceptual Excavation Plan
Alternative 2 Saturated Zone Excavation
Corrective Measures Study Work Plan Update
East Helena, Montana

1"=100'

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

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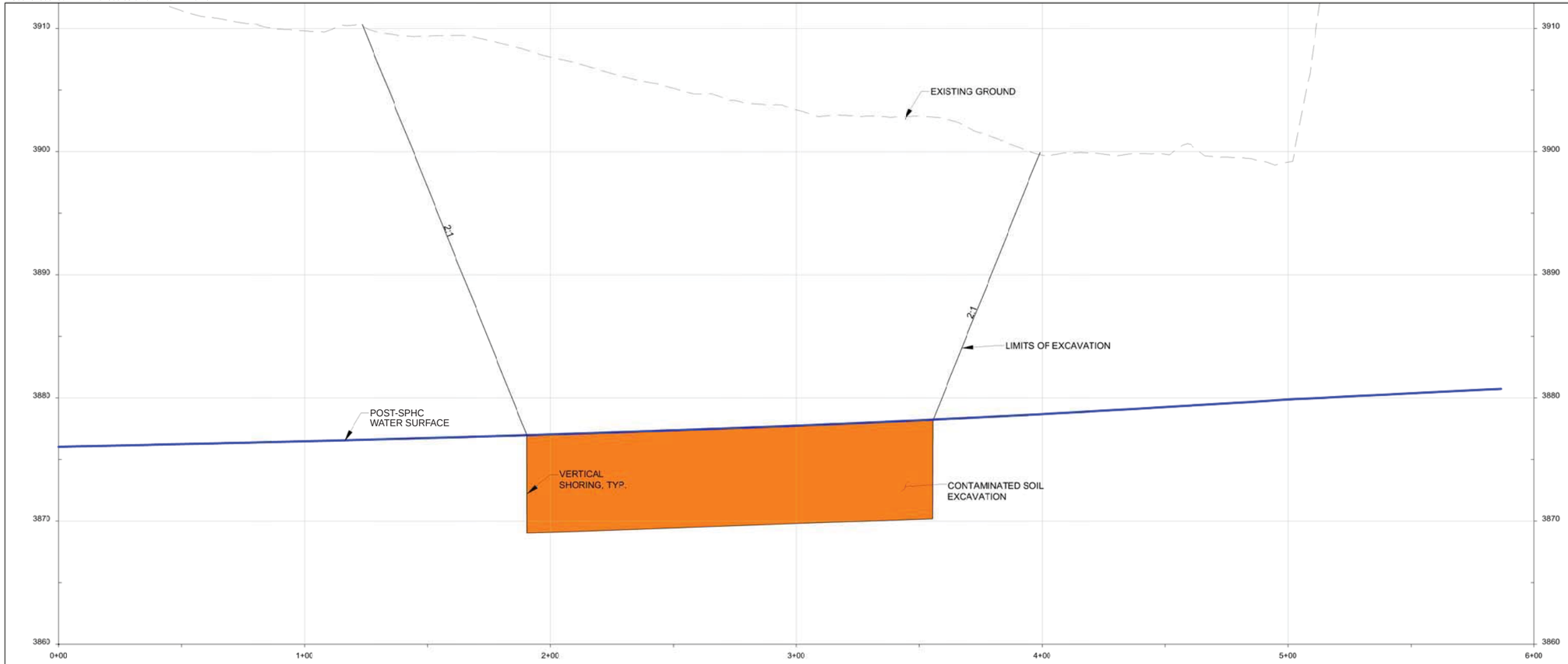
FIGURE 3

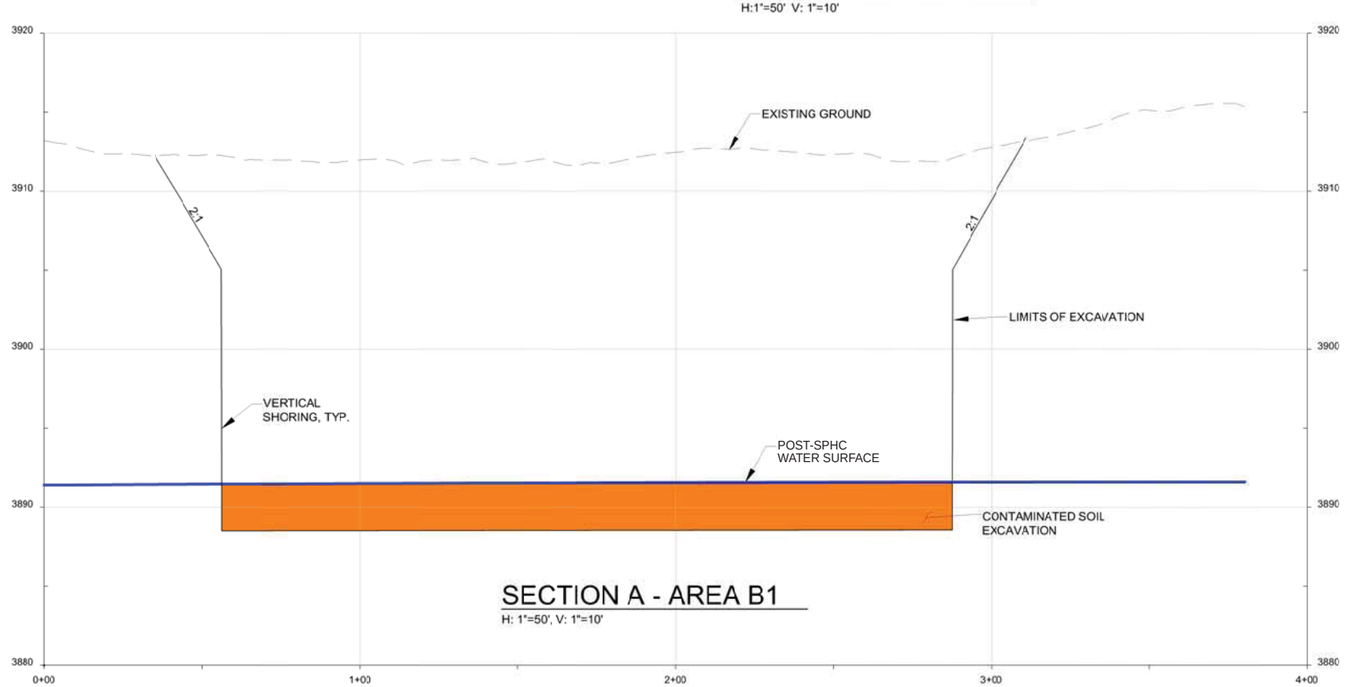
Preliminary Concept

FILENAME: SOILREMOVAL FIGURE1.DWG PLOT DATE: 30-Jul-13 PLOT TIME: 1:45 PM



SECTION B - AREA D

H:1"=50' V: 1"=10'



SECTION A - AREA B1

H: 1"=50', V: 1"=10'

Jay Dehner | JD | PJK | PK

METG

CH2MHILL

FIGURE 5-5
Cross-sectional Views of Excavation Areas B1 and D
Corrective Measures Study Work Plan Update
East Helena, Montana

1"=100'

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

01-05-12
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FIGURE 3

Preliminary Concept

SECTION 6

CMS Project Management and Public Involvement Plans

This section describes the CMS Project Management and Public Involvement Plans. Included in this discussion is the proposed CMS schedule.

6.1 Project Management Plan

The Custodial Trust will manage the CMS activities as part of the responsibilities and obligations set forth in the Settlement Agreement and First Modification. The Custodial Trust will communicate relevant information about CMS task plans, results, and progress to USEPA, as Lead Agency, as well as to the federal and state Beneficiaries of the Custodial Trust. Communications will be held on a frequent and timely basis to review progress on the CMS, to solicit input from the Beneficiaries, and to ensure they are kept well informed of activities onsite.

6.1.1 Organization and Lines of Communication

The Custodial Trust will procure the services of consultants and contractors to implement the CMS as efficiently and cost-effectively as possible. The current CMS Project Organization Chart and the lines of communication are shown in Figure 6-1.

6.1.2 Deliverables and Reporting

CMS deliverables and reports will be prepared to meet the requirements of the First Modification, to communicate progress, and to provide a complete and accurate administrative record of key activities and decisions. To meet this objective efficiently and cost-effectively, the following deliverables are recommended for the CMS:

- For each CMS task:
  - Scope of Work describing the task objective(s), scope, decision/evaluation/performance criteria and task schedule, and serving as an authorizing document to establish the task's financial parameters
  - Draft report documenting the task activities and results
  - Final report addressing and incorporating comments from USEPA, after consideration of input from the other Beneficiaries, and the public when public comment is solicited
- Draft and final CMS Report(s), to summarize CMS activities and propose final remedies for the CMS Properties. The CMS Report will likely be prepared in phases, given that CMS tasks will be performed in phases, with the appropriate documentation to record activities and results.

USEPA has determined that written monthly progress reports are not necessary for the CMS implementation process, given the frequent and regular communication between the Custodial Trust and the Beneficiaries. The Custodial Trust and USEPA expect that Beneficiary meetings will have a standing CMS Progress line item on the agenda to discuss activities and provide updates on progress. In addition, the Custodial Trust will provide copies of key technical memoranda and summaries of key investigations or evaluations to update USEPA on significant CMS results.

6.1.3 Proposed CMS Schedule

Table 6-1 shows the proposed CMS schedule, and provides the currently anticipated sequence of activities and estimated timeframes.

TABLE 6-1
Draft Corrective Measures Study Schedule

Task Name	Start	End
Conceptual Site Model Refinement	September 2011	August 2015
Leachate and Stormwater Management Evaluation	September 2013	September 2014
Numerical Groundwater Modeling	June 2012	December 2014
Interim Measures Design and Implementation		
South Plant Hydraulic Control Assessment	September 2011	November 2016
Structures and Utility Demolition	October 2012	November 2016
Source Control and Removal Options	December 2012	December 2016
Remediation Waste Management	October 2013	December 2016
ET Cover System Construction	October 2013	November 2016
Interim Measures Performance Monitoring and Evaluation	July 2012	December 2015
Completion of Remedy Evaluations and Preparation of CMS Report	January 2016	June 2017
Public Participation	January 2012	December 2017

As noted previously, IMs will be developed concurrently with the CMS and evaluated as part of the CMS. The IMs are expected to be phased to maximize efficiency of implementation. For examples,

- The first phase of the SPHC consisted of construction of the PPC Temporary Bypass, which was completed in October 2013. This will allow for the removal of TPA soil and Lower Lake sediment in mostly dry conditions. The PPC Realignment will be constructed starting in early 2014 with a target completion of October 2015. As noted in Section 5.4, the greatest drop in water levels is anticipated to occur now that the bypass is in place. The water levels throughout the main plant site and the South Plant area will be monitored for a period of approximately 2 years after the construction of the bypass, until the end of 2015, to evaluate the effectiveness of the SPHC IM.
- The ET Cover System implementation will occur in phases, with the two ICS phases occurring in 2014 and 2015, and the final ET Cover System completed in 2016. The construction also will be coordinated with other activities including building demolition.

Elements of this schedule may change depending on the outcome and timing of related tasks. Accordingly, the schedule will be updated on a regular basis, to reflect progress to date, new tasks, and other key changes in CMS scope or timing.

6.2 Public Involvement

Public involvement is a critical part of the RCRA Corrective Action process. USEPA is leading the public involvement effort for this site. General communication with the public will continue to follow the draft *Community Relations Plan, Former ASARCO Smelter Facility, East Helena, Montana* (Custodial Trust, 2010), as well as the requirements of the First Modification to the 1998 Consent Decree.

The Custodial Trust continues to perform several activities to provide the public with information and appropriate opportunities for involvement (Appendix C). In 2013, the Custodial Trust held the following meetings and workshops:

- Two meetings of the East Helena Entire Cleanup Team in Coordination were held in April and December 2013 to provide project stakeholders and the community with information on progress of the IMs.
- A workshop was held in October 2013 to provide the community an update on the PPC Realignment design.

- An informational meeting was held in December 2013 to provide the community with an overview of the 2014 IM work.

The Custodial Trust's website: http://www.mtenvironmentaltrust.org/east-helena contains links to news on cleanup progress, design documents, meeting materials, and future meeting dates. A video of the PPC Realignment project is available for viewing. In addition, newsletters, fact sheets, and news articles describing the ongoing work have been published, and site tours have been conducted.

While the Custodial Trust and USEPA will continue to provide regular and timely updates on all significant activities, including implementation of the CMS, final formal public comment on the CMS Report will be solicited after the Beneficiaries review and USEPA approves the CMS Report, and USEPA has preliminarily selected the final site remedies. USEPA has committed to continue to coordinate public input into the IMs that are developed and implemented during the CMS, and will ensure that the public is made aware of all other information relating to corrective action activities at the CMS properties in a timely manner.

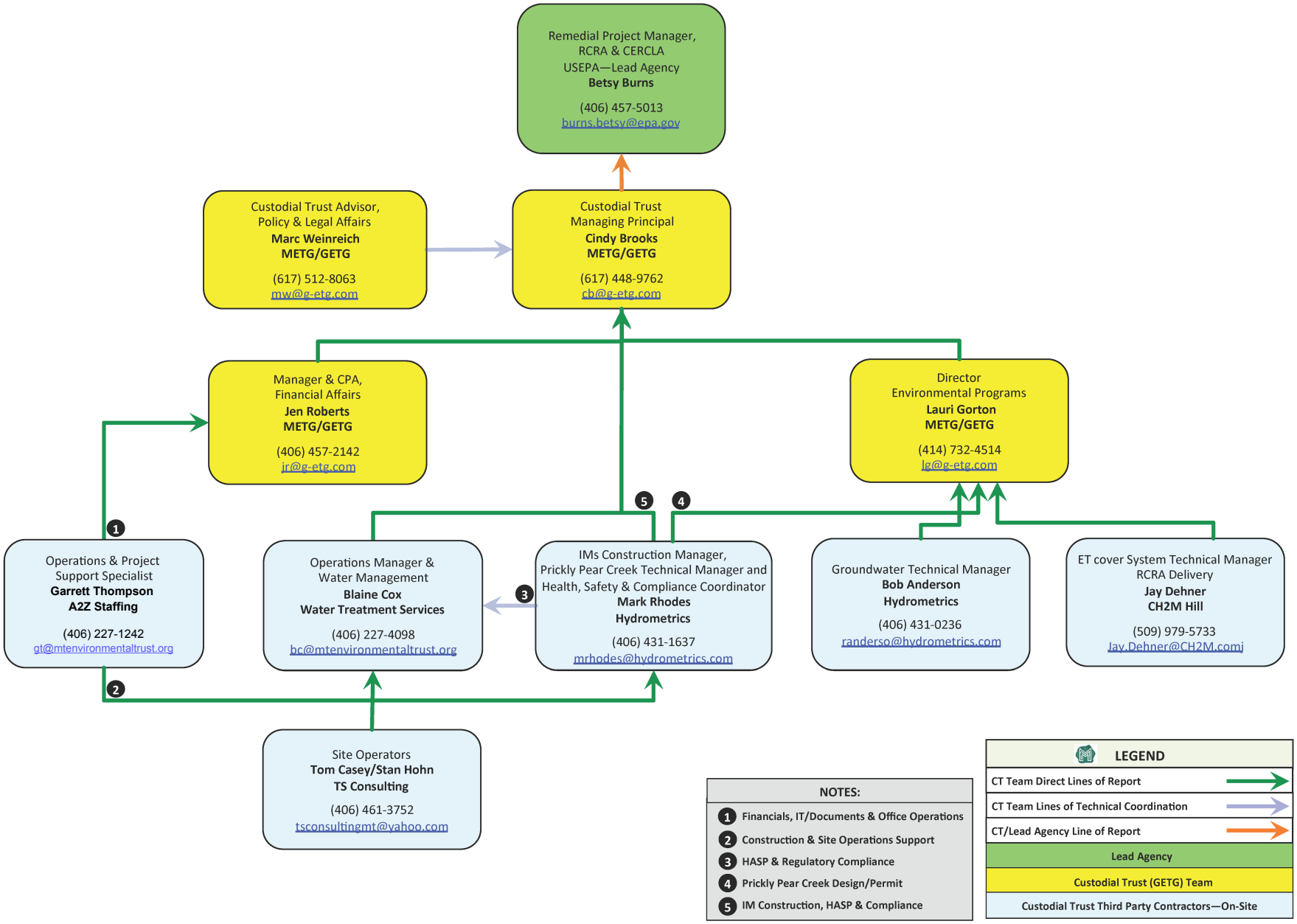


FIGURE 6-1

Corrective Measures Study Project Organization and Lines of Communication

Corrective Measures Study Work Plan

East Helena, Montana

SECTION 7

References

Asarco Consulting, Inc. 2005. *Phase I RCRA Facility Investigation Site Characterization Report, East Helena Facility.* Prepared for ASARCO Incorporated. February 2003 (Revised 2005).

CH2M HILL. 2011. *Screening-Level Human Health Risk Assessment*, *East Helena Facility, East Helena, Montana*. Prepared for Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust.

CH2M HILL. 2012. *Former ASARCO East Helena Facility Interim Measures Work Plan—Conceptual Overview of Proposed Interim Measures and Details of 2012 Activities*. Final. Prepared for Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust. September 2012.

CH2M HILL. 2013a. *Former ASARCO East Helena Facility Interim Measures Work Plan—2013*. Final. Prepared for Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust. February 2013.

CH2M HILL. 2013b. Technical Memorandum: *Summary of Soil Removal Alternatives Evaluation at the East Helena Former ASARCO Smelter Site*. November 12.

CH2M HILL. 2013c. *Former ASARCO East Helena Facility Interim Measures Work Plan—2014*. Public Review Draft. Prepared for Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust. December 2013.

Dreher, Robert G., E. Rockler, M.W. Cotter, L. Johnson/United States District Court for the District of Montana. 2012. First Modification to the 1998 Consent Decree. Civil Action No. CV 98-H-CCL. Case 6:98-cv-00003-CCL. Document 38. Filed January 17, 2012.

Gradient. 2011. *Final Baseline Ecological Risk Assessment, Former ASARCO East Helena Facility, East Helena, Montana*. Prepared for Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust.

GSI Water Solutions, Inc. (GSI). 2011. *Phase II RCRA Facility Investigation Report*, *East Helena Facility*. Draft. May 2011.

Hooper, M.J., G.P. Cobb, S.T. McMurry. 2002. *Wildlife Biomonitoring at the Anaconda Smelter Site, Deer Lodge County, Montana*. Texas Cooperative Fish and Wildlife Research Center, Texas Tech University.

Hydrometrics. 1990. *Comprehensive Remedial Investigation/Feasibility Study, ASARCO Incorporated, East Helena, Montana*. Prepared for ASARCO Incorporated. March 1990.

Hydrometrics. 1999. *Current Conditions/Release Assessment, East Helena Facility*. Prepared for ASARCO Incorporated. September 1998 (Revised January 1999).

Hydrometrics. 2010. *Phase II RCRA Facility Investigation Site Characterization Work Plan, East Helena Facility*. May 2010.

Hydrometrics, Inc. 2012. *Upper Lake Drawdown Test Technical Memorandum–DRAFT*. September 20, 2012.

Hydrometrics. 2014. *East Valley Controlled Groundwater Area Petition-Lewis and Clark County, Montana*. Prepared for the Montana Environmental Trust Group, Trustee of the Montana Environment Custodial Trust. August 2014.Montana Department of Environmental Quality (MDEQ). 2009. *Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases*. September 2009.

Montana Department of Environmental Quality (MDEQ). 2012. *Circular DEQ-7, Montana Numeric Water Quality Standards*. Prepared by: Water Quality Planning Bureau, Water Quality Standards Section, Helena, Montana. October 2012.

Montana Department of Environmental Quality (MDEQ). 2013. *Project Report Background Concentrations of Inorganic Constituents in Montana Surface Soils*. September 2013.Montana Environmental Custodial Trust (Custodial Trust). 2010. *Community Relations Plan, Former ASARCO Smelter Facility, East Helena, Montana*. Draft May 2010.

U.S. Environmental Protection Agency (USEPA). 1994. *RCRA Corrective Action Plan*. Final. Office of Waste Programs Enforcement and Office of Solid Waste. OSWER Directive 9902.3-2A. May 1994.

U.S. Environmental Protection Agency (USEPA). 1996. Advanced Notice of Proposed Rulemaking: Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities. http://www.epa.gov/osw/hazard/correctiveaction/resources/guidance/anpr.htm. May 1, 1996.

U.S. Environmental Protection Agency (USEPA). 1998. Risk Assessment Guidance for Sup*erfund, Volume I: Human Health Evaluation Manual, Part A (Interim Final)*.

U.S. Environmental Protection Agency (USEPA). 2004. *Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action*. For Facilities Subject to Corrective Action Under Subtitle C of the Resource Conservation and Recovery Act. EPA530-R-04-030. April 2004.

U.S. Environmental Protection Agency (USEPA). 2005. *Technical Memorandum: Supplemental Ecological Risk Assessment for the East Helena Smelter Site, Montana.* USEPA with technical assistance from Syracuse Research Corporation, Denver, Colorado.

U.S. Environmental Protection Agency (USEPA). 2009a. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance.* EPA 530/R-09-007. March 2009.

U.S. Environmental Protection Agency (USEPA). 2009b. *U.S. East Helena Superfund Site, Operable Unit No. 2, Residential Soils and Undeveloped Lands, Final Record of Decision.* U.S. Environmental Protection Agency, Washington, D.C.

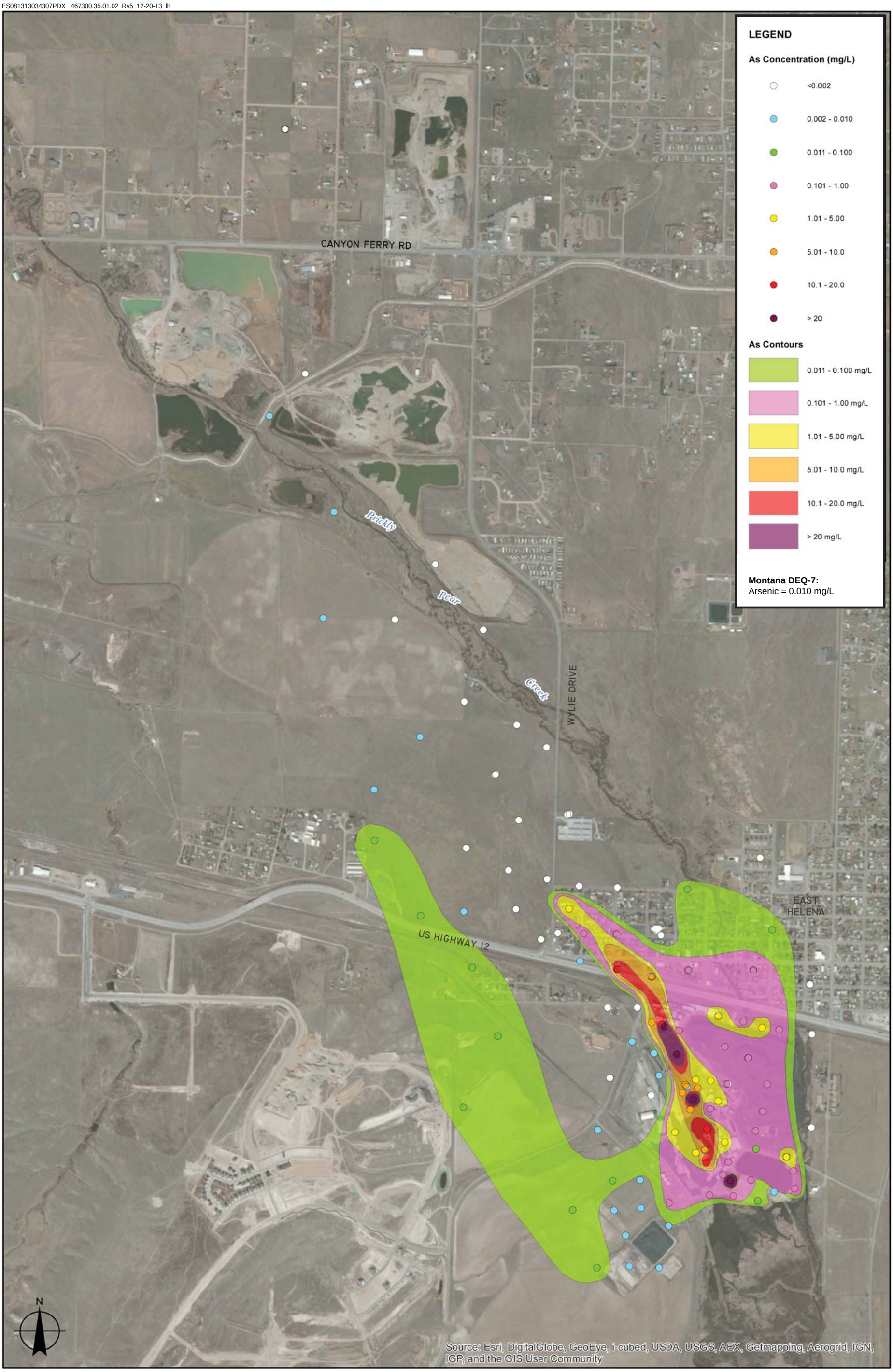
U.S. Environmental Protection Agency (USEPA). 2013. RCRA Cleanup Reforms. Accessible from: http://www.epa.gov/osw/hazard/correctiveaction/reforms/.

U.S. Environmental Protection Agency (USEPA). 2014. *Hegeler Zinc Superfund Site, Operable Unit 3, Record of Decision*. September 2014.

Appendix A
June 2013 Groundwater Plume Maps

Groundwater Plume Map—Arsenic

ES081313034307PDX 467300.35.01.02 Rv5 12-20-13 lh



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Consulting Scientists and Engineers

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Scale in Miles

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Notes:

DEQ-7: The Montana Department of Environmental Quality (DEQ) Circular DEQ-7 *Montana Numeric Water Quality Standards* (October 2012).

mg/L = milligram(s) per liter

FIGURE A-1
Dissolved Arsenic Concentrations in Groundwater—June 2013
Corrective Measures Study Work Plan Update
East Helena, Montana

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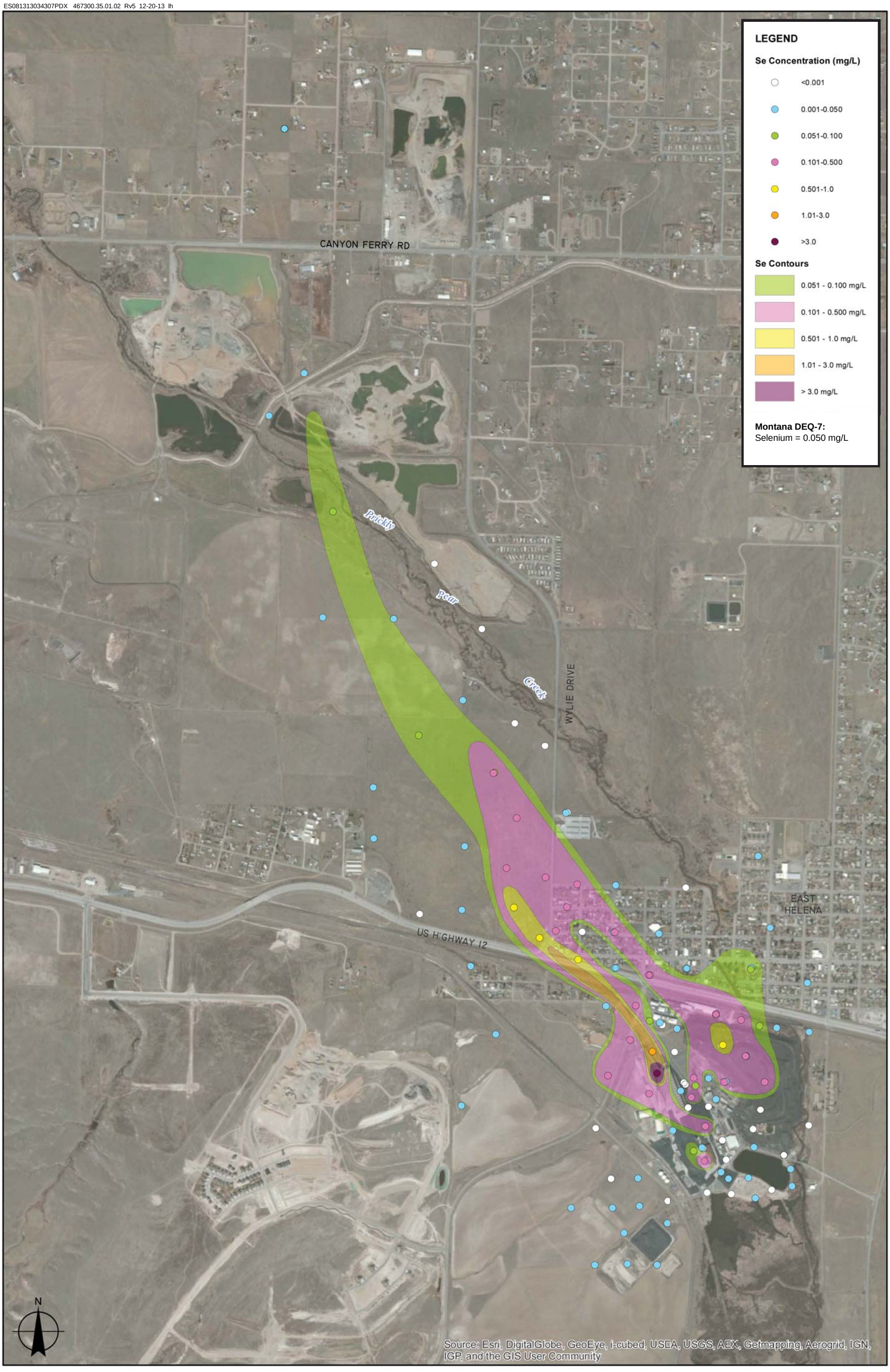
Groundwater Plume Map—Selenium

ES081313034307PDX 467300.35.01.02 Rv5 12-20-13 lh



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Notes:

DEQ-7: The Montana Department of Environmental Quality (DEQ) Circular DEQ-7 *Montana Numeric Water Quality Standards* (October 2012).

mg/L = milligram(s) per liter

FIGURE A-2
Dissolved Selenium Concentrations in Groundwater—June 2013
Corrective Measures Study Work Plan Update
East Helena, Montana

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Appendix B
Screening-Level Human Health Risk Assessment

Draft

Screening-Level Human Health Risk Assessment

Former ASARCO East Helena Facility
East Helena, Montana

Prepared for

The Montana Environmental Trust Group, LLC
Trustee of the Montana Environmental Custodial Trust

Originally Drafted December 2011

Updated January 2014

CH2MHILL®

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Acronyms and Abbreviations

µg/L	microgram per liter
ASARCO	American Smelting and Refining Company
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Cleanup Liability
cm	centimeter
CMS	Corrective Measures Study
COPC	constituent of potential concern
FSAP	Field Sampling and Analysis Plan
ft	foot/feet
GSI	GSI Water Solutions, Inc.
HDS	high-density sludge
ICP	institutional controls program
IRIS	Integrated Risk Information System
mg/kg	milligrams per kilogram
OEHHA	Office of Environmental Health Hazard Assessment
PRG	preliminary remediation goal
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSL	regional screening level
SLHHRA	Screening-Level Human Health Risk Assessment
SLV	screening-level value
U.S.	United States
USEPA	U.S. Environmental Protection Agency

SECTION 1

Introduction

The purpose of this Screening-Level Human Health Risk Assessment (SLHHRA) is to assess the potential current and future exposure pathways associated with environmental media at the former ASARCO East Helena Facility (the Facility). The results of this SLHHRA will be used to support the Corrective Measures Study (CMS) to meet requirements of the First Modification to the 1998 Resource Conservation and Recovery Act (RCRA) Consent Decree (First Modification) and all other applicable regulatory guidance requirements.

This evaluation is referred to as a "screening-level" assessment because it relies on published generic U.S. Environmental Protection Agency (USEPA) screening levels and does not present or use site-specific screening levels for the analysis. This SLHHRA incorporates information from the draft *Human Health Risk Assessment Work Plan* (Exponent, 2009), but relies primarily on the draft *Phase II RCRA Facility Investigation—East Helena Facility* (draft Phase II RFI; GSI Water Solutions, Inc. [GSI], 2011) for data. The SLHHRA provides a discussion of screening results for properties cited in Section 38 of the First Modification (Figure 1-1). These areas, along with areas not owned by the Trust, where contamination has migrated from the former ASARCO property via groundwater or surface water, are hereafter referred to as the "CMS Properties." For the purposes of remedy identification and evaluation, the CMS Properties have been subdivided into the following parcels based on current and reasonably anticipated future land use:

- Custodial Trust-owned Properties
  - Parcels 16 and 19: Site of ASARCO's now-demolished lead smelter, other historical industrial and manufacturing operations, and materials and waste-handling activities (hereafter referred to as the "former Smelter site"). Lower Lake and the majority of Tito Park are located here. These parcels have been the focus of the RCRA corrective action work completed to date.
  - Parcel 15: Location of Corrective Action Management Units (CAMUs), Upper Lake, Upper Lake Marsh, a small portion of Tito Park, agricultural lands, and the rodeo grounds.
  - Parcels 17 and 18: Location of the ASARCO Plant Manager home and other employee housing, which was demolished in 2010.
  - Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518: Agricultural lands.
  - The portion of Parcel 2 near Prickly Pear Creek: Particularly the riparian corridor.
- Un-owned CMS Properties
  - Areas affected by migration of contaminated groundwater or surface water from the former ASARCO properties, which are not owned by the Custodial Trust. The areas affected by contaminated groundwater are being defined by ongoing groundwater sampling and are defined by the boundaries of the arsenic and selenium plumes.

1.1 Site Background

ASARCO built a lead smelter in East Helena in 1888 and operated at the site from 1899 until its closure in April 2001. Operations occurred primarily on Parcel 16, which is approximately 142 acres. Interior portions of the site were largely covered with buildings, paved with concrete, or otherwise developed. Most of the buildings and infrastructure at the former Smelter site have been demolished as part of the IM activities in 2012 and 2013. A large slag pile is situated in the northeast quadrant of the site. Wilson Ditch flows from Upper Lake across the site underground through an enclosed pipe emerging on the northwestern side of the site. Wilson Ditch is a human-made diversion ditch for irrigation and is wet only seasonally. Parcels 16 and 19, collectively referred to as "the former Smelter site," have been the focus of site investigation and remediation work under both CERCLA and the RCRA Corrective Action program since 1984. Land use for the former Smelter site has been, and will continue to be industrial or commercial use.

The other Custodial Trust-owned parcels that comprise the CMS Properties surrounded the former Smelter site and were acquired over the years by ASARCO. Some environmental quality data exist for these areas from past RCRA and CERCLA investigations, but the dataset is not as robust as that available for the former Smelter site. Land use for the other Custodial Trust-owned CMS Properties consists of agricultural, and recreation/open space. Historically, Parcel 18 (located immediately to the east of the former Smelter site) had a residential use (ASARCO employee housing), but most of the homes were demolished in 2010 and future use of this site will not be residential.

The Un-owned CMS Properties included in this SLHHRA are those affected by contaminant migration from the former Smelter site (excluding airborne particulate deposition to surface soil, which is addressed under CERCLA). Significant groundwater data are available for these sites, because groundwater is the primary migration pathway of interest, in addition to surface water and sediment data obtained as part of the *Baseline Ecological Risk Assessment* (BERA) (Gradient, 2011). Offsite, as well as residential and public water supply, wells are monitored regularly to evaluate groundwater quality and contaminant migration. The monitoring intervals are monthly, quarterly, semiannually, and annually, depending on the objectives described in the annual Field Sampling and Analysis Plans (FSAPs). Land use for these parcels is agricultural, recreational, industrial/commercial, and residential.

Surface water bodies present on the CMS Properties are Prickly Pear Creek, Wilson Ditch, Lower Lake, Upper Lake, and Upper Lake Marsh. Upstream mining activities are known to contribute many of the same inorganic constituents identified as constituents of potential concern (COPCs) associated with former ASARCO operations. However, dissolved and total metal concentrations historically have been elevated above upstream concentrations in the reach of Prickly Pear Creek adjacent to the former Smelter site. This increase has been attributed to historical seepage from Lower Lake via groundwater in the stream reach immediately adjacent to Lower Lake. The water bodies, sediment quality, and associated habitat are described further in the draft Phase II RFI (GSI, 2011) and the BERA (Gradient, 2011).

1.2 Preliminary Conceptual Site Model for All CMS Properties

As described in Section 3 of the CMS Work Plan, the overall preliminary conceptual site model (PCSM) for the CMS Properties is summarized as follows:

- The former Smelter site is the primary, if not sole, historical and current source of contaminants to the CMS Properties.
- COPCs identified to date are metals associated with former ASARCO operations. The Phase II RFI identified arsenic, cadmium, copper, lead, and zinc (based on concentrations) as primary COPCs for soil; and arsenic and selenium as the primary COPCs for groundwater. Although other COPCs are present in groundwater at concentrations exceeding SLVs, they are located within the footprint of the combined arsenic and selenium plume areas (and it is reasonable to expect that the concentrations of these COPCs will be lowered to appropriate levels while addressing the arsenic and selenium plumes).
- Historical sources associated with plant operations include stack emissions, materials handling and storage, leaks from process water systems, and infiltration from plant dust suppression activities. The operational sources have been eliminated and several interim measures (e.g., slurry wall containment, installation of temporary covers) have been implemented to address some known source areas.
- Historically, contaminants released to the environment during operations were transported to surrounding areas in groundwater, surface water, and sediment, and via airborne particulate deposition to surface soil. Although the operational sources have been eliminated, residual contamination in environmental media (primarily onsite soil and sediment) continues to release COPCs to the CMS Properties. Current transport mechanisms are summarized as follows:
  - The most significant transport mechanism is groundwater flow, which is north and west of the former Smelter site. Groundwater is monitored in accordance with a FSAP. Onsite monitoring wells, piezometers, public water supply wells, and residential wells are monitored under this plan, with monthly, quarterly, semiannual and annual sampling events depending on the monitoring objective(s). Recent monitoring results indicate that the arsenic plume appears to be relatively stable. The extent of the selenium plume was

delineated in 2011 and continues to be updated as new groundwater information becomes available. At this time, insufficient data are available to determine whether it is stable, shrinking, or continuing to migrate offsite to the north.

  - The majority of stormwater runoff on the former Smelter site is contained and treated at the high-density sludge (HDS) water treatment plant onsite, which significantly reduces the potential contribution of stormwater to surface water as a contaminant transport mechanism.
  - Other current potential transport mechanisms, such as windblown dust, surface water movement, and sediment transport, are much less significant; however, monitoring is required to confirm that these transport mechanisms do not create a potential source of contaminant transport.

- Potential exposure to human receptors at the former Smelter site (Parcels 16 and 19), Parcel 17, and Parcel 18 presently are being addressed through engineered controls (fencing and covers) and institutional controls (changes in land use and strict compliance with the Site-wide Health and Safety Plan). These sites, particularly the former Smelter site, were historically addressed using interim measures as early as possible in the corrective action process because they are expected to be the location of the highest potential risk, based on existing data.
- Potential unacceptable exposures to contaminated soil are also being addressed by the Regulations Governing Soil Displacement and Disposal in the East Helena Superfund Area in Lewis and Clark County, Montana. This institutional control was implemented in 2013 by the Lewis and Clark City-County Health Department and encompasses all CMS Parcels.
- The potential for human exposures to COPCs at concentrations exceeding risk-based screening levels at the other CMS Properties, including the Un-owned CMS Properties, is considered relatively low based on existing data. Potential human exposure at all CMS properties, however, will be further evaluated during the CMS.
- Potential exposures and risk to ecological receptors were evaluated in the 2011 BERA for the Custodial Trust-owned CMS Properties. The BERA generally concluded as follows:
  - The primary COPCs for ecological receptors are arsenic, cadmium, copper, mercury (and methyl mercury), lead, and selenium.
  - The areas noted to have the most habitat available for aquatic and terrestrial communities (Prickly Pear Creek Upper Lake, Upper Lake Marsh), were characterized with either “minimal” or “low to moderate” potential risk. Wilson Ditch was also evaluated. The highest potential risks to aquatic and terrestrial communities were identified at the areas referred to in the BERA as the “East and West Perimeter CSM units.” As their name indicates, these areas are located at the perimeter of the former operating areas on the edges of Parcel 16 and 19. Lower Lake and Tito Park were also found to have significantly elevated COPC concentrations in the aquatic and terrestrial communities, although minimal habitat is available.

1.3 Current Land and Reasonably Anticipated Land and Groundwater Use

For the purposes of this SLHHRA, the current land and groundwater use is the assumed “reasonably anticipated future use” of the CMS Properties (as shown in Table 1-1). The Custodial Trust currently is evaluating the potential future use of owned properties and considering market opportunities, community goals, and objectives, and other stakeholder interests. Ultimately, although environmental conditions will be considered, decisions regarding the future use of these parcels will be made outside the RCRA Corrective Action process.

1.4 Scope of SLHHRA

As stated above, the purpose of this SLHHRA is to assess the potential current and future exposure pathways associated with environmental media at the former ASARCO East Helena Facility. The SLHHRA identifies potentially complete direct contact exposure pathways associated with soil and groundwater by using data summarized in the

Phase II RFI (GSI, 2011) and taking into consideration current assumptions regarding parcel-specific settings and land use.

This screening-level risk assessment contains the following components:

- **Identification of COPCs**—Identifying the constituents found in environmental media and selecting the COPCs. COPCs represent the subset of the constituents found at the facility, which are expected to contribute the most to the total risks associated with the facility.
- **Exposure Assessment**—Identifying the potential pathways of human exposure, and estimating the magnitude, frequency, and duration of these exposures.
- **Toxicity Assessment**—Compiling the toxicity values used for evaluating potential cancer risks and noncancer hazards.
- **Risk Characterization**—Integrating the results of the exposure and toxicity assessments to characterize the potential health risks associated with potential exposure to site-related contamination.
- **Uncertainty Assessment**—Identifying and discussing sources of uncertainty in the risk assessment.

1.5 Report Organization

The remainder of this report presents the approach, methodology, and results of the screening-level human health risk assessment for the East Helena Facility. The report is organized as follows:

- Section 2—Identification of Constituents of Potential Concern
- Section 3—Exposure Assessment
- Section 4—Toxicity Assessment
- Section 5—Risk Characterization
- Section 6—Uncertainty Associated with Screening-Level Human Health Risk Assessment
- Section 7—Assessment of Dataset and Recommendations to Address Uncertainties
- Section 8—References
- Appendix A—Screening-Level Values
- Appendix B—Detailed COPC Screening Results by Media

SECTION 2

Identification of Constituents of Potential Concern

For the purpose of risk screening, a COPC is defined as a constituent that exceeds conservative risk-based screening-level values (SLVs) presented in this document. The identification of COPCs in this SLHHRA relied on data collected for previous investigations (primarily data summarized in the Phase II RFI and the BERA), data evaluation, and data screening steps. The data evaluation step involved gathering and reviewing the available facility data, and identifying a subset of the data at appropriate locations and depth intervals and of acceptable quality for use in this SLHHRA. This dataset was then screened against published generic values that represent concentrations protective of human health to reduce the dataset to those constituents and media of potential concern.

2.1 Data Evaluation and Selection

The data that were selected for evaluation in the SLHHRA have been validated. Some of the data were qualified during the validation process. The following bullets discuss how the qualified data were evaluated in the risk assessment:

- Data qualified with a J (estimated) were treated as detected concentrations
- Data qualified with an R (rejected) were excluded from the risk assessment
- Duplicate samples were not used in the screening evaluation
- Analytes for which no detected results are reported for a particular medium were not considered COPCs for that medium

2.2 Data Summary

Existing surface soil, sediment, surface water, and groundwater data as described below were compiled for the screening process to identify COPCs. Because metals are the site-related chemicals of concern, the evaluation of the existing data was limited to the following list of 19 metals as indicated in the draft HHRA Work Plan (Exponent, 2009):

Aluminum	Lead
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Selenium
Cadmium	Silver
Chromium	Thallium
Cobalt	Vanadium
Copper	Zinc
Iron	

2.2.1 Soil

Soil samples have been collected from numerous investigations since 1993, with the most recent data obtained in 2010 as a part of the Phase II RFI (GSI, 2011). Historical soil samples were collected in 2001 as part of the Phase I RFI (ACI, 2005). Soil data presented in both studies were used in this assessment. The Phase II RFI presents a compilation of historical and more recent soil sampling data. All data presented in the Phase II RFI that remain representative of existing site conditions were used in this screening-level assessment. Soil samples collected prior to permanent remedial actions (e.g., removal) in certain areas (according to the Phase II RFI [GSI, 2011]) were not used in this screening-level assessment because they are no longer representative of current conditions. However, the soil below the temporary cap is not considered permanently remediated and data for soil samples located beneath the cap were used for screening purposes. Soil samples used in the screening are shown in Figure 2-1a (2010 sample locations) and Figure 2-1b (historical sample locations).

2.2.2 Sediment

Sediment samples were collected in 2010 as part of the Phase II RFI. Historical sediment samples were collected in 2001 as part of the Phase I RFI and in 2003 as part of the field studies conducted for the Supplemental Ecological Risk Assessment (EPA, 2005). Only data from the 2010 sampling effort will be used in this SLHHRA because, given the possible movement of sediment, these data are most representative of current site conditions. The sediment sample locations are shown in Figure 2-2.

2.2.3 Surface Water

Recent surface water data are available from the ongoing surface water monitoring program for the site. The 2011 monitoring data were used for this screening. Surface water sample locations are shown in Figure 2-3. In addition to recent data, surface water samples were collected in 2001 as part of the Phase I RFI. Surface water was also sampled in 2003 as part of the field studies conducted for the Supplemental ERA; however, these historical samples are not considered representative of current conditions and were not included in this SLHHRA.

2.2.4 Groundwater

The original screening was done in 2011, using two sets of groundwater data: offsite private well data, and on- and offsite monitoring well data. For both datasets, the 2011 data from each well location were included in the screening. The results will be reviewed as appropriate with respect to current groundwater data to evaluate changes in conditions.

2.3 Selection of Constituents of Potential Concern

The constituents detected in soil, sediment, surface water and groundwater samples were screened to select the COPCs using the risk-based screening levels described below. This screening will result in a list of constituents for each CMS Property in order to focus future investigations on chemicals that have the greatest potential to contribute to human health risks. Because the SLHHRA is intended to be a conservative, preliminary assessment, the maximum detected concentration of each constituent in each CMS property (by depth interval) or the detected concentration of each constituent in groundwater was compared to a screening value to select the COPCs. For this SLHHRA, surface soil is defined as the 0 to 2 feet (ft) below ground surface (bgs) depth interval and subsurface soil includes samples collected from deeper than 2 ft bgs.

If the maximum detected concentration exceeded the screening value, the constituent was selected as a COPC. Risk-based screening levels for soil that are based on the constituent-specific noncarcinogenic effects are based on a hazard quotient of 1. Risk-based screening levels that are based on carcinogenic effects are based on a target risk of $1x10^{-6}$.

The screening-level values used for each medium are presented in Appendix A and include the following:

- **Soil:** The maximum detected constituent concentrations in soil were compared to the USEPA residential and industrial soil regional screening levels (RSLs) (USEPA, 2011).
- **Sediment:** The maximum detected constituent concentrations in sediment were compared to the USEPA residential and industrial soil RSLs (USEPA, 2011). Although sediment exposure is not likely to be as frequent as for soil, the soil RSLs were used as conservative screening criteria to select COPCs.
- **Surface Water:** The maximum detected constituent concentrations in surface water were compared to the USEPA maximum contaminant level (MCL) and tap water RSLs (USEPA, 2011). Although surface water at the facility is not used as a drinking water source, these RSLs were used as conservative screening criteria to select COPCs.
- **Groundwater:** The maximum detected constituent concentrations from the most recent groundwater data for each location were compared to USEPA MCL and tap water RSLs (USEPA, 2011). Although groundwater at the former Smelter site is not used as a drinking water source, these RSLs were used as conservative screening criteria to select COPCs.

SECTION 3

Exposure Assessment

Exposure refers to the potential contact of an individual with a chemical. The exposure assessment identifies pathways and routes by which an individual may be exposed to the COPCs, and estimates the magnitude, frequency, and duration of potential exposure. The following subsections discuss the three components of the exposure assessment:

- Characterization of exposure setting
- Identification of exposure pathways
- Quantification of exposure

3.1 Characterization of Exposure Setting

The Custodial Trust-owned and Un-owned CMS Properties have been evaluated separately in the SLHHRA based on site characteristics, including expected future land use, topography, contaminant migration pathways, and media concentrations (from the Phase II RFI data collection and relevant historical data). Exposure areas within the properties were not defined for the SLHHRA because for this preliminary evaluation a simplified approach of comparing maximum detected concentrations within a property was used to identify COPCs. Section 7.2 presents possible next steps for refining the risk characterization, including suggested exposure area sizes for the various CMS Properties.

The following site use scenarios and receptors are considered in this SLHHRA and are consistent with the draft HHRA Work Plan (Exponent, 2009):

- Industrial Worker (adult, Parcels 16 and 19 and Un-owned CMS Properties)
- Resident (adult and child, Parcel 15 and Un-owned CMS Properties)
- Rancher (adult, Parcels 10,11,12, 15, 17, 23, portions of Parcel 8 west of Highway 518 and Un-owned CMS Properties)
- Recreational User (adult and child, all CMS Properties except Parcels 16 and 19)
- Trespasser (adult)

An additional potential receptor that was not included in the draft HHRA Work Plan (Exponent, 2009) is the construction worker. Future construction workers may be exposed to site COPCs in subsurface soil through direct contact with site soil (ingestion, inhalation, and dermal contact). The construction worker scenario is considered in this SLHHRA for subsurface soil as described in Section 5.

3.2 Identification of Exposure Pathways

Potential exposure pathways and scenarios that were evaluated as part of this SLHHRA for the former Smelter site soil, sediment, surface water, and groundwater are summarized for CMS properties in the sections below.

3.2.1 Parcels 16 and 19 (Former Smelter Site)

Figure 3-1 presents the preliminary conceptual exposure model for potential current and future human receptors within Parcels 16 and 19 (former Smelter site).

Under current and reasonably anticipated future land use, the potential receptors on Parcel 16 and 19 include onsite workers and trespassers. Institutional controls (which are currently in place and will be part of the final remedy for the site) will prevent worker exposure to COPCs through direct contact with soil and incidental contact with surface water. It is possible that workers occasionally contact surface water or catch and consume fish from Prickly Pear Creek.

The former Smelter site currently is fenced and unauthorized access is forbidden. Nevertheless, trespassers may occasionally enter the site to engage in recreation (e.g., fishing), vandalism, or other activities. Trespassers could also be exposed to site COPCs through incidental contact with surface water (ingestion and dermal contact) or catching and consuming fish from Upper Lake.

3.2.2 Parcel 15

Figure 3-2 presents the preliminary conceptual exposure model for potential current and future human receptors within Parcel 15. Parcel 15 is located on the western and southern border of Parcels 16 and 19. Parcel 15 is the location of the CAMUs and a small portion of Tito Park, but historically there were no industrial facilities on Parcel 15. As noted in the PCSM presented in the CMS Work Plan, contaminants may have migrated to Parcel 15 surface soil primarily via wind/areal deposition, and to a much lesser extent surface water runoff/soil erosion immediately adjacent to Parcels 16 and 19. Groundwater data collected to date indicates that only the northeasterly portion of Parcel 15 is downgradient of, and has been affected by the migration of contaminated groundwater from, the former Smelter site. The majority of Parcel 15 is upgradient and therefore effects on groundwater quality are not expected. Surface water bodies on Parcel 15 include Wilson Ditch (downstream of the former Smelter site), Prickly Pear Creek and Upper Lake (which are both upstream).

Under current and reasonably anticipated future land use, the potential receptors on Parcel 15 include workers, ranchers, recreational users and trespassers. Residential land use is not considered to be “reasonably anticipated”, based on the current property development studies being conducted by the Custodial Trust. However, residential use was included in this screening to provide a conservative evaluation. Potential receptors may come in contact with COPCs through direct contact with surface soil and incidental contact with surface water. It is possible workers, residents, recreational users and/or trespassers could occasionally contact surface water or catch and consume fish from Upper Lake or Prickly Pear Creek.

Under both current and future use scenarios, ranchers may graze cattle in the agricultural areas of Parcel 15. The one exposure pathway unique to the rancher scenario is consumption of beef from cattle that have grazed onsite. Note, metals concentrations in locally grazed beef were evaluated in the 1995 HHRA and no differences were found in comparison to reference herds.

Under the future use scenario, residents may grow gardens and consume homegrown produce. For the purposes of the SLHHRA, groundwater is conservatively assumed to be a possible drinking water source in the future.

3.2.3 Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518

Figure 3-3 presents the preliminary conceptual exposure model for potential current and future human receptors within Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518. There have never been industrial facilities on these parcels ; however, contaminants may have migrated to surface soil via wind/areal deposition. These parcels are upstream of the former Smelter site from a surface water perspective and upgradient from a groundwater flow perspective. Migration of contaminated surface water and groundwater from the former Smelter site therefore would not be expected to affect surface water or groundwater quality here.

Under current and reasonably anticipated future land use, the potential receptors on Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Route 518include recreational users and trespassers. Recreational users and/or trespassers may come in contact with COPCs through direct contact with surface soil that has been contaminated through transport of airborne particulates. Under reasonably anticipated future land use, ranchers may graze cattle in the agricultural areas of these parcels.

3.2.4 Parcels 17 and 18

Figure 3-4 presents the preliminary conceptual exposure model for potential current and future human receptors within Parcels 17 and 18. Parcels 17 and 18 are located immediately to the east of and adjacent to Parcel 16. There are no industrial facilities on Parcels 17 and 18; however, contaminants may have migrated to surface soil via wind/ areal deposition. Parcels 17 and 18 are generally upgradient from a groundwater flow perspective and extensive groundwater data collected to date shows that migration of contaminated groundwater from the former Smelter site

has not affected groundwater quality here. There are no surface water bodies in these parcels as Prickly Pear Creek is assumed (for the purpose of this SLHHRA) to be on Parcel 16.

Under current and reasonably anticipated future land use, the potential receptors on Parcels 17 and 18 include recreational users and trespassers. It is possible recreational users and/or trespassers occasionally contact with COPCs in surface soil.

3.2.5 Portions of Parcel 2 Near Prickly Pear Creek

Figure 3-5 presents the preliminary conceptual exposure model for potential current and future human receptors within Parcel 2 Near Prickly Pear Creek. There are no industrial facilities on Parcel 2 near Prickly Pear Creek; however, slag and debris has been observed along the banks of the creek. Contaminants may have migrated to Parcel 2 near Prickly Pear Creek to surface water via flow in Prickly Pear Creek and sediment transport (under both normal and flooding conditions), and contaminants may have also migrated to groundwater from upgradient sources. Parcel 2 is downstream and generally downgradient of the former Smelter site. Although contaminants may also have migrated to this parcel via wind/areal deposition to surface soil, this media is specifically excluded from RCRA corrective actions by the First Modification. Migration of contaminated surface water, sediment, and groundwater from the former Smelter site may affect surface water, sediment, and groundwater quality here.

Under current and reasonably anticipated future land use, the potential receptors on Parcel 2 near Prickly Pear Creek include recreational users and trespassers. Potential receptors may come in contact with COPCs through direct contact with surface soil, slag, surface water and sediment (both in-stream channel and on floodplains). It is possible recreational users and/or trespassers occasionally contact surface water or catch and consume fish from Upper Like.

Under the reasonably anticipate future land used, ranchers may graze cattle in the agricultural areas of Parcel 2 Near Prickly Pear Creek. As previously mentioned, metals concentrations in locally grazed beef were evaluated in the 1995 HHRA and no differences were found in comparison to reference herds.

3.2.6 Un-owned CMS Properties

Figure 3-6 presents the preliminary conceptual exposure model for potential current and future human receptors within Un-owned CMS Properties. Historical and current land use of these properties has included residential, agricultural, and recreational or open space. Both RCRA and CERCLA site investigations have, to date, confirmed that contaminants have migrated to these properties from the former Smelter site primarily in groundwater, but also via surface water, sediment, and as airborne particulate deposited on surface soil. As specified in the First Modification, surface soil on Un-owned CMS Properties has been or will be addressed under CERCLA, as well as the portions of Wilson Ditch (consistent with previous ditch remediation work conducted under CERCLA). The CMS will address those properties affected by contaminant migration in groundwater, surface water, and sediment.

Un-owned CMS Properties are downstream and downgradient of the former Smelter site from a groundwater flow perspective. Migration of contaminated surface water, sediment, and groundwater from the former Smelter site may affect surface water, sediment, and groundwater quality here. Prickly Pear Creek and Wilson Ditch are two surface water bodies on Un-owned CMS Properties that may be affected by former site activities. Groundwater on certain Un-owned property currently is used for industrial purposes, but there is record of municipal wells. Therefore, to be conservative, the ingestion exposure pathway was evaluated by screening the detected concentrations in groundwater against the USEPA tap water RSLs.

3.3 Quantification of the Exposure

For this SLHHRA the exposure is conservatively quantified by first identifying the maximum detected concentrations of COPCs in a given area. The maximum detected concentration for each COPC is compared to both the residential and industrial screening values (see Section 2.3 for description of screening values). The residential screening levels are assumed to be protective for the residential and recreational user scenarios because the residential screening levels include both adult and child daily exposure. Using the residential screening levels for areas where the future exposure is anticipated to be recreational will most likely overestimate potential risks because recreational exposure is expected to be much less frequent than the daily exposure assumed for residential screening levels. The industrial

screening levels are assumed to be protective for the industrial, construction worker, and trespassers scenarios because they are based on daily adult exposure.

Because the risk-based screening levels (RSLs) for arsenic in soil are less than naturally-occurring, background levels, soil concentrations of arsenic were also compared to both the Montana background level of 40 mg/kg which is based on the mean background level of arsenic in Helena Valley soil (MDEQ, 2007) and the offsite PRG for residential areas of 100 mg/kg (USEPA, 2009). (See the HHRA Work Plan for further explanation of the arsenic PRG [Exponent, 2009].)

SECTION 4

Toxicity Assessment

Toxicity assessment defines the relationship between the magnitude of exposure and possible severity of adverse effects, and weighs the quality of available toxicological evidence. Toxicity assessment generally consists of two steps: hazard identification and dose-response assessment. Hazard identification is the process of determining the potential adverse effects from exposure to the constituent along with the type of health effect involved. Dose-response assessment is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the constituent administered or received and the incidence of adverse health effects in the exposed population, and determining the toxicity values for each constituent.

USEPA recommends that a tiered approach be used to obtain the toxicity values, the reference doses and cancer slope factors, used to calculate noncancer and cancer risks, respectively (USEPA, 2003). The RSL tables (USEPA, 2011) used for the COPC identification and data screening follow this tiered approach for obtaining toxicity values. The sources of toxicity values are as follows:

- The Integrated Risk Information System (IRIS) database available through the USEPA National Center for Environmental Assessment in Cincinnati, Ohio. IRIS, prepared and maintained by USEPA, is an electronic database containing health risk and USEPA regulatory information on specific chemicals (USEPA, 2011).
- The provisional peer reviewed toxicity values (PPRTVs) derived by USEPA's Superfund Health Risk Technical Support Center for the USEPA Superfund program.
- The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk levels (MRLs) (ATSDR, 2008)
- The California Environmental Protection Agency/Office of Environmental Health Hazard Assessment's toxicity values (OEHHA, 2009)
- The Health Effects Assessment Summary Tables (HEAST), provided by the USEPA Office of Solid Waste and Emergency Response (USEPA, 1997), is a compilation of toxicity values published in various health effects documents issued by USEPA.

Health effects are divided into two broad groups: noncarcinogenic and carcinogenic effects. This division is based on the different mechanisms of action currently associated with each category. The carcinogenic and noncarcinogenic toxicity factors used to develop the screening-level values that are the basis of the risk characterization for the SLHHRA are presented in Appendix A.

SECTION 5

Risk Characterization

Risk characterizations were based on sample-by-sample comparison against USEPA RSLs (2011) for each CMS or Un-owned CMS Property. This approach is conservative, as is reasonable for a preliminary screening evaluation, because RSLs reflect either residential or industrial exposures and there currently is no residential use of any Custodial Trust-owned property. The results of this comparison are presented in Appendix B and summarized in Tables 2-1a and 2-1b for soil, Table 2-2 for sediment, Table 2-3 for surface water, and Table 2-4 for groundwater. Table 2-5 provides a summary of COPCs across all media. In addition to the comparison against screening values, the text below and Table 2-1c provide the results of a comparison against the Montana background level of 40 mg/kg (MDEQ, 2007) and the offsite PRG for residential areas of 100 mg/kg (USEPA, 2009) for arsenic in soil.

5.1 Parcels 16 and 19 (Former Smelter Site)

Surface soil, subsurface soil, sediment, groundwater, and surface water samples have been collected in Parcels 16 and 19. The results of the data screening are presented by medium in Section 2 tables. In summary, antimony, arsenic, cadmium, lead, and thallium were detected at concentrations above screening levels in all four media.

Arsenic and chromium were consistently detected in samples above screening levels. For arsenic, over three quarters of the surface soil samples, and about half of the subsurface soil samples have concentrations that exceed the Montana background level and the offsite residential PRG. Surface sediment samples collected in Lower Lake and portions of Prickly Pear Creek, have arsenic and chromium detections above screening levels in 100 percent of the samples. All reference sediment samples collected upstream of the former Smelter site were also above both residential and industrial screening levels; however, the maximum concentration detected on the former Smelter site was nearly 45-fold higher than the maximum concentration detected in reference samples (Appendix B2).

Surface water and groundwater samples also show in frequent detections of arsenic and chromium above screening levels. Arsenic exceeded the tap water screening level in 100 percent of the surface water samples and over 80 percent of the groundwater samples.

As expected based on historical land use, available data density, and investigations to date, more metals were detected at concentrations above screening levels in samples collected throughout Parcels 16 and 19 than other CMS properties and Un-owned CMS Properties. Based on the prevalence of concentrations detected above SLVs, unacceptable risk to human health cannot be ruled out for this parcel.

5.2 Parcel 15

Data used for this SLHHRA consisted of analyses from surface soil, subsurface soil, sediment, groundwater, and surface water samples summarized in the Phase II RFI. The results of the data screening are presented by media in Section 2 tables. In summary, chromium was the only constituent detected in more than one medium above the screening level. Chromium was detected above the screening level in soil, sediment, and groundwater.

For Parcel 15, the available soil samples are located primarily along the boundary between Parcel 15 and Parcel 16. There is limited spatial coverage of soil samples locations for the rest of Parcel 15 in the datasets used for this SLHHRA. Arsenic, chromium, and lead were detected above both screening levels in over 70 percent of the surface soil samples and over 50 percent of the subsurface samples. Arsenic was detected in 86 percent of the surface samples and 70 percent of the subsurface samples at concentrations exceeded the Montana background level. Approximately 70 percent of the surface samples and 63 percent of the subsurface samples at concentrations exceeded the offsite PRG for arsenic.

Sediment samples in Parcel 15 were collected around the perimeter of Upper Lake. As seen in the Parcel 16 and 19, sediment samples arsenic and chromium were detected above residential and industrial screening levels in nearly 100 percent of the sediment samples.

Only two groundwater samples and one surface water sample were collected in Parcel 15. A total of 19 metals were analyzed and seven were detected in groundwater samples. The maximum detected concentrations for selenium exceeded the MCL. Detected results for selenium exceeded the MCL in both samples. Chromium and selenium were detected above the tap water RSL in both groundwater samples.

Given these results, and the frequency of detection above SLVs in samples collected adjacent to the former Smelter site in Parcel 15, unacceptable risk to human health cannot be ruled out for the portions of this CMS property for which data is available.

5.3 Parcels 17 and 18

For Parcels 17 and 18, the available soil samples are located primarily along the boundary between Parcel 15 and Parcel 18. There is limited spatial coverage of soil sample locations for the rest of Parcel 18 presented in the Phase II RFI, and no soil samples in Parcel 17. Arsenic, chromium, lead, mercury, and thallium were detected above the residential screening levels in over 50 percent or more of the surface and subsurface samples. Arsenic was detected at concentrations above Montana background levels in 75 percent of surface and subsurface samples; while, 38 percent of the surface samples and 50 percent of the subsurface samples at concentrations exceeded the offsite PRG for arsenic. Chromium was detected above the industrial screening levels in 100 percent of surface and subsurface samples.

In general, fewer metals were detected above screening levels in soil samples collected on Parcels 17 and 18 when compared to Parcels 16 and 19; however, the data are not adequate to assess risk to human health, given the proportion of exceedances above the screening levels in the small sample size for this CMS property.

5.4 Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518

Only one surface water sample has been collected in Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518. The results of the data screening are presented for this sample in Table 2-3. A total of 19 metals were analyzed and only seven metals were detected in surface water samples. The maximum concentration for arsenic exceeded the tap water screening levels. The MCL was not exceeded.

No soil, sediment, or groundwater data are available for this CMS parcel and therefore it is not possible to rule out unacceptable risk to human health. However, given the PCSM for this property and the existing transport mechanisms, the only medium expected to have been affected by migration from the former Smelter site is surface soil.

5.5 Portions of Parcel 2 Near Prickly Pear Creek

Only two sediment samples were collected in Parcel 2 Near Prickly Pear Creek in 2010. The results of the data screening are presented in Table 2-2. Arsenic exceeded both residential and industrial screening levels in 100 percent of the samples. Chromium exceeded both residential and industrial screening levels in 100 percent and 50 of the samples, respectively.

No soil, surface water or groundwater data are available for this CMS property and it is therefore, not possible to rule out unacceptable human health risk.

5.6 Un-owned CMS Properties

Surface soil, subsurface soil, sediment, groundwater, and surface water samples have been collected in Un-owned CMS Properties. The results for surface soil are not included in this discussion because this pathway has been specifically excluded from RCRA corrective action work in the First Modification. The results of the subsurface soil, sediment, groundwater, and surface water data screening are presented by medium in Section 2 tables. In summary, arsenic was detected in all media at concentrations above screening levels on Un-owned CMS Properties.

Arsenic and chromium were frequently detected in subsurface soil, over half (64 percent) of the samples for which arsenic was detected exceeded the industrial screening levels. A large proportion (83 percent) of the samples for which chromium was detected exceeded both residential and industrial screening levels. Arsenic was also detected in sediment. All samples (100 percent) for which arsenic was detected exceeded both residential and industrial screening levels. Similarly, 100 percent of the surface water samples for which arsenic was detected exceeded the tap water screening level. In groundwater, the maximum concentration for arsenic, chromium, manganese, and selenium exceeded the tap water RSLs; however, less than 30 percent of detected constituents exceeded the screening levels.

In general, a fewer number of metals and a smaller proportion of the samples collected on Un-owned CMS Properties resulted in concentrations above SLVs when compared to Parcels 17 and 19. The current monitoring dataset should be adequate to assess risk to human receptors in Un-owned CMS Properties (see Section 7).

SECTION 6

Uncertainty Associated with Screening-Level Human Health Risk Assessment

A number of uncertainties are inherent in this SLHHRA process. These uncertainties are generally associated with: (1) the data available given the sampling strategies and site characterization process to date, and (2) the assumptions made in the conceptual exposure models. The potential effect of the uncertainties on risk estimates (overestimation or underestimation) varies from readily predicted to difficult to assess. Thus, it is important to specify the assumptions and uncertainties inherent in the risk assessment to place the risk estimates in proper perspective (USEPA 1989). Specific uncertainties related to the dataset used for the SLHHRA are presented in Section 7. The following subsections present key uncertainties related to other components of the SLHHRA.

6.1 General Uncertainty in Dataset and COPC Selection

The dataset used for the SLHHRA is based on site characterization samples collected over many years. These data were not collected specifically for risk assessment and consequently, for some properties, the data do not provide adequate spatial coverage for evaluating all potential exposure areas within a property. Therefore, there is uncertainty related to the conclusions of the SLHHRA based on these data limitations. The SLHHRA presents suggestions for next steps (Section 7.2) to address some of these data limitations and refine the risk evaluation conclusions.

The general assumptions used in the COPC selection process were conservative. COPCs were selected based on the comparison of maximum detected concentrations to RSLs for residential and industrial land use assumptions. However, residential land use is not reasonably anticipated for the Custodial Trust-owned properties and the future land use is anticipated to be industrial/commercial, recreational or open space. Consequently, the screening levels are overly conservative for the future land use and COPCs may be identified based on default residential and/or industrial RSLs that would not be COPCs using site-specific screening levels based on reasonable anticipated future land use. Conversely, because of the limited spatial coverage of samples in some media in some of the parcels, there is uncertainty whether areas of actual maximum concentrations have been sampled in all media and parcels and additional COPCs may be identified if additional samples are collected.

6.2 Uncertainty Associated with Exposure Assessment

Uncertainty in the exposure assessment was generally treated with conservative decision rules and assumptions, and therefore, the uncertainty likely results in overestimates of actual exposure to COPCs. For example, some scenarios such as recreational use or trespasser activity would not be expected to result in daily exposure of those receptors to environmental media in the parcels. However, as a screening-level approach, RSLs based on daily residential or industrial use were used for data screening purposes. Because of this conservative approach, exceedances of the generic screening levels do not indicate unacceptable risk but do indicate that further site-specific evaluations may be warranted to support remedial action decision-making.

6.3 Uncertainty Associated with Toxicity Assessment

The toxicological database is a source of uncertainty for all risk assessments. USEPA has outlined some of the sources of uncertainty in the *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part A (Interim Final)* (USEPA 1989). These sources might include or result from the extrapolation of toxicities from high to low doses and from animals to humans; the species, gender, age, and strain differences in a toxin's uptake; metabolism, organ distribution, and target site susceptibility; and the human population's variability with respect to diet, environment, activity patterns, and cultural factors.

6.4 Uncertainty in Risk Characterization

The uncertainties identified in each component of risk assessment ultimately contribute to uncertainty in risk characterization. For this SLHHRA, the simplified approach of comparing data within the properties to published RSLs based on default residential and industrial land use assumptions has identified exceedances of these screening levels in all of the properties for which environmental data were available. However, acquisition of current environmental quality data for the exposure media of interest and site-specific assumptions regarding actual future use of some of these parcels may result in less frequent or intense exposure and consequently, potential cancer risks and noncancer hazards may not exceed scenario-specific thresholds.

SECTION 7

Assessment of Dataset and Recommendations to Address Uncertainties

7.1 Assessment of Dataset

The following is an assessment of the existing dataset for the former Smelter site and the potential use of the existing dataset in evaluating risk to human health within each CMS property and Un-owned CMS property. With the understanding that the existing dataset was developed to provide general characterization data, rather than to support a risk assessment, the dataset was reviewed to determine the extent to which historical data could meet CMS project objectives and to guide development of plans for additional sample collection. Project objectives include meeting the needs of human health risk assessments and determining the nature and extent of contamination within each CMS property.

Table 7-1 presents the data gaps in tabular form with respect to the following criteria:

- **Spatial representativeness** – Identifies horizontal and vertical (or subsurface) spatial coverage. Spatial representativeness is considered *adequate* if samples were collected at locations and with sufficient density to address anticipated spatial variability, potential sources of contamination or to address activity patterns of potential receptors within the parcels.
- **Temporal representativeness** – Identifies whether samples were collected within a time period such that detected constituent concentrations are indicative of current site conditions. Surface soil/sediment is considered *adequate* if collected in the past 5 years, while deeper soil/sediment may be considered *adequate* if collected in the past 10 years. Groundwater and surface water conditions are always changing and the recent dataset is considered *adequate* for evaluating current conditions.
- **Exposure potential** – Identifies whether environmental media were evaluated where receptor exposure is most feasible (for example, surface soil sampling locations), or where historical releases may be evident, such as in subsurface sediment sampling locations. Evaluates whether adequate data exist to evaluate potential human health risks for individual exposure areas within the properties. An exposure area is the area over which receptors are anticipated to contact environmental media over their daily activities. Size of exposure areas differ based on the current or anticipated future land use. For these CMS and Un-owned CMS Properties, the following exposure area sizes are proposed:
  - **Residential land use** – 1 acre
  - **Industrial land use** – 2 acres
  - **Recreational, open space, ranching** – 10 acres

  Data are considered *adequate* if samples were collected in appropriate environmental media where receptors may be exposed and at a sample density so that each potential exposure area has data for appropriate media.
- **Chemical representativeness** – Identifies whether analyses were conducted for constituents expected to be present, on the basis of an understanding of historical practices at the site. Data are considered *adequate* if the analytical suite includes constituents associated with smelter operations. The existing dataset includes all 19 metals considered in previous investigations to be potentially site-related and therefore, the chemical representativeness for all sites is *adequate.*

7.2 Recommended Steps to Address Uncertainties

Based on the results of the initial assessment of potential risk, unacceptable human health risk cannot be ruled for any of the CMS Properties and Un-owned CMS Properties. The following next steps are proposed to develop sufficient data to refine the risk characterization for each CMS Property.

- A clearer definition of land use would allow further refinement of the conceptual exposure models. The conceptual exposure models presented in this document are based on assumptions made for the HHRA Work Plan (Exponent, 2009) as well as the land use assumptions outlined in the CMS Work Plan. Until remedy decisions have been made, there is also some uncertainty regarding the institutional controls that will be used to eliminate exposure pathways. For example, implementation of a Controlled Ground Water Area will be an effective institutional control for addressing potential exposures to contaminated groundwater.
- Table 7-1 identifies the types of data needed to refine the risk assessment. Additional data will be needed if it is necessary to better understand average exposure within exposure areas for each property and to refine the conclusions of the risk evaluation. Additional data will also help to focus remedial action planning on areas where the highest concentrations of COPCs are found.
  - Parcels 16 and 19 (former Smelter site) encompasses a total of 129 acres. The current dataset is adequate with respect to spatial, temporal, and chemical representativeness. Further information on future site use may be used to determine exposure units.
  - Parcel 15 encompasses 486 acres. The current soil dataset includes samples collected near the former Smelter site. Additional surface soil sampling is recommended if needed to refine the understanding of the distribution of potential contamination throughout the parcel. Sampling could be conducted in a phased manner starting with transects positioned perpendicular to the western boundary of the former Smelter site to better understand the extent of aerial deposition from the former smelter. Then, additional sampling could be done for exposure areas that are in areas where surface soil has been impacted by aerial deposition.
  - Parcels 17 and 18 include 55 acres of recreation and open space land. The current soil dataset includes samples collected near the former Smelter site. Additional surface soil sampling is recommended if needed to refine the understanding of the distribution of potential contamination throughout the parcel.
  - Parcels 10, 11, 12, 23, and Portion of Parcel 8 west of Route 518 encompass nearly 85 acres and no soil samples have been collected on this CMS Property. Surface soil sampling is recommended if needed to refine the understanding of the distribution of potential contamination throughout the parcel.
  - Parcel 2 near Prickly Pear Creek is an 19-acre parcel adjacent to residential areas. Because no sampling has been conducted to date, surface soil, surface water, and ground water samples are needed characterize this area and evaluate future potential risk. There are no wells on this property; however, there are wells upgradient and downgradient from this property.
- Once the dataset is considered sufficient for each CMS property and no additional interim remedial action or institutional controls are planned, additional risk evaluates could be conducted as needed to support risk-based remedial action decisions. The SLVs used in this SLHHRA were generic and highly conservative for some of the reasonably anticipated future land uses. It is recommended that the future risk assessment activities use site-specific screening levels based on the receptors associated with reasonably anticipated future land use (e.g., recreators or ranchers) to give a more accurate assessment of potential risks. In addition, evaluating the data on a point-by-point basis, as was done for this SLHHRA, does not give an estimate of average exposure for the various receptors and typically remedial action decisions are based on average exposure of current and/or future receptors. Exposure point concentrations could be calculated using the data from each exposure area to give a better estimate of overall average exposure in the exposure areas within the properties.

SECTION 8

References

Asarco Consulting, Inc. (ACI). 2005. *Phase I RCRA Facility Investigation, Site Characterization Report, East Helena Facility*. Prepared for ASARCO. February 2003 (revised July 2005).

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. *Minimal Risk Levels (MRLs) for Hazardous Substances.* U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry.

Exponent. 2009. *Draft Human Health Risk Assessment Work Plan*.

Gradient. 2010. *Final Baseline Ecological Risk Assessment Work Plan: Former ASARCO East Helena Facility, East Helena, Montana*. Prepared for Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust. August 2010.

GSI Water Solutions, Inc. (GSI). 2011. *Phase II RCRA Facility Investigation Report, East Helena Facility*. Draft. May 2011.

Montana Department of Environmental Quality (MDEQ). 2007. "Background Concentration for Inorganics in Soil." Table. December 26, 2007.

Office of Environmental Health Hazard Assessment (OEHHA). 2009. *State of California, Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database.*

United States Environmental Protection Agency (USEPA). 1997. *Health Effect Assessment Summary Tables*. EPA-540-R-97-036.

United States Environmental Protection Agency (USEPA). 1998. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part A (Interim Final)*.United States Environmental Protection Agency (USEPA). 2009. *U.S. East Helena Superfund Site, Operable Unit No. 2, Residential Soils and Undeveloped Lands, Final Record of Decision.* U.S. Environmental Protection Agency, Washington, DC.

United States Environmental Protection Agency (USEPA). 2005. *Supplemental Ecological Risk Assessment for the East Helena Smelter Site, Montana*. Prepared by the U.S. Environmental Protection Agency and Syracuse Research Corporation. January 25, 2005.

United States Environmental Protection Agency (USEPA). 2011. *Regional Screening Level (RSL) Summary Table June 2011.*

Tables

TABLE 1-1

CMS Properties Land and Groundwater Use Considerations

Screening-Level Human Health Risk Assessment, East Helena Facility

<table>
<tr><th rowspan="2">Parcels</th><th colspan="2">Land Use</th><th colspan="2">Groundwater Use</th></tr>
<tr><th>Historical/Current</th><th>Reasonably Anticipated Future</th><th>Current</th><th>Reasonably/Anticipated Future</th></tr>
<tr><td>16 and 19</td><td>Industrial/None</td><td>Industrial, commercial</td><td>None</td><td>Use prohibited via deed restrictions</td></tr>
<tr><td>15</td><td colspan="2">Agricultural, recreational and open space, limited industrial (location of CAMUs, portion of Tito Park), residential</td><td rowspan="4">None</td><td rowspan="4">In areas where groundwater exceeds cleanup criteria, use will be restricted using deed notices and/or other Institutional Controls.</td></tr>
<tr><td>17 and 18</td><td>Former residential/None</td><td>Recreational and open space</td></tr>
<tr><td>10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518</td><td colspan="2">Agricultural or recreational and open space</td></tr>
<tr><td>Portions of Parcel 2</td><td colspan="2">Agricultural or recreational and open space</td></tr>
<tr><td>Un-Owned Properties</td><td colspan="2">Residential, agricultural or recreational and open space</td><td>Potable, agricultural and non-potable use</td><td>In areas where groundwater exceeds cleanup criteria, use will be restricted via groundwater management overlay district and/or other Institutional Controls</td></tr>
</table>

TABLE 2-1a

Summary of Results for Metals in Surface Soil (mg/kg)

Screening-Level Human Health Risk Assessment, East Helena Facility

			Parcels 16 and 19 (Former Smelter Site)							Parcel 15							Parcels 17 and 18							Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518	Portions of Parcel 2	Un-Owned Properties						
Chemical	Residential RSL [a]	Industrial RSL [a]	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of samples	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL
Aluminum	77,000	990,000	65	65	20,700	No		No		18	18	18,800	No		No		2	2	6,820	No		No		0	0	30	30	15,400	No		No	
Antimony	31	410	65	58	3,320	Yes	52%	Yes	9%	18	18	173	Yes	28%	No		2	2	28	No		No		0	0	30	14	56	Yes	7%	No	
Arsenic	0.39	1.6	448	435	35,500	Yes	96%	Yes	96%	133	131	8,091	Yes	98%	Yes	98%	8	7	387	Yes	88%	Yes	88%	0	0	113	112	8,848	Yes	99%	Yes	99%
Barium	15,000	190,000	65	55	2,300	No		No		18	15	838	No		No		2	1	113	No		No		0	0	30	22	912	No		No	
Beryllium	160	2,000	65	0	0	No		No		18	0	0	No		No		2	0	0	No		No		0	0	30	0	0	No		No	
Cadmium	70	800	448	411	75,300	Yes	66%	Yes	28%	134	120	10,646	Yes	63%	Yes	10%	8	7	80	Yes	38%	No		0	0	113	89	2,875	Yes	48%	Yes	12%
Chromium	0.29	5.6	65	63	110	Yes	97%		97%	18	17	26	Yes	94%	Yes	94%	2	2	13	Yes	100%	Yes	100%	0	0	30	30	25	Yes	100%	Yes	100%
Cobalt	23	300	65	62	445	Yes	29%	Yes	3%	18	18	46	Yes	6%	No		2	2	9	No		No		0	0	30	25	16	No		No	
Copper	3,100	41,000	39	39	13,900	Yes	28%	No		18	18	3,070	No		No		2	2	421	No		No		0	0	22	22	5,830	Yes	5%	No	
Iron	55,000	720,000	65	65	261,000	Yes	25%	No		18	18	57,500	Yes	6%	No		2	2	18,700	No		No		0	0	30	30	43,800	No		No	
Lead	400	800	448	440	104,528	Yes	75%	Yes	71%	134	132	43,027	Yes	80%	Yes	74%	8	8	2,706	Yes	75%	Yes	63%	0	0	111	110	76,504	Yes	65%	Yes	60%
Manganese	1,800	23,000	88	88	19,000	Yes	20%	No		20	20	3,290	Yes	5%	No		2	2	1,000	No		No		0	0	34	34	1,849	Yes	3%	No	
Mercury	23	310	65	60	550	Yes	22%	Yes	3%	18	17	58	Yes	11%	No		2	2	11	No		No		0	0	30	10	11	No		No	
Nickel	1,500	20,000	65	59	159	No		No		18	17	84	No		No		2	2	10	No		No		0	0	30	23	15	No		No	
Selenium	390	5,100	117	102	1,310	Yes	3%	No		18	18	54	No		No		2	2	4.1	No		No		0	0	30	13	58.9	No		No	
Silver	390	5,100	65	52	451	Yes	5%	No		18	17	233	No		No		2	2	18	No		No		0	0	30	10	54	No		No	
Thallium	0.78	10	65	59	307	Yes	80%	Yes	38%	18	17	7	Yes	78%	No		2	2	3.7	Yes	50%	No		0	0	30	21	20.9	Yes	20%	Yes	7%
Vanadium	390	5,200	65	65	83	No		No		18	18	54	No		No		2	2	44	No		No		0	0	30	30	58	No		No	
Zinc	23,000	310,000	448	447	160,000	Yes	13%	No		134	133	67,175	Yes	2%	No		8	8	2,585	No		No		0	0	113	113	71,979	Yes	17%	No	

Notes:

ND> = not detected in any sample, but the detection limit exceeded the screening level

CMS Max = maximum concentration detected in Corrective Measures Study (CMS) Area

RSL = regional screening level

No. = number

chemicals shown in **bold** exceed one or more screening level value within one more CMS Area

[a] USEPA (June 2011)

TABLE 2-1b

Summary of Results for Metals in Subsurface Soil (mg/kg)

Screening-Level Human Health Risk Assessment, East Helena Facility

			Parcels 16 and 19 (Former Smelter Site)							Parcel 15							Parcels 17 and 18							Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518	Portions of Parcel 2	Un-Owned Properties						
Chemical	Residential RSL [a]	Industrial RSL [a]	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of samples	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL
Aluminum	77,000	990,000	333	333	43,200	No		No		48	48	20,500	No		No		2	2	12,400	No		No		0	0	24	24	29,300	No		No	
Antimony	31	410	334	132	1,450	Yes	19%	Yes	2%	48	24	259	Yes	8%	No		2	2	16.7	No		No		0	0	24	5	2.1	No		No	
Arsenic	0.39	1.6	938	874	23,700	Yes	93%	Yes	93%	339	309	32,735	Yes	91%	Yes	91%	4	3	180	Yes	75%	Yes	75%	0	0	344	219	2,553	Yes	64%	Yes	64%
Barium	15,000	190,000	334	324	5,970	No		No		48	46	258	No		No		2	2	147	No		No		0	0	24	22	184	No		No	
Beryllium	160	2,000	334	15	10	No		No		48	3	9	No		No		2	0	10 U	No		No		0	0	24	0	10 U	No		No	
Cadmium	70	800	939	509	13,588	Yes	21%	Yes	4%	340	244	4,787	Yes	44%	Yes	4%	4	2	34.9	No		No		0	0	344	149	592	Yes	6%	No	
Chromium	0.29	5.6	334	288	160	Yes	86%	Yes	84%	48	33	21	Yes	69%	Yes	69%	2	2	17	Yes	100%	Yes	100%	0	0	24	20	21	Yes	83%	Yes	83%
Cobalt	23	300	334	223	687	Yes	24%	Yes	4%	48	27	25	Yes	2%	No		2	2	9	No		No		0	0	24	11	9	No		No	
Copper	3,100	41,000	315	311	54,300	Yes	13%	Yes	0.32%	48	41	3,450	Yes	2%	No		2	2	273	No		No		0	0	14	14	359	No		No	
Iron	55,000	720,000	333	333	292,000	Yes	26%	No		48	48	40,900	No		No		2	2	25,500	No		No		0	0	24	24	29,200	No		No	
Lead	400	800	939	905	197,730	Yes	29%	Yes	26%	338	337	47,520	Yes	66%	Yes	62%	4	4	1,290	Yes	50%	Yes	50%	0	0	317	298	20,819	Yes	13%	Yes	12%
Manganese	1,800	23,000	554	554	14,200	Yes	17%	No		69	69	2,780	Yes	3%	No		2	2	749	No		No		0	0	167	167	1,411	No		No	
Mercury	23	310	334	80	380	Yes	3%	Yes	0.3%	48	18	360	Yes	13%	Yes	2%	2	2	25	Yes	50%	No		0	0	24	4	0.083	No		No	
Nickel	1,500	20,000	334	179	330	No		No		48	24	35	No		No		2	2	11	No		No		0	0	24	9	9.4	No		No	
Selenium	390	5,100	432	211	325	No		No		48	13	90	No		No		2	2	1.3	No		No		0	0	129	106	77.7	No		No	
Silver	390	5,100	334	90	298	No		No		48	12	210	No		No		2	2	21	No		No		0	0	24	2	4	No		No	
Thallium	0.78	10	333	202	359	Yes	55%	Yes	9%	48	33	20	Yes	58%	Yes	10%	2	2	0.9	Yes	50%	No		0	0	24	8	31.9	Yes	25%	Yes	8%
Vanadium	390	5,200	334	328	200	No		No		48	42	60	No		No		2	2	54	No		No		0	0	23	23	74	No		No	
Zinc	23,000	310,000	939	937	149,000	Yes	9%	No		343	342	25,056	Yes	0.29%	No		4	4	1,430	No		No		0	0	345	303	39,575	Yes	0.29%	No	

Notes:

ND> = not detected in any sample, but the detection limit exceeded the screening level

CMS Area Max = maximum concentration detected in Corrective Measures Study (CMS) Area

RSL = regional screening level

No. = number

chemicals shown in **bold** exceed one or more screening level value within one more CMS Area

[a] USEPA (June 2011)

TABLE 2-1c

Summary of Results for Arsenic in Soil (mg/kg)

Screening-Level Human Health Risk Assessment, East Helena Facility

CMS Area	Sample Type	No. of Samples	% Exceeding Off-site Residential PRG [a] (100 mg/kg)	% Exceeding Background [b] (40 mg/kg)
Parcels 16 and 19	Surface Soil	448	75%	85%
	Subsurface Soil	938	46%	58%
Parcel 15	Surface Soil	133	70%	86%
	Subsurface Soil	339	63%	70%
Parcels 17 and 18	Surface Soil	8	38%	75%
	Subsurface Soil	4	50%	75%
Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518	Surface Soil	0	na	na
	Subsurface Soil	0	na	na
Portions of Parcel 2 Near Prickly Pear Creek	Surface Soil	0	na	na
	Subsurface Soil	0	na	na
Un-Owned Properties	Surface Soil	113	54%	66%
	Subsurface Soil	344	6%	13%

Notes:

mg/kg = milligram per kilogram

No. = number

PRG = preliminary remediation goal

na = not applicable because no data available to calculate an exceedance

[a] USEPA (2009)

[b] Montana DEQ (2007)

TABLE 2-2

Summary of Sediment Sample Screening Results

Screening-Level Human Health Risk Assessment, East Helena Facility

			Parcels 16 and 19 (Former Smelter Site)							Parcel 15							Parcels 17 and 18	Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518	Portions of Parcel 2							Un-Owned Properties						
Chemical	Residential RSL[a]	Industrial RSL[a]	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of samples	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL	No. of samples	No. of detects	CMS Max	> Residential RSL?	% > Residential RSL	> Industrial RSL?	% > Industrial RSL
Aluminum	77,000	990,000	10	10	6,180	No		No		20	20	9,950	No		No		0	0	2	2	2,890	No		No		12	12	7,070	No		No	
Antimony	31	410	10	8	121	Yes	43%	No		20	20	57.2	Yes	15%	No		0	0	2	1	0.8	No		No		12	11	2.4	No		No	
Arsenic	0.39	1.6	10	10	901	Yes	100%	Yes	100%	20	20	581	Yes	100%	Yes	100%	0	0	2	2	19	Yes	100%	Yes	100%	12	12	44	Yes	100%	Yes	100%
Barium	15,000	190,000	10	2	229	No		No		20	10	218	No		No		0	0	2	0	100 U	No		No		12	0	100 U	No		No	
Beryllium	160	2,000	10	0	10 U	No		No		20	0	10 U	No		No		0	0	2	0	10 U	No		No		12	0	10 U	No		No	
Cadmium	70	800	10	10	228	Yes	29%	No		20	20	122	Yes	15%	No		0	0	2	2	1.2	No		No		12	12	27.7	No		No	
Chromium	0.29	5.6	10	9	17	Yes	100%	Yes	100%	20	19	14	Yes	95%	Yes	95%	0	0	2	1	8	Yes	50%	Yes	50%	12	8	11	Yes	67%	Yes	67%
Cobalt	23	300	10	10	15	No		No		20	20	9	No		No		0	0	2	2	4	No		No		12	12	6	No		No	
Copper	3,100	41,000	10	10	932	No		No		20	20	988	No		No		0	0	2	2	25	No		No		12	12	78	No		No	
Iron	55,000	720,000	10	10	22,800	No		No		20	20	19,600	No		No		0	0	2	2	10,100	No		No		12	12	14,100	No		No	
Lead	400	800	10	10	3,900	Yes	71%	Yes	43%	20	20	13,600	Yes	70%	Yes	50%	0	0	2	2	116	No		No		12	12	625	Yes	17%	No	
Manganese	1,800	23,000	10	10	726	No		No		20	20	1,120	No		No		0	0	2	2	419	No		No		12	12	919	No		No	
Mercury	23	310	10	9	28	Yes	14%	No		20	17	230	Yes	40%	No		0	0	2	1	0.28	No		No		12	7	120	Yes	8%	No	
Nickel	1,500	20,000	10	5	13	No		No		20	16	11	No		No		0	0	2	0	5 U	No		No		12	6	6	No		No	
Selenium	390	5,100	10	5	24.9	No		No		20	14	25.3	No		No		0	0	2	0	0.5 U	No		No		12	2	0.7	No		No	
Silver	390	5,100	10	10	38.6	No		No		20	20	69.3	No		No		0	0	2	2	0.7	No		No		12	12	4.7	No		No	
Thallium	0.78	10	10	5	87	Yes	71%	Yes	43%	20	5	5	Yes	25%	No		0	0	2	0	1 U	ND>		No		12	1	1	Yes	8%	No	
Vanadium	390	5,200	10	9	56	No		No		20	20	42	No		No		0	0	2	2	25	No		No		12	12	41	No		No	
Zinc	23,000	310,000	10	9	2,280	No		No		20	20	3,290	No		No		0	0	2	2	328	No		No		12	12	586	No		No	

Notes:

results presentated in milligrams per kilogram

ND> = not detected in any sample, but the detection limit exceeded the screening level

U = results not detected and value shown is the reporting limt

CMS Max = maximum concentration detected in Corrective Measures Study (CMS) Property

RSL = regional screening level

No. = number

chemicals shown in **bold** exceed one or more screening level value within one more CMS Property

[a] USEPA (June 2011)

TABLE 2-3

Summary of Surface Water Sample Screening Results

Screening-Level Human Health Risk Assessment, East Helena Facility

			Parcels 16 and 19 (Former Smelter Site)							Parcel 15							Parcels 17 and 18	Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518							Portions of Parcel 2	Un-Owned Properties						
Chemical	MCL[a]	Tap Wate RSL[a]	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL	No. of samples	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL	No. of samples	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL
Aluminum (dis)	na	37	4	0	0.1U	na		No		1	0	0.1U	na		No		0	1	0	0.1U	na		No		0	9	0	0.1U	na		No	
Antimony	0.006	0.015	4	1	0.12	Yes	25%	Yes	25%	1	0	0.003U	No		No		0	1	0	0.003U	No		No		0	9	0	0.003U	No		No	
Arsenic	0.01	0.000045	4	4	0.042	Yes	25%	Yes	100%	1	1	0.006	No		Yes	100%	0	1	1	0.004	No		Yes	100%	0	9	9	0.022	Yes	22%	Yes	100%
Barium	2	7.3	4	0	0.1U	No		No		1	0	0.1U	No		No		0	1	0	0.1U	No		No		0	9	0	0.1U	No		No	
Beryllium	0.004	0.073	4	0	0.001U	No		No		1	0	0.001U	No		No		0	1	0	0.001U	No		No		0	9	0	0.001U	No		No	
Cadmium	0.005	0.018	4	4	0.0578	Yes	25%	Yes	25%	1	1	0.0013	No		No		0	1	1	0.0002	No		No		0	9	5	0.0003	No		No	
Chromium	0.1	0.000043	4	0	0.001U	No		ND>		1	0	0.001U	No		ND>		0	1	0	0.001U	No		ND>		0	9	0	0.001U	No		ND>	
Cobalt	na	0.011	4	0	0.005U	na		No		1	0	0.005U	na		No		0	1	0	0.005U	na		No		0	9	0	0.005U	na		No	
Copper	1.3	1.5	4	4	0.0078	No		No		1	1	0.0075	No		No		0	1	1	0.0031	No		No		0	9	9	0.0042	No		No	
Gold	na	na	4	0	0.01U	na		na		1	0	0.01U	na		na		0	1	0	0.01U	na		na		0	9	0	0.01U	na		na	
Iron	na	26	4	4	0.39	na		No		1	1	0.26	na		No		0	1	1	0.38	na		No		0	9	9	0.52	na		No	
Lead	0.015	na	4	4	0.0162	Yes	25%	na		1	1	0.0434	Yes	100%	na		0	1	1	0.0036	No		na		0	9	9	0.0095	No		na	
Manganese	na	0.88	4	4	0.11	na		No		1	1	0.05	na		No		0	1	1	0.05	na		No		0	9	7	0.07	na		No	
Mercury	0.002	0.011	4	0	0.00001U	No		No		1	0	0.00001U	No		No		0	1	0	0.00001U	No		No		0	9	0	0.0001U	No		No	
Nickel	na	0.73	4	0	0.01U	na		No		1	0	0.01U	na		No		0	1	0	0.01U	na		No		0	9	0	0.01U	na		No	
Selenium	0.05	0.18	4	1	0.019	No		No		1	0	0.001U	No		No		0	1	0	0.001U	No		No		0	9	0	0.001U	No		No	
Silver	na	0.18	4	0	0.0005U	na		No		1	0	0.0005U	na		No		0	1	0	0.0005U	na		No		0	9	0	0.0005U	na		No	
Tellurium	na	na	4	0	0.1U	na		na		1	0	0.1U	na		na		0	1	0	0.1U	na		na		0	9	0	0.1U	na		na	
Thallium	0.002	0.00037	4	1	0.0443	Yes	25%	Yes	25%	1	0	0.0002U	No		No		0	1	0	0.0002U	No		No		0	9	0	0.0002U	No		No	
Vanadium	na	0.18	4	0	0.1U	na		No		1	0	0.1U	na		No		0	1	0	0.1U	na		No		0	9	0	0.1U	na		No	
Zinc	na	11	4	4	0.06	na		No		1	1	0.05	na		No		0	1	1	0.06	na		No		0	9	5	0.07	na		No	

Notes:

results shown in milligrams per liter

ND> = not detected in any sample, but the detection limit exceeded the screening level

U = results not detected and value shown is the reporting limt

CMS Max = maximum concentration detected in Corrective Measures Study (CMS) Property

MCL = maximum contaminant level

RSL = regional screening level

No. = number

(dis) = dissolved metals results shown because no data available for total metals results

chemicals shown in **bold** exceed one or more screening level value within one more CMS Area

[a] USEPA (June 2011)

TABLE 2-4

Summary of Results for Total Metals in Groundwater Water (mg/L)

Screening-Level Human Health Risk Assessment, East Helena Facility

			Parcels 16 and 19 (Former Smelter Site)							Parcel 15							Parcels 17 and 18	Parcels 10, 11, 12, 23, and the Portion of Parcel 8 West of Route 518	Portions of Parcel 2	Un-Owned Properties						
Chemical	MCL[a]	Tap Wate RSL[a]	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL	No. of samples	No. of samples	No. of samples	No. of samples	No. of detects	CMS Max	> MCL?	% > MCL	> Tap Water RSL?	% > Tap Water RSL
Aluminum (dis)	na	37	40	25	41.3	No		Yes	3%	2	2	1.3	No		No		0	0	0	72	7	2.9	No		No	
Antimony	0.006	0.015	40	21	0.427	Yes	43%	Yes	38%	2	0	0.003 U	No		No		0	0	0	72	3	0.015	Yes	3%	No	
Arsenic	0.01	0.000045	40	34	109	Yes	80%	Yes	85%	2	0	0.002 U	No		ND>		0	0	0	124	33	9.91	Yes	16%	Yes	27%
Barium	2	7.3	40	6	0.6	No		No		2	0	0.1 U	No		No		0	0	0	72	8	0.1	No		No	
Beryllium	0.004	0.073	40	5	0.008	Yes	3%	No		2	0	0.001 U	No		No		0	0	0	72	0	0.001 U	No		No	
Cadmium	0.005	0.018	40	21	2.7	Yes	43%	Yes	28%	2	0	0.001 U	No		No		0	0	0	72	2	0.003	No		No	
Chromium	0.1	0.000043	40	15	0.03	No		Yes	38%	2	2	0.003	No		Yes	100%	0	0	0	72	7	0.011	No		Yes	10%
Cobalt	na	0.011	40	22	0.021	No		Yes	15%	2	2	0.002	No		No		0	0	0	72	5	0.005	No		No	
Copper	1.3	1.5	40	31	3.28	Yes	3%	Yes	3%	2	2	0.008	No		No		0	0	0	72	50	0.084	No		No	
Gold	na	na	40	0	0.01 U	na		na		2	0	0.01 U	na		na		0	0	0	72	0	0.01 U	na		na	
Iron	na	26	40	36	34.1	No		Yes	3%	2	2	1.46	No		No		0	0	0	72	42	24.3	No		No	
Lead	0.015	na	40	15	9.88	Yes	20%	No		2	0	0.005 U	No		No		0	0	0	72	1	0.006	No		No	
Manganese	na	0.88	40	35	9.94	No		Yes	40%	2	1	0.04	No		No		0	0	0	72	17	8.05	No		Yes	14%
Mercury	0.002	0.011	40	2	0.003	Yes	3%	No		2	0	0.001 U	No		No		0	0	0	72	0	0.001 U	No		No	
Nickel	na	0.73	40	10	0.03	No		No		2	0	0.01 U	No		No		0	0	0	72	3	0.01	No		No	
Selenium	0.05	0.18	40	32	2.45	Yes	55%	Yes	33%	2	2	1.44	Yes	100%	Yes	100%	0	0	0	124	74	0.61	Yes	21%	Yes	7%
Silver	na	0.18	40	2	0.154	No		No		2	0	0.005 U	No		No		0	0	0	72	0	0.005 U	No		No	
Tellurium	na	na	40	2	0.1	na		na		2	0	0.1 U	na		na		0	0	0	72	0	0.1 U	na		na	
Thallium	0.002	0.00037	40	12	0.051	Yes	25%	Yes	30%	2	0	0.001 U	No		ND>		0	0	0	72	0	0.001 U	No		ND>	
Vanadium	na	0.18	40	14	0.06	No		No		2	0	0.01 U	No		No		0	0	0	72	8	0.02	No		No	
Zinc	na	11	40	26	9.09	No		No		2	0	0.01 U	No		No		0	0	0	72	18	0.28	No		No	

Notes:

results shown in milligrams per liter

ND> = not detected in any sample, but the detection limit exceeded the screening level

U = results not detected and value shown is the reporting limt

CMS Area Max = maximum concentration detected in Corrective Measures Study (CMS) Properties

MCL = maximum contaminant level

RSL = regional screening level

No. = number

chemicals shown in **bold** exceed one or more screening level value within one more CMS Area

[a] USEPA (June 2011)

TABLE 2-5

Summary of Data Screening Results

Screening-Level Human Health Risk Assessment, East Helena Facility

CMS Property	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Parcel 16 and 19 (Former Smelter Site) - 129 acres																			
Surface Soil		x	x			x	x	x	x	x	x	x	x		x	x	x		x
Subsurface Soil		x	x			x	x	x	x	x	x	x	x				x		x
Sediment		x	x			x	x				x		x				x		
Surface Water		x	x			x					x						x		
Groundwater	x	x	x		x	x	x	x		x		x		x			x		
Parcel 15 - 486 acres																			
Subsurface Soil		x	x			x	x	x		x	x	x	x				x		x
Subsurface Soil		x	x			x	x	x	x		x	x					x		x
Sediment		x	x			x	x				x		x				x		
Surface Water			x								x								
Groundwater							x								x				
Parcels 17 and 18 - 55 acres																			
Subsurface Soil			x			x	x				x						x		
Subsurface Soil										no data									
Sediment										no data									
Surface Water										no data									
Groundwater										no data									
Parcels 10, 11, 12, 23, and the Portion of Parcel 8 west of Route 518 - 85 acres																			
Surface Soil										no data									
Subsurface Soil										no data									
Sediment										no data									
Surface Water			x																
Groundwater										no data									
Portions of Parcel 2 - 19 acres																			
Surface Soil										no data									
Subsurface Soil										no data									
Sediment			x				x												
Surface Water										no data									
Groundwater										no data									
Un-Owned CMS Property																			
Surface Soil		x	x			x	x		x		x	x					x		x
Subsurface Soil			x			x	x				x						x		x
Sediment			x				x				x		x				x		
Surface Water			x																
Groundwater		x	x				x					x		x					

Notes:

x = metals detected above lowest screening level value

blank = metal not detected above lowest screening leel value

TABLE 7-1

Data Gap Identification

Screening-Level Human Health Risk Assessment, East Helena Facility

	Sample Size[a]	Spatial[b]	Temporal	Exposure Potential	Analytical Suite	Conclusions
Parcel 16 and 19 (Former Smelter Site) - 129 acres						
Surface Soil	39 - 447	adequate	adequate - variuos studies from 1993 to 2010	adequate	adequate -- all metals	Current dataset represenative
Subsurface Soil	333 - 939	adequate	adequate - variuos studies from 1993 to 2010	adequate - 373 samples collected in 2-10 ft interval	adequate -- all metals	Current dataset represenative
Sediment	7	adequate	adequate - study from 2010	adequate	adequate -- all metals	Current dataset represenative
Surface Water	4	adequate	adequate - annual monitoring program	adequate	adequate -- all metals	Current dataset represenative
Groundwater	40	adequate	adequate - annual monitoring program	na	adequate -- all metals	incomplete exposure pathway
Parcel 15 - 486 acres						
Surface Soil	18 - 134	inadequate - samples concentrated on border with Smelter Site	adequate - variuos studies from 1993 to 2010	inadequate	adequate -- all metals	Data Gap -- need better spatial resolution of data
Subsurface Soil	48 - 340	inadequate - samples concentrated on border with Smelter Site	adequate - variuos studies from 1993 to 2010	inadequate - poor spatial coverage	adequate -- all metals	Data Gap -- need better spatial resolution of data
Sediment	20	adequate	adequate - study from 2010	adequate	adequate -- all metals	Current dataset represenative
Surface Water	1	adequate	inadequate - WD-4 dry in 2010	adequate	adequate -- all metals	Current dataset represenative
Groundwater	2	inadequate	inadequate	na	adequate -- all metals	Data Gap -- confirm no contamination upgradient of Smelter Site
Parcels 17 and 18 - 55 acres						
Surface Soil	2 - 8	inadequate - samples concentrated on border with Smelter Site	inadequate - no data	inadequate - no data	inadequate - no data	Data Gap -- need better spatial resolution of data
Subsurface Soil	2 - 4	inadequate - samples concentrated on border with Smelter Site	inadequate - no data	inadequate - no data	inadequate - no data	Data Gap -- need better spatial resolution of data
Sediment	0	adequate - no surface water bodies	--	adequate -- no surface water bodies	--	No data needed -- incomplete expsoure pathway
Surface Water	0	adequate - no surface water bodies	--	adequate -- no surface water bodies	--	No data needed -- incomplete expsoure pathway
Groundwater	0	inadequate - no data	inadequate - no data	na	inadequate - no data	No data needed -- incomplete expsoure pathway
Parcels 10, 11, 12, 23, and the Portion of Parcel 8 west of Route 518 - 85 acres						
Surface Soil	0	inadequate -- no data	inadequate - no data	inadquate - no data	inadequate - no data	Data Gap -- need better spatial resolution of data
Subsurface Soil	0	inadequate -- no data	inadequate - no data	na	inadequate - no data	No data needed -- incomplete expsoure pathway
Sediment	0	inadequate -- no data	inadequate - no data	na	inadequate - no data	No data needed -- incomplete expsoure pathway
Surface Water	1	adequate	adequate - annual monitoring program	na	inadequate - no data	No data needed -- incomplete expsoure pathway
Groundwater	0	inadequate -- no data	inadequate - no data	na	inadequate - no data	No data needed -- incomplete expsoure pathway
Portions of Parcel 2 - 19 acres						
Surface Soil	0	inadequate -- no data	inadequate -- no data	inadequate -- no data	inadequate -- no data	Data Gap -- need better spatial/temporal resolution of data
Subsurface Soil	0	inadequate -- no data	inadequate -- no data	na	inadequate -- no data	No data needed -- incomplete expsoure pathway
Sediment	2	adequate	adequate - study from 2010	adequate	adequate	Current dataset represenative
Surface Water	0	inadequate -- no data	inadequate -- no data	inadequate -- no data	inadequate -- no data	Data Gap -- need better spatial/temporal resolution of data
Groundwater	0	inadequate -- no data	inadequate -- no data	inadequate -- no data	inadequate -- no data	Data Gap -- need better spatial/temporal resolution of data
Un-Owned CMS Property						
Surface Soil	--	--	--	--	--	
Subsurface Soil	24 - 344	adequate	adequate - studies from 1999 to 2010	na	adequate -- all metals	No data needed -- incomplete expsoure pathway
Sediment	12	adequate	adequate - study from 2010	adequate	adequate -- all metals	Current dataset represenative
Surface Water	9	adequate	adequate - annual monitoring program	adequate	adequate -- all metals	Current dataset represenative
Groundwater	72 - 124	adequate	adequate - annual monitoring program	adequate	adequate -- all metals	Current dataset represenative

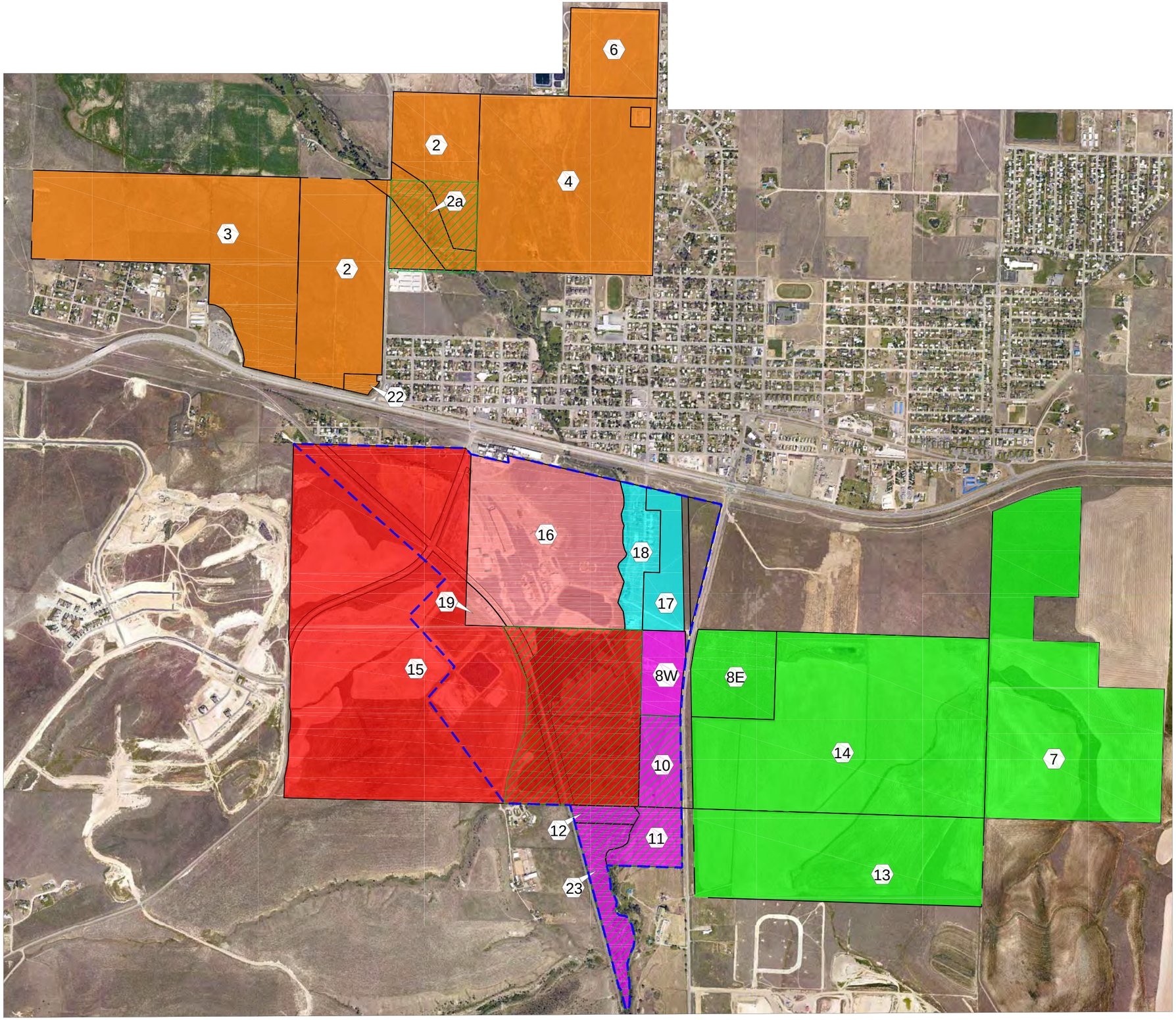
[a] Sample size presented as a range because n varies by analytical suite for a given study. The upper range for n includes samples analyzed for asrenic, cadmium, lead and zinc.

[b] spatial representation includes horizontal and vertical (subsurface)

na = not a complete pathway

-- = not assessed in this document

Figures



VICINITY MAP

LEGEND

- Parcel Boundary
- Parcels 2, 2a, 3, 4, 6, and 22
- Parcel 15
- Parcels 16 and 19
- Parcels 17 and 18
- Parcels 7, 8E, 13 and 14
- Parcels 8W,10,11,12, and 23
- Montana's First Right of Refusal Property
- Approved Area of Contamination Boundary

N

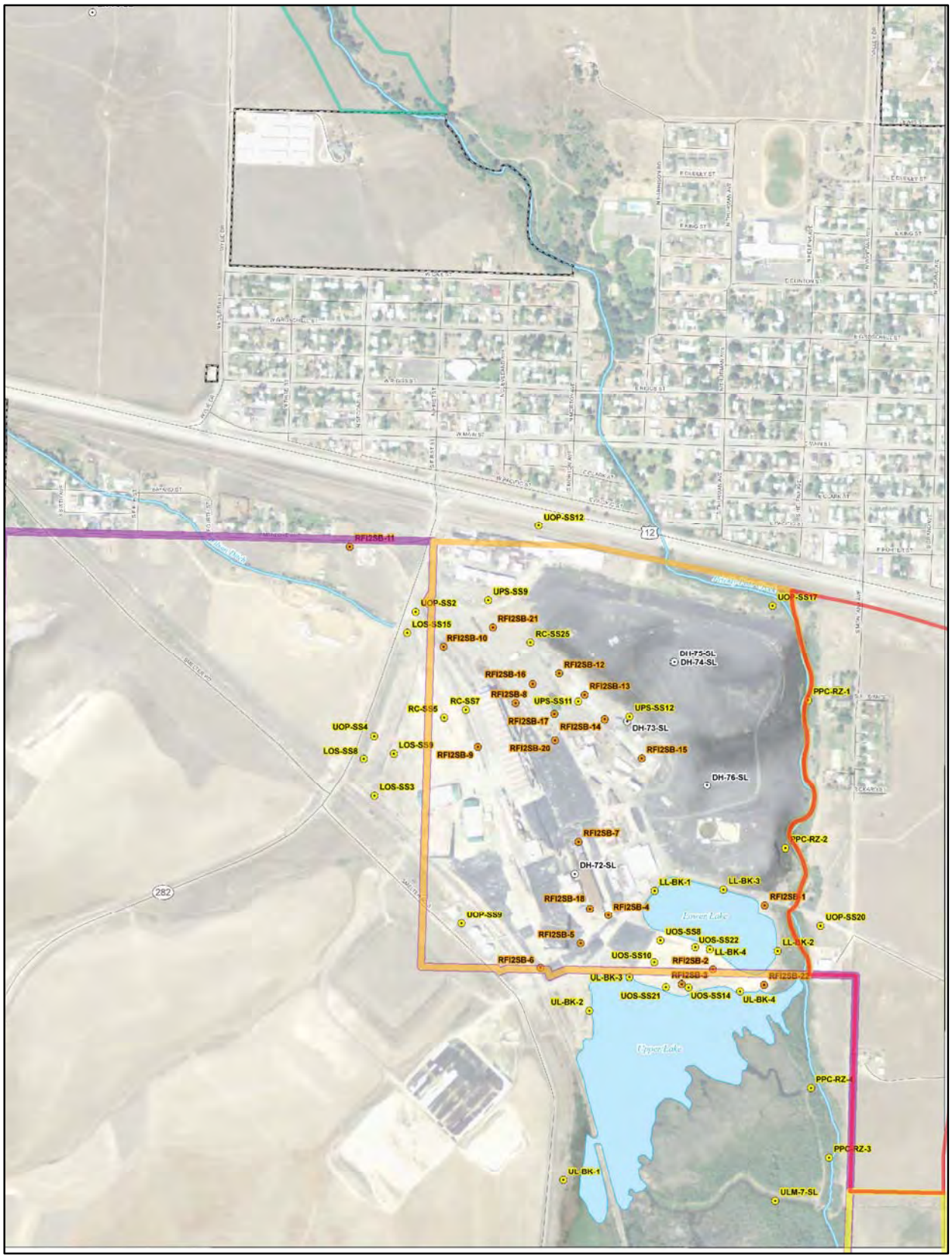
0 750 1500 2250

1"=750'

FIGURE 1-1
Corrective Measures Study Properties Identified in Paragraph 38 of the First Modification
East Helena, Montana

ES081313030307PDX 467300.35.01.02 Rv1 01-09-14 lh

CH2MHILL.



Parcels 16 and 19 (Former Smelter Site)

Portions of Parcel 2

Parcels 17 and 18

Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518

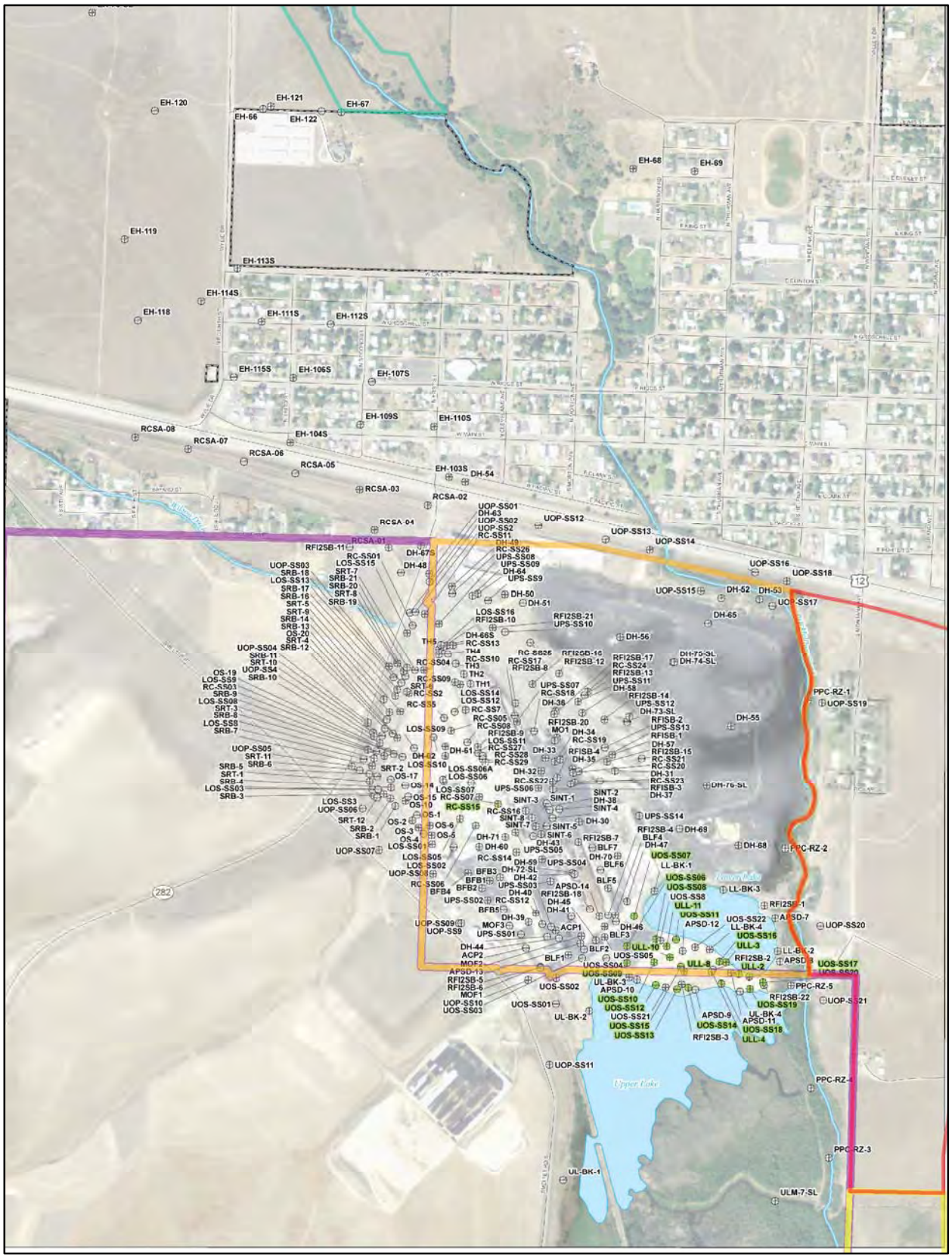
Parcel 15

N

0 500 1,000 Feet

FIGURE 2-1a
2010 Soil Sample Locations
East Helena, Montana

CH2MHILL.



Parcels 16 and 19 (Former Smelter Site)

Portions of Parcel 2

Parcels 17 and 18

Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518

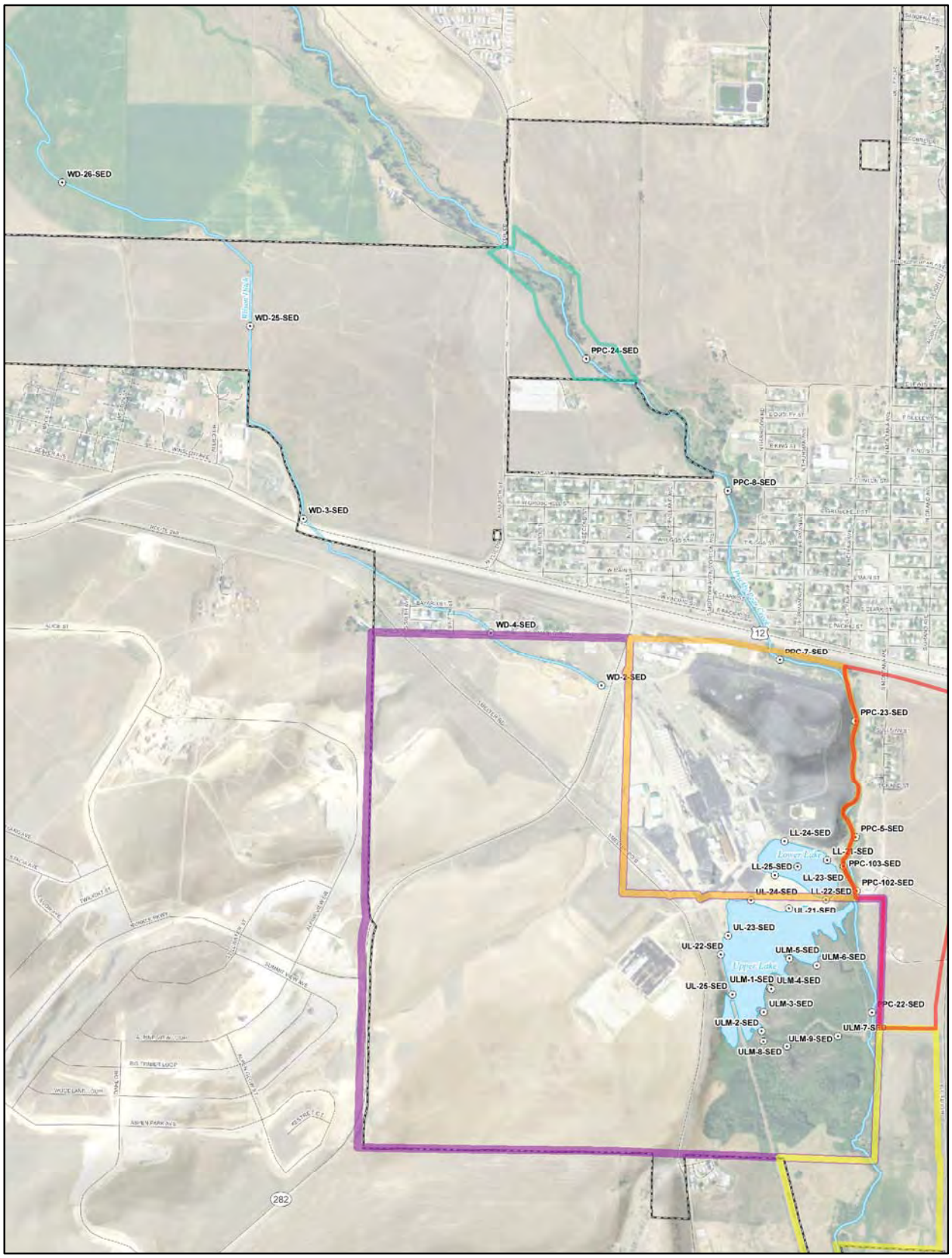
Parcel 15

N

0 500 1,000 Feet

FIGURE 2-1b
Historical Soil Sample Locations
East Helena, Montana

CH2MHILL.



Parcels 16 and 19 (Former Smelter Site)

Portions of Parcel 2

Parcels 17 and 18

Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518

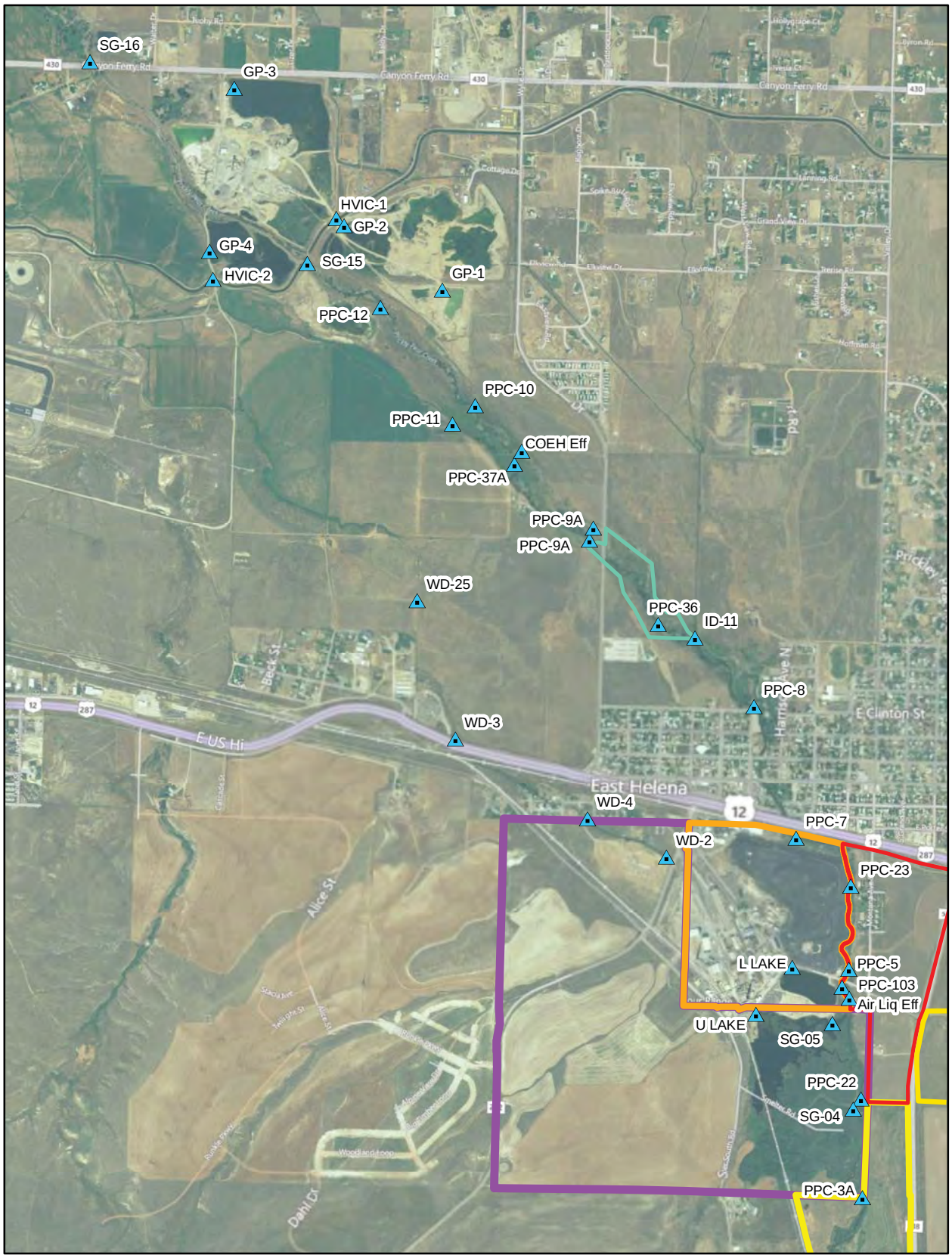
Parcel 15

N

0 500 1,000 Feet

FIGURE 2-2
Sediment Sample Locations
East Helena, Montana

CH2MHILL.



Surface Water Sample Location

Parcels 16 and 19 (Former Smelter Site)

Portions of Parcel 2

Parcels 17 and 18

Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518

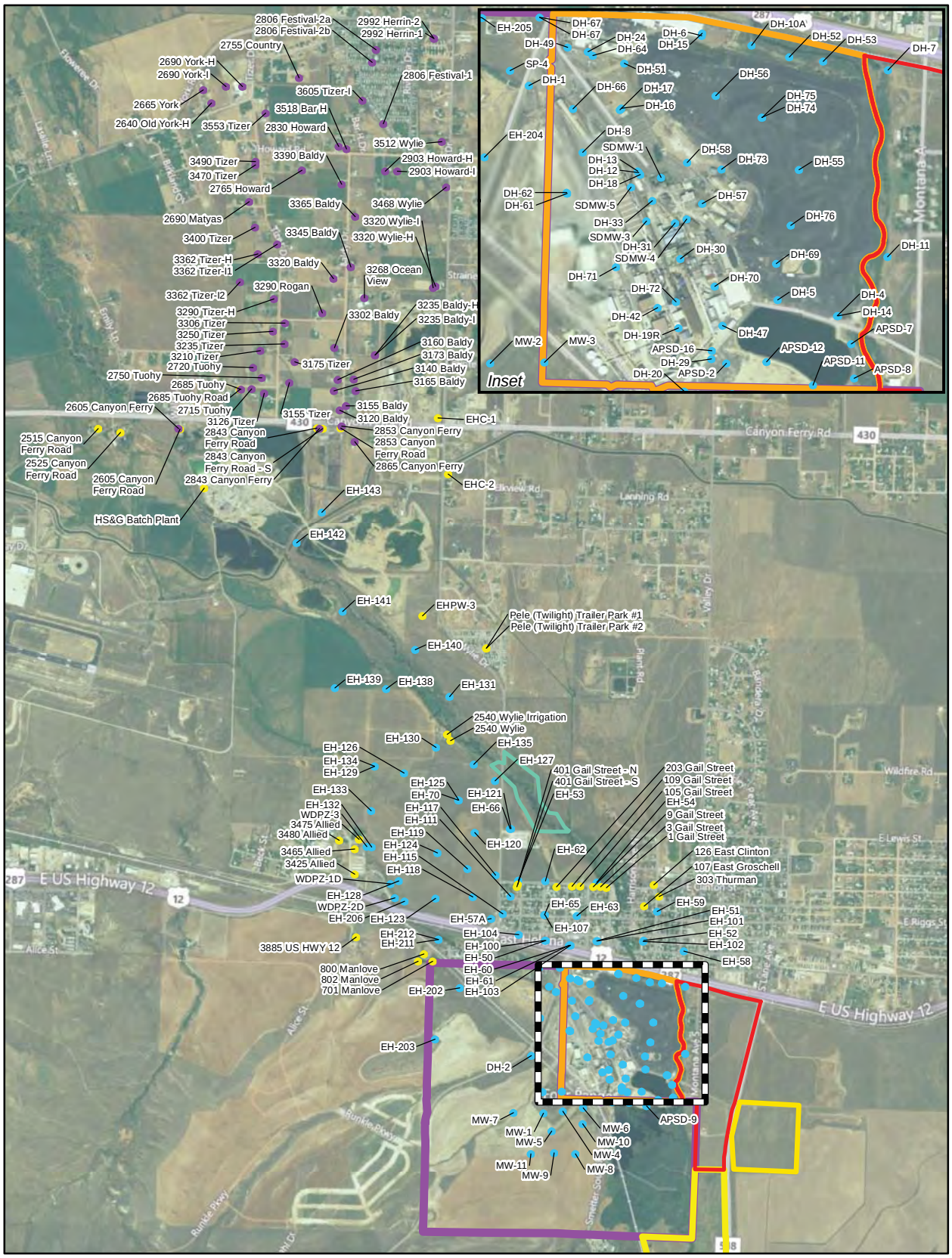
Parcel 15

N

0 1,000 2,000 Feet

FIGURE 2-3
Surface Water Sample Locations
East Helena, Montana

CH2MHILL.



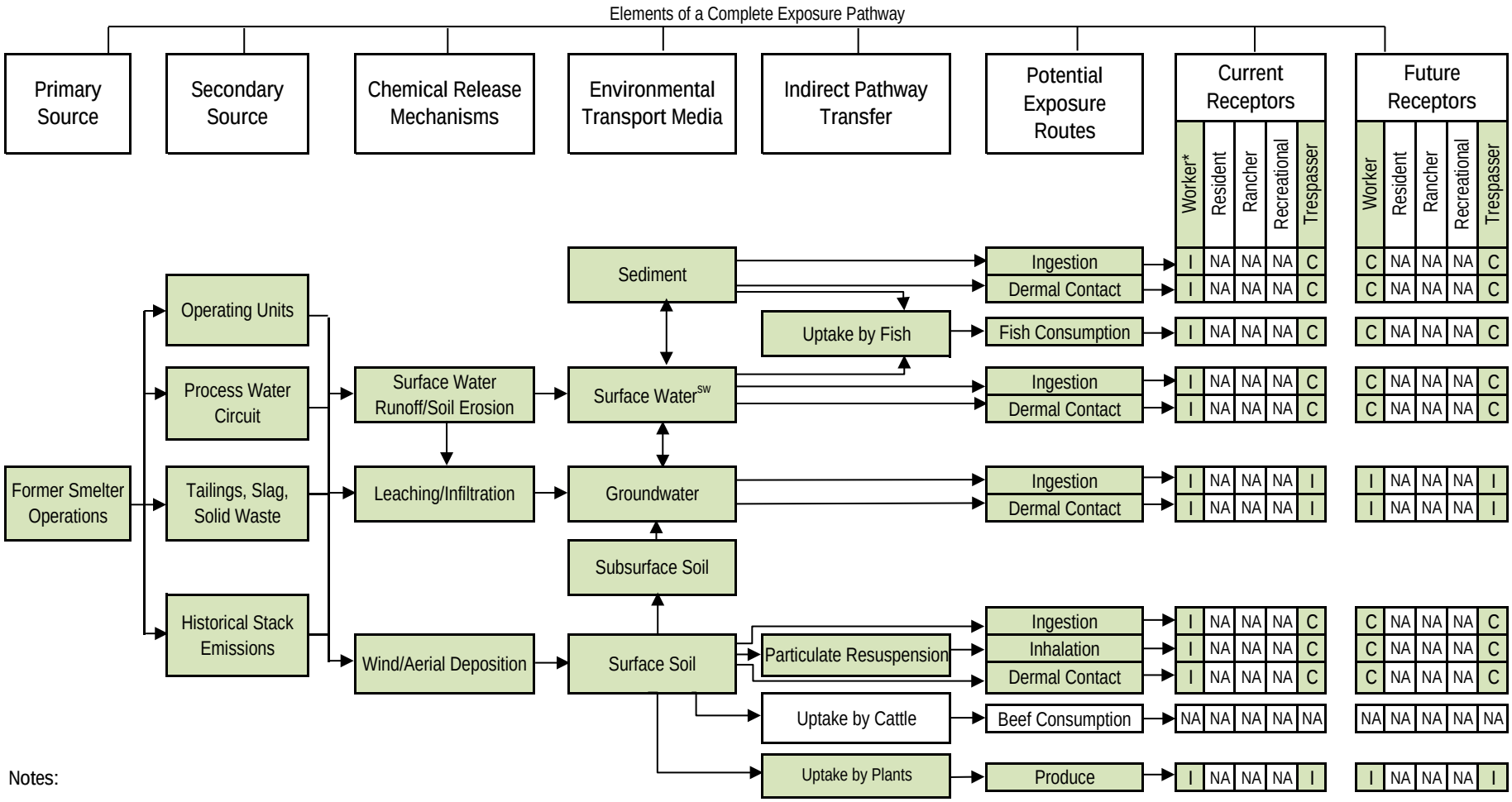
- 2011 Downgradient Private Well
- 2011 FSAP Private Well
- 2011 Groundwater Monitoring Well
- Parcels 16 and 19 (Former Smelter Site)
- Portions of Parcel 2
- Parcels 17 and 18
- Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518
- Parcel 15

N

0 500 1,000 Feet

FIGURE 2-4
Groundwater Sample Locations
East Helena, Montana

CH2MHILL.



Notes:

C = Potentially complete pathway I = Incomplete pathway

NA = not an applicable pathway

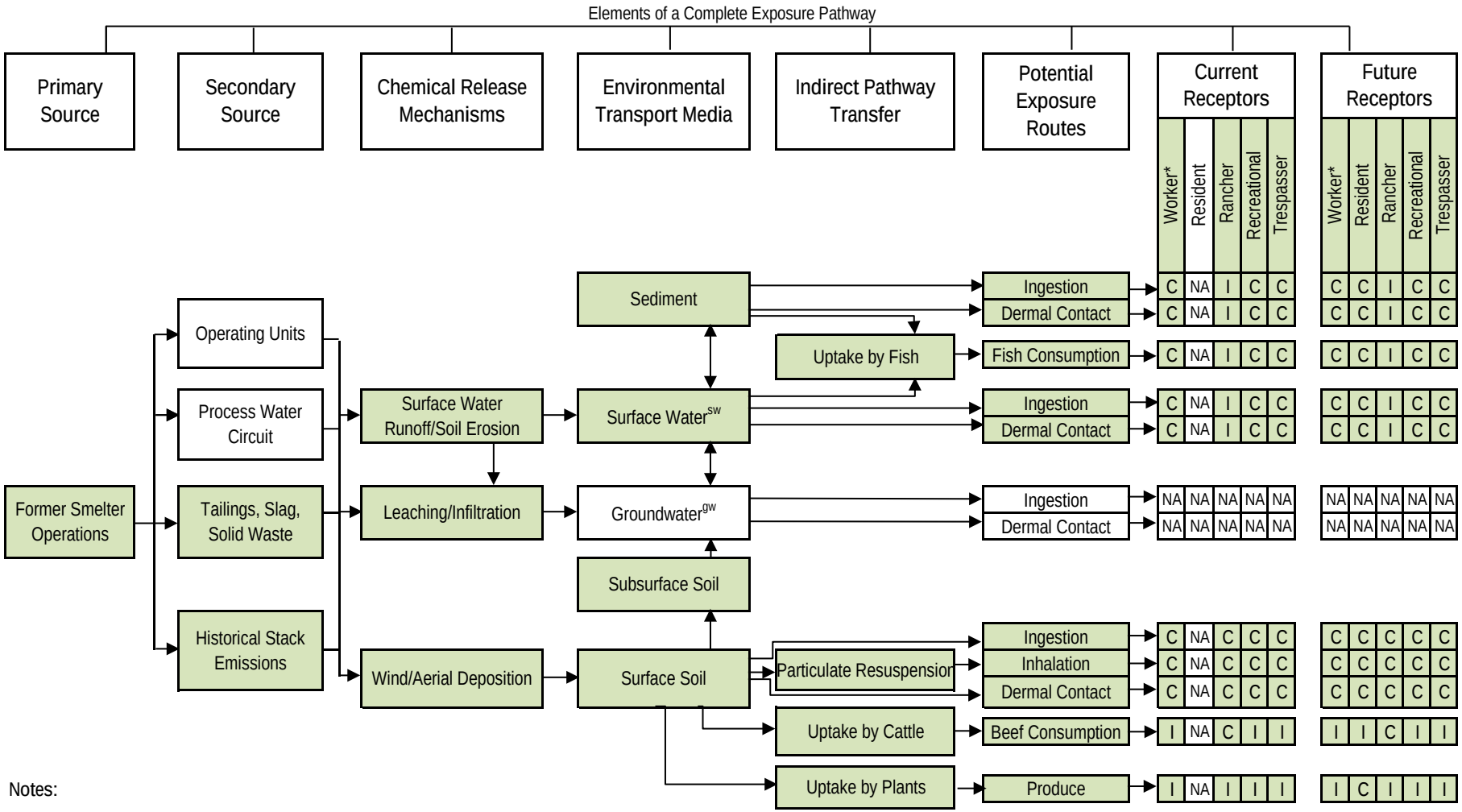
Green shaded boxes indicate elements of exposure pathways applicable to parcels under current or reasonably anticipated future land use.

Offsite residential exposure addressed in Non-Trust Properties preliminary exposure model (Figure 3-6).

[SW] surface water bodies include Prickly Pear Creek and Lower Lake.

* Institutional controls currently in-place to eliminate worker exposure.

FIGURE 3-1
Preliminary Conceptual Exposure Model for Potential Human Receptors—Parcels 16 and 19 (Former Smelter Site)
East Helena, Montana



Notes:

C = Potentially complete pathway I = Incomplete pathway

NA = not an applicable pathway

Green shaded boxes indicate elements of exposure pathways applicable to parcels under current or reasonably anticipated future land use.

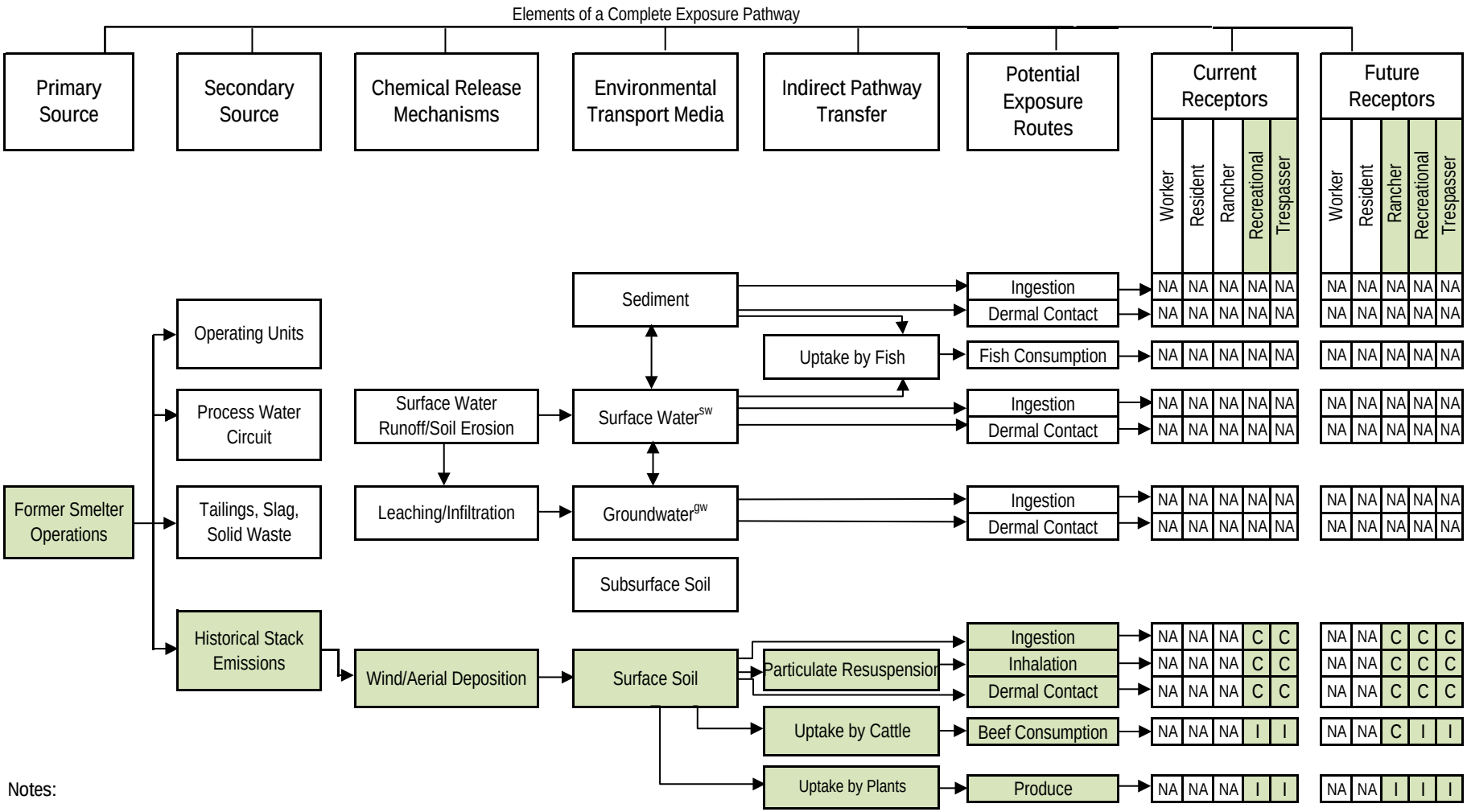
Offsite residential exposure addressed in Non-Trust Properties preliminary exposure model (Figure 3-6).

* Limited industrial workers (location of CAMU and portion of Tito Park).

[sw] surface water bodies include Wilson Ditch, Prickly Pear Creek and Upper Lake.

[gw] Parcel 15 is generally upgradient from a groundwater flow perspective and migration of contaminated groundwater from the former Smelter Site would not be expected to affect groundwater.

FIGURE 3-2
Preliminary Conceptual Exposure Model for Potential Human Receptors—Parcel 15
East Helena, Montana



Notes:

C = Potentially complete pathway

I = Incomplete pathway

NA = not an applicable pathway

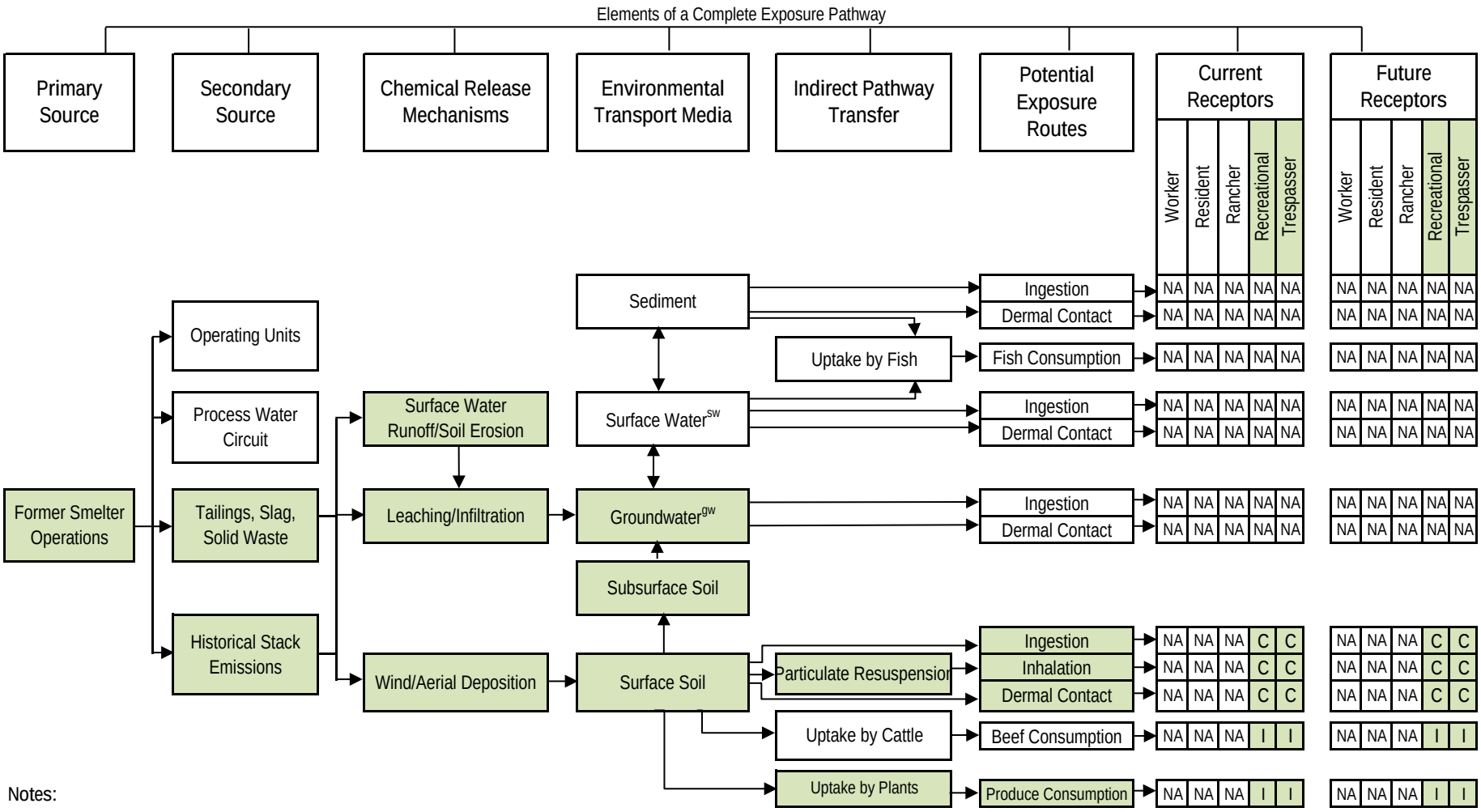
Green shaded boxes indicate elements of exposure pathways applicable to parcels under current or reasonably anticipated future land use.

Offsite residential exposure addressed in Non-Trust Properties preliminary exposure model (Figure 3-6).

[sw] Surface water body includes: Prickly Pear Creek upstream of Smelter Site and would not be expected to affect groundwater quality here.

[gw] Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518 are generally upgradient from a groundwater flow perspective and migration of contaminated groundwater from the former Smelter Site would not be expected to affect groundwater.

FIGURE 3-3
Preliminary Conceptual Exposure Model for Potential Human Receptors—Parcels 10, 11, 12, 23 and the portion of Parcel 8 West of Route 518
East Helena, Montana



Notes:

C = Potentially complete pathway I = Incomplete pathway

NA = not an applicable pathway

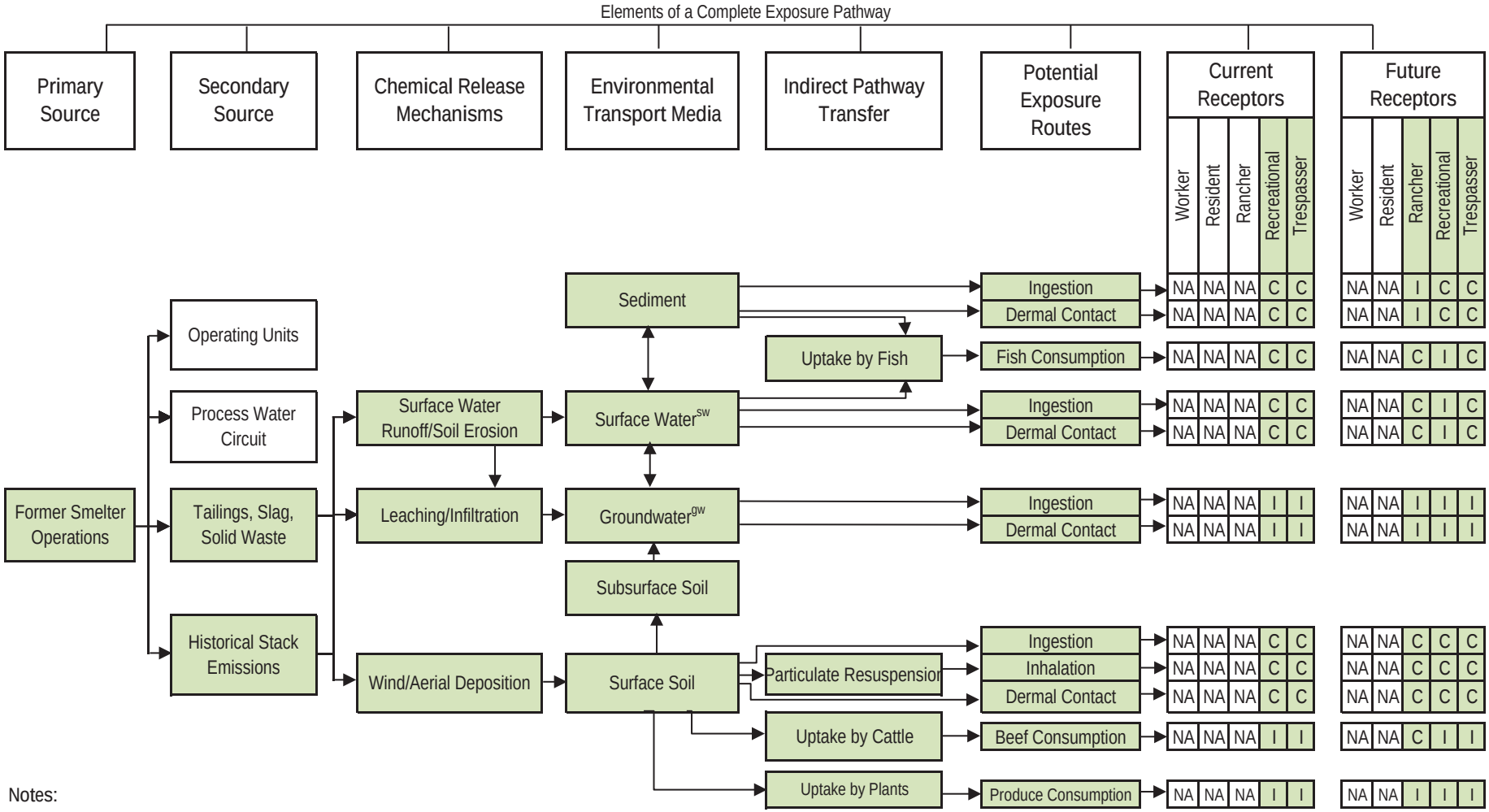
Green shaded boxes indicate elements of exposure pathways applicable to parcels under current or reasonably anticipated future land use.

Offsite residential exposure addressed in Non-Trust Properties preliminary exposure model (Figure 3-6).

[sw] No surface water bodies in these parcels.

[gw] Parcels 17 and 18 are generally upgradient from a groundwater flow perspective and migration of contaminated groundwater from the Smelter Site would not be expected to affect groundwater.

FIGURE 3-4
Preliminary Conceptual Exposure Model for Potential Human Receptors—Parcels 17 and 18
East Helena, Montana



Notes:

C = Potentially complete pathway

I = Incomplete pathway

NA = not an applicable pathway

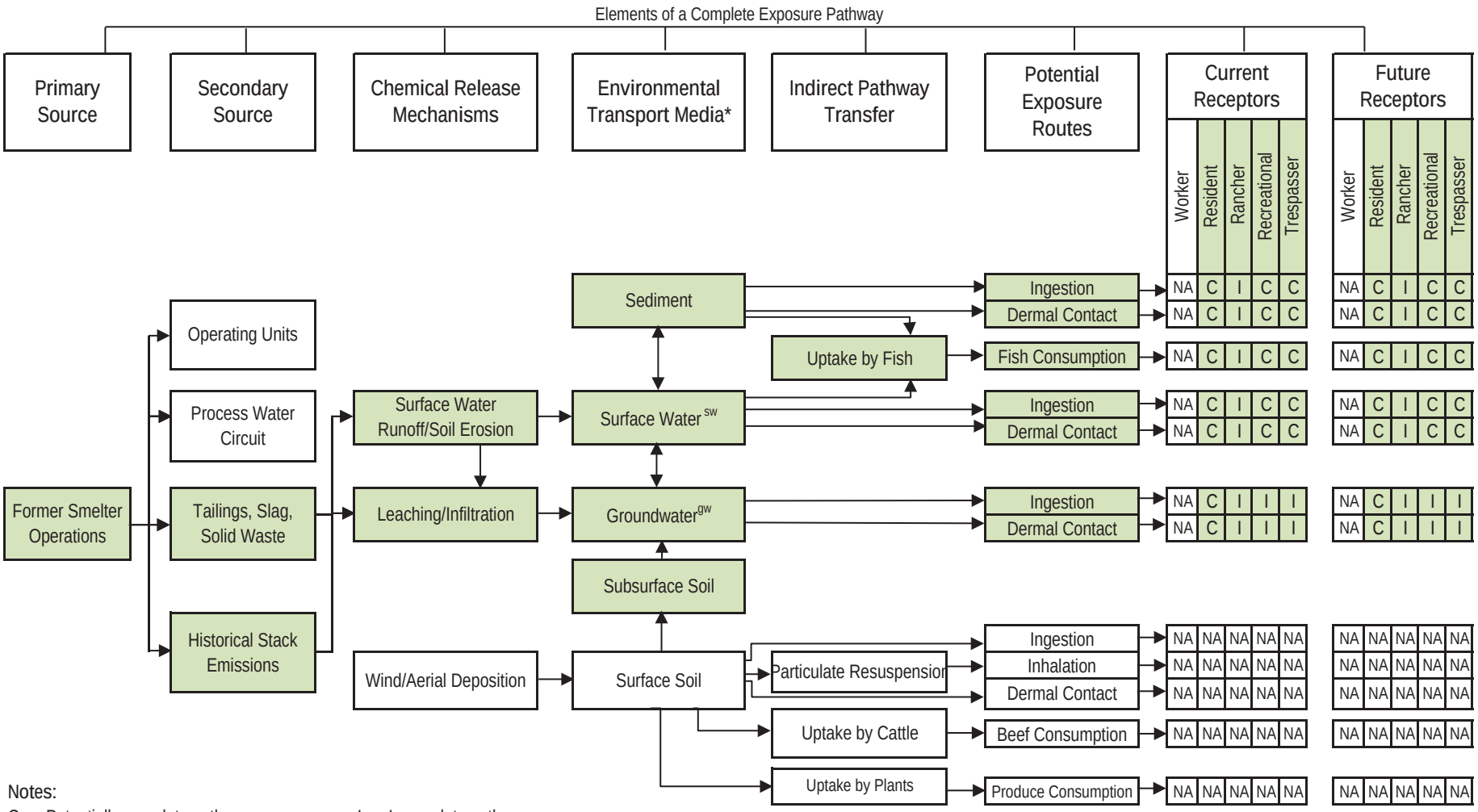
Green shaded boxes indicate elements of exposure pathways applicable to parcels under current or reasonably anticipated future land use.

Offsite residential exposure addressed in Non-Trust Properties preliminary exposure model (Figure 3-6).

[gw] Portions of Parcel 2 downgradient from a groundwater flow perspective may be impacted by contaminated groundwater from the former Smelter Site.

[sw] Surface water body includes: Prickly Pear Creek.

FIGURE 3-5
Preliminary Conceptual Exposure Model for Potential Human Receptors—Portions of Parcel 2 Near Prickly Pear Creek
East Helena, Montana



Notes:

C = Potentially complete pathway I = Incomplete pathway

NA = not an applicable pathway

Green shaded boxes indicate elements of exposure pathways applicable to parcels under current or reasonably anticipated future land use.

gw Un-owned Properties downgradient from a groundwater flow perspective may be impacted by contaminated groundwater from the former Smelter Site.

sw Surface water body includes: Prickly Pear Creek.

* As specified in the First Modification to the Consent Decree, surface soils on un-owned properties have been or will be addressed under CERCLA, and the CMS will address those properties affected by contaminant migration in groundwater, surface water, and /or sediments.

FIGURE 3-6
Preliminary Conceptual Exposure Model for Potential Human Receptors—Un-owned Properties
East Helena, Montana

Appendix A
Screening-Level Values

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information												Contaminant		Screening Levels										Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				1.0E+00	P	5.0E-03	P			1			Aluminum	7429-90-5	7.7E+04	n	9.9E+05	nm	5.2E+00	n	2.2E+01	n	3.7E+04	n		5.5E+04	
				4.0E-04	I					0.15			Antimony (metallic)	7440-36-0	3.1E+01	n	4.1E+02	n					1.5E+01	n	6.0E+00	6.6E-01	2.7E-01
				2.0E-01	I	5.0E-04	H			0.07			Barium	7440-39-3	1.5E+04	n	1.9E+05	nm	5.2E-01	n	2.2E+00	n	7.3E+03	n	2.0E+03	3.0E+02	8.2E+01
		2.4E-03	I	2.0E-03	I	2.0E-05	I			0.007			Beryllium and compounds	7440-41-7	1.6E+02	n	2.0E+03	n	1.0E-03	c*	5.1E-03	c*	7.3E+01	n	4.0E+00	5.8E+01	3.2E+00
		1.8E-03	I	1.0E-03	I	2.0E-05	C			0.025	0.001		Cadmium (Diet)	7440-43-9	7.0E+01	n	8.0E+02	n									
		1.8E-03	I	5.0E-04	I	2.0E-05	C			0.05	0.001		Cadmium (Water)	7440-43-9					1.4E-03	c*	6.8E-03	c*	1.8E+01	n	5.0E+00	1.4E+00	3.8E-01
5.0E-01	J	8.4E-02	S	3.0E-03	I	1.0E-04	I		M	0.025			Chromium(VI)	18540-29-9	2.9E-01	c	5.6E+00	c	1.1E-05	c	1.5E-04	c	4.3E-02	c		8.3E-04	
										0.013			Chromium, Total	7440-47-3											1.0E+02		1.8E+05
		9.0E-03	P	3.0E-04	P	6.0E-06	P			1			Cobalt	7440-48-4	2.3E+01	n	3.0E+02	n	2.7E-04	c*	1.4E-03	c*	1.1E+01	n		4.9E-01	
				4.0E-02	H					1			Copper	7440-50-8	3.1E+03	n	4.1E+04	n					1.5E+03	n	1.3E+03	5.1E+01	4.6E+01
				7.0E-01	P					1			Iron	7439-89-6	5.5E+04	n	7.2E+05	nm					2.6E+04	n		6.4E+02	
													Lead Compounds															
										1			~Lead and Compounds	7439-92-1	4.0E+02	n	8.0E+02	n							1.5E+01		1.4E+01
				1.4E-01	I	5.0E-05	I			1			Manganese (Diet)	7439-96-5													
													Mercury Compounds															
				3.0E-04	I	3.0E-05	C			0.07			~Mercuric Chloride (and other Mercury salts)	7487-94-7	2.3E+01	n	3.1E+02	n	3.1E-02	n	1.3E-01	n	1.1E+01	n	2.0E+00		
		2.6E-04	C	2.0E-02	I	9.0E-05	A			0.04			Nickel Soluble Salts	7440-02-0	1.5E+03	n	2.0E+04	n	9.4E-03	c*	4.7E-02	c**	7.3E+02	n		4.8E+01	
				5.0E-03	I	2.0E-02	C			1			Selenium	7782-49-2	3.9E+02	n	5.1E+03	n	2.1E+01	n	8.8E+01	n	1.8E+02	n	5.0E+01	9.5E-01	2.6E-01
				5.0E-03	I					0.04			Silver	7440-22-4	3.9E+02	n	5.1E+03	n					1.8E+02	n		1.6E+00	
				1.0E-05	X					1			Thallium (Soluble Salts)	7440-28-0	7.8E-01	n	1.0E+01	n					3.7E-01	n	2.0E+00	2.6E-02	1.4E-01
				5.0E-03	S					1			Vanadium and Compounds	NA	3.9E+02	n	5.2E+03	n					1.8E+02	n		1.8E+02	
				3.0E-01	I					1			Zinc and Compounds	7440-66-6	2.3E+04	n	3.1E+05	nm					1.1E+04	n		6.8E+02	

Appendix B
Detailed Constituent of Potential Concern Screening Results by Media

B1 2010 Soil Data

APPENDIX B1.

Soil Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

Screening Level (mg/kg)											**Residential Soil**	**77,000**	**31**	**0.39**	**15,000**	**160**	**70**	**0.29**	**23**
											Industrial Soil	***990,000***	***410***	***1.6***	***190,000***	***2,000***	***800***	***5.6***	***300***
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	**Remediated?**	**Station Name**	**Field Sample ID**	**Sample Matrix**	**Analytical Method**	**Sample Top**	**Sample Bottom**	**Depth Units**	**FilteredAnalysis**	**Reporting Units**	**Sample Date**	**Aluminum (Al)**	**Antimony (Sb)**	**Arsenic (As)**	**Barium (Ba)**	**Beryllium (Be)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Cobalt (Co)**
1		DH-72-SL		Soil		0	5	feet	TOTAL	mg/kg	8/24/2010 17:00	8150	94	436	1370	10 U	108	29	41
1		DH-72-SL		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/24/2010 17:05	11100	205	779	1480	10 U	182	73	120
1		DH-72-SL		Soil		2.5	5	feet	TOTAL	mg/kg	8/24/2010 17:10	9300	21	816	768	10 U	236	38	20
1		DH-72-SL		Soil		5	7	feet	UNKNOWN	mg/kg	8/24/2010 17:20	12500	5 U	28	113	5 U	67	20	12
1		DH-72-SL		Soil		10	12	feet	UNKNOWN	mg/kg	8/24/2010 17:40	8750	5 U	143	403	5 U	114	24	9
1		DH-72-SL		Soil		15	17	feet	UNKNOWN	mg/kg	8/25/2010 7:45	5820	5 U	1070	92	5 U	21	9	5 U
1		DH-72-SL		Soil		20	22	feet	UNKNOWN	mg/kg	8/25/2010 8:05	7580	5 U	189	59	5 U	157	10	5 U
1		DH-72-SL		Soil		25	27	feet	UNKNOWN	mg/kg	8/25/2010 8:30	6870	5 U	143	59	5 U	343	11	5 U
1		DH-72-SL		Soil		27.5	29.5	feet	UNKNOWN	mg/kg	8/25/2010 9:05	37300	5 U	366	71	5 U	1 U	5 U	5 U
1		DH-72-SL		Soil		30	32	feet	UNKNOWN	mg/kg	8/25/2010 12:05	32300	5 U	5 U	44	7	1 U	5 U	5 U
1		DH-72-SL		Soil		35	37	feet	UNKNOWN	mg/kg	8/25/2010 12:25	16000	5 U	5 U	23	6	1 U	5 U	5 U
1		DH-72-SL		Soil		40	42	feet	UNKNOWN	mg/kg	8/25/2010 12:55	10500	5 U	5 U	18	5 U	1 U	5 U	5 U
1		DH-72-SL		Soil		45	47	feet	UNKNOWN	mg/kg	8/25/2010 13:15	4910	5 U	5 U	13	5 U	1 U	5 U	5 U
1		DH-72-SL		Soil		50	52	feet	UNKNOWN	mg/kg	8/25/2010 13:30	9050	5 U	5 U	26	5 U	1 U	5 U	5 U
1		DH-73-SL		Soil		0	0.5	feet	TOTAL	mg/kg	8/20/2010 14:40	11700	74.9	797	457	10 U	70	38	96
1		DH-73-SL		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/20/2010 14:45	14000	14.2	507	312	10 U	37.5	29	32
1		DH-73-SL		Soil		2.5	5	feet	TOTAL	mg/kg	8/20/2010 14:50	12900	14	153	566	10 U	13.5	26	20
1		DH-73-SL		Soil		5	7	feet	UNKNOWN	mg/kg	8/20/2010 14:55	16800	5 U	116	266	5 U	5	16	8
1		DH-73-SL		Soil		10	12	feet	UNKNOWN	mg/kg	8/20/2010 15:00	7980	5 U	237	114	5 U	6	8	6
1		DH-73-SL		Soil		15	17	feet	UNKNOWN	mg/kg	8/20/2010 15:10	3050	5 U	30	30	5 U	1 U	5 U	5 U
1		DH-73-SL		Soil		20	22	feet	UNKNOWN	mg/kg	8/20/2010 15:20	13200	5 U	22	93	5 U	1 U	14	7
1		DH-73-SL		Soil		25	27	feet	UNKNOWN	mg/kg	8/20/2010 15:35	8420	5 U	18	89	5 U	1 U	10	6
1		DH-73-SL		Soil		30	32	feet	UNKNOWN	mg/kg	8/20/2010 15:45	9260	5 U	5	35	5 U	1 U	8	5 U
1		DH-73-SL		Soil		35	37	feet	UNKNOWN	mg/kg	8/21/2010 8:20	5700	5 U	5 U	18	5 U	1 U	5 U	5 U
1		DH-73-SL		Soil		40	42	feet	UNKNOWN	mg/kg	8/21/2010 8:30	8100	5 U	8	20	5 U	1 U	8	5 U
1		DH-73-SL		Soil		45	47	feet	UNKNOWN	mg/kg	8/21/2010 9:30	10300	5 U	6	16	5 U	1 U	6	5 U
1		DH-73-SL		Soil		48	50	feet	UNKNOWN	mg/kg	8/21/2010 10:00	19700	5 U	5 U	25	6	1 U	5 U	5 U
1		DH-74-SL		Soil		0	2	feet	UNKNOWN	mg/kg	8/23/2010 14:15	11500	82	814	224	5 U	43	42	294
1		DH-74-SL		Soil		15	17	feet	UNKNOWN	mg/kg	8/23/2010 14:50	11900	213	1370	227	5 U	64	43	184
1		DH-74-SL		Soil		20	22	feet	UNKNOWN	mg/kg	8/23/2010 14:55	12200	433	1840	197	5 U	117	87	171
1		DH-74-SL		Soil		25	27	feet	UNKNOWN	mg/kg	8/23/2010 15:20	12700	364	1760	210	5 U	92	72	170
1		DH-74-SL		Soil		40	42	feet	UNKNOWN	mg/kg	8/23/2010 15:25	13000	195	1210	226	5 U	130	47	123
1		DH-74-SL		Soil		60	62	feet	UNKNOWN	mg/kg	8/23/2010 16:30	21700	80	166	1450	5 U	1 U	104	338
1		DH-74-SL		Soil		65	67	feet	UNKNOWN	mg/kg	8/23/2010 16:35	22800	79	194	1580	5 U	1 U	143	535
1		DH-74-SL		Soil		70	72	feet	UNKNOWN	mg/kg	8/23/2010 16:40	15700	5 U	74	597	5 U	1 U	81	60
1		DH-74-SL		Soil		75	77	feet	UNKNOWN	mg/kg	8/23/2010 16:45	19300	5 U	68	2810	5 U	1 U	114	37
1		DH-74-SL		Soil		80	82	feet	UNKNOWN	mg/kg	8/23/2010 16:50	19300	5 U	120	5970	5 U	1 U	68	55
1		DH-74-SL		Soil		85	87	feet	UNKNOWN	mg/kg	8/23/2010 17:00	17600	6	59	651	5 U	1 U	70	44
1		DH-74-SL		Soil		90	92	feet	UNKNOWN	mg/kg	8/23/2010 17:05	20400	5 U	28	999	5 U	1 U	103	42
1		DH-74-SL		Soil		95	97	feet	UNKNOWN	mg/kg	8/23/2010 17:10	19400	5 U	31	1390	5 U	1 U	69	45
1		DH-74-SL		Soil		100	102	feet	UNKNOWN	mg/kg	8/23/2010 17:15	16400	5 U	26	1120	5 U	1 U	58	35
1		DH-74-SL		Soil		105	107	feet	UNKNOWN	mg/kg	8/23/2010 17:20	18600	5 U	25	1820	5 U	1 U	72	45
1		DH-74-SL		Soil		110	112	feet	UNKNOWN	mg/kg	8/23/2010 17:45	14000	5	91	165	5 U	16	16	9
1		DH-74-SL		Soil		115	117	feet	UNKNOWN	mg/kg	8/24/2010 7:55	5910	5 U	30	70	5 U	1 U	11	5 U
1		DH-74-SL		Soil		115	117	feet	UNKNOWN	mg/kg	8/24/2010 7:50	4000	5 U	25	47	5 U	1 U	8	5 U
1		DH-74-SL		Soil		120	122	feet	UNKNOWN	mg/kg	8/24/2010 10:20	7110	5 U	31	669	5 U	1 U	20	10
1		DH-74-SL		Soil		125	127	feet	UNKNOWN	mg/kg	8/24/2010 11:00	5850	5 U	9	45	5 U	1 U	7	5 U
1		DH-75-SL		Soil		5	7	feet	UNKNOWN	mg/kg	8/21/2010 13:05	5560	50	436	136	5 U	29	10	161
1		DH-75-SL		Soil		10	12	feet	UNKNOWN	mg/kg	8/21/2010 13:35	8320	51	312	123	5 U	4	20	163
1		DH-75-SL		Soil		15	17	feet	UNKNOWN	mg/kg	8/21/2010 13:50	7050	75	299	181	5 U	6	55	109
1		DH-75-SL		Soil		20	22	feet	UNKNOWN	mg/kg	8/21/2010 14:15	6280	246	1180	187	5 U	37	35	102
1		DH-75-SL		Soil		25	27	feet	UNKNOWN	mg/kg	8/21/2010 14:30	4320	201	1400	198	5 U	31	49	145
1		DH-75-SL		Soil		30	32	feet	UNKNOWN	mg/kg	8/21/2010 14:45	7030	86	539	134	5 U	21	52	143
1		DH-75-SL		Soil		35	37	feet	UNKNOWN	mg/kg	8/21/2010 15:00	11300	104	759	206	5 U	10	35	147
1		DH-75-SL		Soil		40	42	feet	UNKNOWN	mg/kg	8/21/2010 15:25	10800	182	1150	228	5 U	44	28	90
1		DH-75-SL		Soil		53	55	feet	UNKNOWN	mg/kg	8/21/2010 15:50	11500	64	552	155	5 U	7	160	84
1		DH-75-SL		Soil		55	57	feet	UNKNOWN	mg/kg	8/22/2010 8:20	19200	42	198	1220	5 U	1 U	109	327
1		DH-75-SL		Soil		60	62	feet	UNKNOWN	mg/kg	8/22/2010 8:40	14700	116	320	1370	5 U	1 U	65	405
1		DH-75-SL		Soil		60	62	feet	UNKNOWN	mg/kg	8/22/2010 8:30	13900	121	312	1210	5 U	1 U	58	382
1		DH-75-SL		Soil		65	67	feet	UNKNOWN	mg/kg	8/22/2010 8:50	14300	5 U	100	4300	5 U	1 U	67	74
1		DH-75-SL		Soil		70	72	feet	UNKNOWN	mg/kg	8/22/2010 9:05	15600	5 U	72	566	5 U	1 U	78	39
1		DH-75-SL		Soil		75	77	feet	UNKNOWN	mg/kg	8/22/2010 9:10	16400	5 U	142	3830	5 U	1 U	89	68
1		DH-75-SL		Soil		80	82	feet	UNKNOWN	mg/kg	8/22/2010 9:15	15200	5 U	79	3300	5 U	1 U	70	37
1		DH-75-SL		Soil		85	87	feet	UNKNOWN	mg/kg	8/22/2010 9:20	15000	5 U	48	2890	5 U	1 U	71	48
1		DH-75-SL		Soil		90	92	feet	UNKNOWN	mg/kg	8/22/2010 9:25	16600	5 U	42	1410	5 U	1 U	82	31
1		DH-75-SL		Soil		95	97	feet	UNKNOWN	mg/kg	8/22/2010 9:30	17200	5 U	26	977	5 U	1 U	66	35

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	**Remediated?**	**Station Name**	**Field Sample ID**	**Sample Matrix**	**Analytical Method**	**Sample Top**	**Sample Bottom**	**Depth Units**	**FilteredAnalysis**	**Reporting Units**	**Sample Date**	**Aluminum (Al)**	**Antimony (Sb)**	**Arsenic (As)**	**Barium (Ba)**	**Beryllium (Be)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Cobalt (Co)**
1		DH-75-SL		Soil		100	102	feet	UNKNOWN	mg/kg	8/22/2010 9:35	17500	5 U	31	1900	5 U	1 U	67	25
1		DH-75-SL		Soil		105	107	feet	UNKNOWN	mg/kg	8/22/2010 9:40	15700	5 U	32	935	5 U	1 U	60	28
1		DH-75-SL		Soil		110	112	feet	UNKNOWN	mg/kg	8/22/2010 9:50	11700	5 U	58	132	5 U	1 U	16	9
1		DH-75-SL		Soil		115	117	feet	UNKNOWN	mg/kg	8/22/2010 10:55	3060	5 U	25	35	5 U	1 U	8	5 U
1		DH-75-SL		Soil		120	122	feet	UNKNOWN	mg/kg	8/22/2010 11:15	8110	5 U	30	45	5 U	1 U	5	5 U
1		DH-75-SL		Soil		125	127	feet	UNKNOWN	mg/kg	8/22/2010 11:50	11700	5 U	12	81	5 U	1 U	19	7
1		DH-75-SL		Soil		130	132	feet	UNKNOWN	mg/kg	8/22/2010 12:30	11800	5 U	7	69	5 U	1 U	8	5 U
1		DH-75-SL		Soil		130	132	feet	UNKNOWN	mg/kg	8/22/2010 12:20	10800	5 U	9	68	5 U	1 U	10	5 U
1		DH-75-SL		Soil		135	137	feet	UNKNOWN	mg/kg	8/22/2010 14:15	4750	5 U	6	33	5 U	1 U	9	5 U
1		DH-75-SL		Soil		140	142	feet	UNKNOWN	mg/kg	8/22/2010 14:55	7340	5 U	7	49	5 U	1 U	5 U	5 U
1		DH-75-SL		Soil		145	147	feet	UNKNOWN	mg/kg	8/23/2010 8:00	9060	5 U	5	34	5 U	1 U	6	5 U
1		DH-76-SL		Soil		0	0.5	feet	TOTAL	mg/kg	8/18/2010 9:15	13400	55.4	623	124	10 U	7	82	445
1		DH-76-SL		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/18/2010 9:20	13400	63	504	551	10 U	9	83	405
1		DH-76-SL		Soil		2.5	5	feet	TOTAL	mg/kg	8/18/2010 9:25	11400	65	549	378	10 U	16	72	415
1		DH-76-SL		Soil		5	7	feet	UNKNOWN	mg/kg	8/18/2010 9:30	14600	69	570	139	5 U	25	56	427
1		DH-76-SL		Soil		10	12	feet	UNKNOWN	mg/kg	8/18/2010 9:35	14000	116	864	181	5 U	28	5 U	118
1		DH-76-SL		Soil		15	17	feet	UNKNOWN	mg/kg	8/18/2010 9:40	11000	126	528	267	5 U	6	5 U	89
1		DH-76-SL		Soil		20	22	feet	UNKNOWN	mg/kg	8/18/2010 9:50	16500	157	885	330	5 U	30	26	267
1		DH-76-SL		Soil		25	27	feet	UNKNOWN	mg/kg	8/18/2010 9:55	15500	34	447	195	5 U	14	9	184
1		DH-76-SL		Soil		30	32	feet	UNKNOWN	mg/kg	8/18/2010 10:00	15200	58	509	261	5 U	11	11	189
1		DH-76-SL		Soil		35	37	feet	UNKNOWN	mg/kg	8/18/2010 10:05	14700	160	906	247	5 U	44	52	157
1		DH-76-SL		Soil		40	42	feet	UNKNOWN	mg/kg	8/18/2010 10:10	13600	120	810	321	5 U	27	90	222
1		DH-76-SL		Soil		45	47	feet	UNKNOWN	mg/kg	8/18/2010 10:15	16900	303	1500	268	5 U	57	104	350
1		DH-76-SL		Soil		50	52	feet	UNKNOWN	mg/kg	8/18/2010 10:30	15000	126	758	277	5 U	14	74	246
1		DH-76-SL		Soil		55	57	feet	UNKNOWN	mg/kg	8/18/2010 10:35	18900	168	1750	425	5 U	47	20	339
1		DH-76-SL		Soil		55	57	feet	UNKNOWN	mg/kg	8/18/2010 10:38	16600	235	2070	376	5 U	52	19	346
1		DH-76-SL		Soil		60	62	feet	UNKNOWN	mg/kg	8/18/2010 11:15	13700	429	3060	244	5 U	84	24	522
1		DH-76-SL		Soil		65	67	feet	UNKNOWN	mg/kg	8/18/2010 11:20	12000	282	1820	95	5 U	72	121	687
1		DH-76-SL		Soil		70	72	feet	UNKNOWN	mg/kg	8/18/2010 13:00	14100	511	2160	282	5 U	42	57	359
1		DH-76-SL		Soil		75	77	feet	UNKNOWN	mg/kg	8/18/2010 13:05	15200	229	1070	185	5 U	27	8	219
1		DH-76-SL		Soil		80	82	feet	UNKNOWN	mg/kg	8/18/2010 13:20	13800	59	701	181	5 U	14	13	100
1		DH-76-SL		Soil		85	87	feet	UNKNOWN	mg/kg	8/18/2010 13:25	16500	9	222	335	5 U	11	5 U	40
1		DH-76-SL		Soil		90	92	feet	UNKNOWN	mg/kg	8/19/2010 8:55	12400	20	375	493	5 U	87	5	54
1		DH-76-SL		Soil		95	97	feet	UNKNOWN	mg/kg	8/19/2010 9:00	5850	5 U	82	347	5 U	13	5 U	19
1		DH-76-SL		Soil		100	102	feet	UNKNOWN	mg/kg	8/19/2010 9:05	16300	5 U	10	200	5 U	1 U	21	10
1		DH-76-SL		Soil		105	107	feet	UNKNOWN	mg/kg	8/19/2010 9:10	13000	5 U	10	62	5 U	1 U	16	6
1		DH-76-SL		Soil		110	112	feet	UNKNOWN	mg/kg	8/19/2010 9:45	16100	5 U	12	144	5 U	1 U	16	8
1		DH-76-SL		Soil		115	117	feet	UNKNOWN	mg/kg	8/19/2010 9:50	7480	5 U	5 U	120	5 U	1 U	5 U	8
1		DH-76-SL		Soil		120	122	feet	UNKNOWN	mg/kg	8/19/2010 11:10	9150	5 U	6	21	5 U	1 U	7	5 U
1		DH-76-SL		Soil		125	127	feet	UNKNOWN	mg/kg	8/19/2010 11:15	6710	5 U	10	28	5 U	1 U	6	5 U
1		DH-76-SL		Soil		130	132	feet	UNKNOWN	mg/kg	8/19/2010 14:40	6970	5 U	9	16	5 U	1 U	7	5 U
1		LL-BK-1		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 11:00	9580	5	45	118	10 U	31.5	12	5
1		LL-BK-2		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 11:25	7450	115	1190	351	10 U	350	13	21
1		LL-BK-3		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 11:45	6490	7.9	45	100 U	10 U	29.7	14	5
1		LL-BK-4		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 12:00	12400	0.8	16	156	10 U	2.9	17	5
1		LL-BK-4		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 12:15	12600	1	15	151	10 U	3.1	18	6
1		PPC-RZ-2		Soil		0	0	feet	TOTAL	mg/kg	7/28/2010 16:20	2800	13.2	69.5	100 U	10 U	17.7	16	4
1		RC-SS25		Soil		0	0.5	feet	UNKNOWN	mg/kg	8/5/2010 12:20	7000	9	161	100 U	10 U	48.4	13	5
1		RC-SS25		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/5/2010 12:30	6530	0.8	13	100 U	10 U	1.3	11	4
1		RC-SS25		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/5/2010 12:40	10400	0.3	18	125	10 U	0.4	18	6
1		RC-SS25		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/5/2010 12:50	9100	0.4	12	122	10 U	0.6	19	6
1		RC-SS5		Soil		0	0.5	feet	UNKNOWN	mg/kg	8/4/2010 13:30	6310	3320	6150	569	10 U	4090	52	55
1		RC-SS5		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/4/2010 13:40	11200	50	1170	175	10 U	554	20	25
1		RC-SS5		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/4/2010 13:50	13200	20	160	177	10 U	644	18	38
1		RC-SS7		Soil		0	0.5	feet	UNKNOWN	mg/kg	8/5/2010 13:05	4990	1200	5100	100 U	10 U	1010	82	28
1		RC-SS7		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/5/2010 13:15	8500	70	685	206	10 U	1720	23	38
1		RC-SS7		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/5/2010 13:25	14300	13.6	588	222	10 U	347	15	13
1		RFI2SB-1		Soil		0	0.5	feet	TOTAL	mg/kg	8/17/2010 14:45	4820	24.8	275	149	10 U	155	6	11
1		RFI2SB-1		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/17/2010 14:50	4950	14	279	165	10 U	90.3	6	7
1		RFI2SB-1		Soil		2.5	5	feet	TOTAL	mg/kg	8/17/2010 15:00	8550	4.4	235	110	10 U	19.3	12	10
1		RFI2SB-1		Soil		5	7	feet	UNKNOWN	mg/kg	8/17/2010 15:10	8700	5	102	111	5 U	14	13	9
1		RFI2SB-1		Soil		10	12	feet	UNKNOWN	mg/kg	8/30/2010 8:00	7590	5 U	127	82	5 U	12	9	6
1		RFI2SB-1		Soil		15	17	feet	UNKNOWN	mg/kg	8/30/2010 8:25	7130	35	208	245	5 U	3	5 U	10
1		RFI2SB-1		Soil		20	22	feet	UNKNOWN	mg/kg	8/30/2010 8:30	4250	5 U	11	49	5 U	1 U	9	5 U
1		RFI2SB-1		Soil		25	27	feet	UNKNOWN	mg/kg	8/30/2010 8:40	4370	5 U	7	26	5 U	1 U	8	5 U
1		RFI2SB-1		Soil		30	32	feet	UNKNOWN	mg/kg	8/30/2010 8:45	5990	5 U	5 U	41	5 U	1 U	5 U	5 U
1		RFI2SB-1		Soil		35	36.5	feet	UNKNOWN	mg/kg	8/30/2010 9:10	5160	5 U	5 U	21	5 U	1 U	7	5 U
1		RFI2SB-10		Soil		0	0.5	feet	TOTAL	mg/kg	9/9/2010 14:30	15000	16.9	109	734	10 U	55.2	58	39
1		RFI2SB-10		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/9/2010 14:35	11900	0.5	25.1	118	10 U	5.3	12	6

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		RFI2SB-10		Soil		2.5	5	feet	TOTAL	mg/kg	9/9/2010 14:40	15100	0.2	16.5	145	10 U	0.2	23	8
1		RFI2SB-10		Soil		5	7	feet	UNKNOWN	mg/kg	9/9/2010 15:00	12400	5 U	10	132	5 U	1 U	16	6
1		RFI2SB-10		Soil		10	12	feet	UNKNOWN	mg/kg	9/9/2010 15:30	8350	5 U	8	93	5 U	1 U	10	5 U
1		RFI2SB-10		Soil		15	17	feet	UNKNOWN	mg/kg	9/9/2010 15:35	12800	5 U	9	163	5 U	1 U	31	10
1		RFI2SB-10		Soil		20	22	feet	UNKNOWN	mg/kg	9/9/2010 16:05	11200	5 U	16	101	5 U	1 U	23	13
1		RFI2SB-10		Soil		25	27	feet	UNKNOWN	mg/kg	9/9/2010 16:25	11400	5 U	8	90	5 U	1 U	17	9
1		RFI2SB-10		Soil		30	32	feet	UNKNOWN	mg/kg	9/9/2010 16:55	38600	5 U	9	153	5 U	1 U	5 U	5 U
1		RFI2SB-10		Soil		30	32	feet	UNKNOWN	mg/kg	9/9/2010 16:50	43200	5 U	5 U	111	5 U	1 U	5 U	5 U
1		RFI2SB-12		Soil		0	0.5	feet	TOTAL	mg/kg	8/20/2010 9:00	4150	448	3700	100 U	10 U	14.5	8	49
1		RFI2SB-12		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/20/2010 9:05	12200	1.7	36.9	145	10 U	1.5	9	6
1		RFI2SB-12		Soil		2.5	5	feet	TOTAL	mg/kg	8/20/2010 9:10	8740	0.5	21.2	117	10 U	1.2	8	5
1		RFI2SB-12		Soil		5	7	feet	UNKNOWN	mg/kg	8/20/2010 9:15	21100	5 U	12	26	5 U	1 U	5 U	5 U
1		RFI2SB-12		Soil		10	12	feet	UNKNOWN	mg/kg	8/20/2010 9:20	7690	5 U	10	76	5 U	1 U	13	6
1		RFI2SB-12		Soil		15	17	feet	UNKNOWN	mg/kg	8/20/2010 9:25	8720	5 U	41	59	5 U	1 U	8	5
1		RFI2SB-12		Soil		20	22	feet	UNKNOWN	mg/kg	8/20/2010 10:25	7560	5 U	11	60	5 U	1 U	10	5
1		RFI2SB-12		Soil		25	27	feet	UNKNOWN	mg/kg	8/20/2010 10:30	6760	5 U	28	42	5 U	1 U	6	5 U
1		RFI2SB-12		Soil		25	27	feet	UNKNOWN	mg/kg	8/20/2010 10:35	7030	5 U	35	39	5 U	1 U	6	5 U
1		RFI2SB-12		Soil		30	32	feet	UNKNOWN	mg/kg	8/20/2010 10:50	10200	5 U	40	81	5 U	1 U	13	5
1		RFI2SB-12		Soil		35	37	feet	UNKNOWN	mg/kg	8/20/2010 10:55	8350	5 U	67	103	5 U	1 U	12	8
1		RFI2SB-12		Soil		40	42	feet	UNKNOWN	mg/kg	8/20/2010 11:30	6380	5 U	7	28	5 U	1 U	5 U	5 U
1		RFI2SB-12		Soil		45	47	feet	UNKNOWN	mg/kg	8/20/2010 11:35	6090	5 U	6	28	5 U	1 U	8	5 U
1		RFI2SB-12		Soil		50	52	feet	UNKNOWN	mg/kg	8/20/2010 12:20	14200	5 U	5 U	27	5 U	1 U	5 U	5 U
1		RFI2SB-12		Soil		55	57	feet	UNKNOWN	mg/kg	8/20/2010 12:25	25000	5 U	5 U	36	5 U	1 U	5 U	5 U
1		RFI2SB-13		Soil		0	0.5	feet	TOTAL	mg/kg	8/24/2010 9:20	6050	0.5	11	100 U	10 U	12.1	13	4
1		RFI2SB-13		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/24/2010 9:25	14600	17.2	149	1220	10 U	25	51	25
1		RFI2SB-13		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/24/2010 9:30	14100	15.5	105	1220	10 U	14	52	27
1		RFI2SB-13		Soil		2.5	5	feet	TOTAL	mg/kg	8/24/2010 9:35	9040	0.3	38	100 U	10 U	0.7	11	4
1		RFI2SB-13		Soil		5	7	feet	UNKNOWN	mg/kg	8/24/2010 9:40	10800	5 U	7	113	5 U	2	12	5
1		RFI2SB-13		Soil		10	12	feet	UNKNOWN	mg/kg	8/24/2010 10:10	7180	5 U	5	85	5 U	1 U	18	6
1		RFI2SB-13		Soil		15	17	feet	UNKNOWN	mg/kg	8/24/2010 10:20	8210	5 U	18	69	5 U	1 U	11	7
1		RFI2SB-13		Soil		20	22	feet	UNKNOWN	mg/kg	8/24/2010 10:50	7890	5 U	54	81	5 U	1 U	13	5
1		RFI2SB-13		Soil		25	27	feet	UNKNOWN	mg/kg	8/24/2010 11:30	9160	5 U	33	84	5 U	1 U	9	5 U
1		RFI2SB-13		Soil		30	32	feet	UNKNOWN	mg/kg	8/24/2010 12:00	10600	5 U	13	92	5 U	1 U	10	6
1		RFI2SB-13		Soil		35	37	feet	UNKNOWN	mg/kg	8/24/2010 13:50	12600	5 U	12	107	5 U	1 U	19	7
1		RFI2SB-13		Soil		40	42	feet	UNKNOWN	mg/kg	8/24/2010 14:40	7120	5 U	7	19	5 U	1 U	7	5 U
1		RFI2SB-13		Soil		45	47	feet	UNKNOWN	mg/kg	8/24/2010 15:00	7990	5 U	6	21	5 U	1 U	9	5 U
1		RFI2SB-13		Soil		50	52	feet	UNKNOWN	mg/kg	8/24/2010 15:20	7200	5 U	5 U	28	5 U	1 U	10	5 U
1		RFI2SB-13		Soil		55	57	feet	UNKNOWN	mg/kg	8/24/2010 16:20	6680	5 U	9	88	5 U	1 U	13	5 U
1		RFI2SB-14		Soil		0	0.5	feet	TOTAL	mg/kg	8/23/2010 11:30	9210	68.1	724	494	10 U	92.5	18	23
1		RFI2SB-14		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/23/2010 11:40	12900	12.8	227	910	10 U	18.6	13	11
1		RFI2SB-14		Soil		2.5	5	feet	TOTAL	mg/kg	8/23/2010 11:50	15200	19.7	467	1980	10 U	23.2	43	29
1		RFI2SB-14		Soil		5	7	feet	UNKNOWN	mg/kg	8/23/2010 12:00	13200	5	310	234	5 U	56	12	8
1		RFI2SB-14		Soil		10	12	feet	UNKNOWN	mg/kg	8/23/2010 12:40	5090	5 U	246	95	5 U	12	10	8
1		RFI2SB-14		Soil		10	12	feet	UNKNOWN	mg/kg	8/23/2010 12:30	5000	5 U	289	92	5 U	8	9	9
1		RFI2SB-14		Soil		15	17	feet	UNKNOWN	mg/kg	8/23/2010 13:00	13000	5 U	84	137	5 U	1 U	14	8
1		RFI2SB-14		Soil		20	22	feet	UNKNOWN	mg/kg	8/23/2010 13:30	10300	5 U	70	69	5 U	1 U	12	7
1		RFI2SB-14		Soil		25	27	feet	UNKNOWN	mg/kg	8/23/2010 14:00	7850	5 U	45	52	5 U	1 U	9	5 U
1		RFI2SB-14		Soil		30	32	feet	UNKNOWN	mg/kg	8/23/2010 14:45	8610	5 U	22	52	5 U	1 U	10	5
1		RFI2SB-14		Soil		35	37	feet	UNKNOWN	mg/kg	8/23/2010 15:00	10500	5 U	6	63	5 U	1 U	8	5 U
1		RFI2SB-14		Soil		40	42	feet	UNKNOWN	mg/kg	8/23/2010 15:40	8750	5 U	11	120	5 U	1 U	13	5 U
1		RFI2SB-14		Soil		45	47	feet	UNKNOWN	mg/kg	8/23/2010 16:30	22100	5 U	5 U	23	7	1 U	5 U	6
1		RFI2SB-15		Soil		0	0.5	feet	TOTAL	mg/kg	8/25/2010 8:45	8880	722	3550	146	10 U	118	58	26
1		RFI2SB-15		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/25/2010 8:50	11500	38	556	1050	10 U	37.1	13	17
1		RFI2SB-15		Soil		2.5	5	feet	TOTAL	mg/kg	8/25/2010 9:10	10900	50	725	871	10 U	19.8	6	16
1		RFI2SB-15		Soil		5	7	feet	UNKNOWN	mg/kg	8/25/2010 9:25	12600	52	708	1050	5 U	17	31	16
1		RFI2SB-15		Soil		10	12	feet	UNKNOWN	mg/kg	8/25/2010 9:35	11700	43	607	1410	5 U	13	7	17
1		RFI2SB-15		Soil		15	17	feet	UNKNOWN	mg/kg	8/25/2010 9:50	12200	53	583	938	5 U	11	9	21
1		RFI2SB-15		Soil		20	22	feet	UNKNOWN	mg/kg	8/25/2010 10:05	9740	5 U	43	297	5 U	1	12	12
1		RFI2SB-15		Soil		25	27	feet	UNKNOWN	mg/kg	8/25/2010 10:20	6460	5 U	11	44	5 U	1 U	24	5 U
1		RFI2SB-15		Soil		30	32	feet	UNKNOWN	mg/kg	8/25/2010 11:00	5940	5 U	5	35	5 U	1 U	9	5 U
1		RFI2SB-15		Soil		35	37	feet	UNKNOWN	mg/kg	8/25/2010 11:40	23100	5 U	8	258	5 U	1 U	37	11
1		RFI2SB-15		Soil		40	42	feet	UNKNOWN	mg/kg	8/25/2010 12:00	8200	5 U	10	51	5 U	1 U	8	5 U
1		RFI2SB-15		Soil		45	47	feet	UNKNOWN	mg/kg	8/25/2010 14:15	8070	5 U	6	15	5 U	1 U	5 U	5 U
1		RFI2SB-15		Soil		50	52	feet	UNKNOWN	mg/kg	8/25/2010 15:00	11200	5 U	5 U	176	5 U	1 U	37	5
1		RFI2SB-15		Soil		55	57	feet	UNKNOWN	mg/kg	8/25/2010 15:30	9420	5 U	14	44	5 U	1 U	8	5 U
1		RFI2SB-15		Soil		60	62	feet	UNKNOWN	mg/kg	8/25/2010 16:00	11300	14	55	43	7	1 U	8	8
1		RFI2SB-15		Soil		62.5	64.5	feet	UNKNOWN	mg/kg	8/25/2010 16:30	16600	5 U	5 U	26	5 U	1 U	5 U	5 U
1		RFI2SB-16		Soil		0	0.5	feet	TOTAL	mg/kg	9/1/2010 13:00	7130	9	174	156	10 U	34.2	7	5
1		RFI2SB-16		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/1/2010 13:10	10400	0.2	34.7	141	10 U	1.7	7	5

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	**Remediated?**	**Station Name**	**Field Sample ID**	**Sample Matrix**	**Analytical Method**	**Sample Top**	**Sample Bottom**	**Depth Units**	**FilteredAnalysis**	**Reporting Units**	**Sample Date**	**Aluminum (Al)**	**Antimony (Sb)**	**Arsenic (As)**	**Barium (Ba)**	**Beryllium (Be)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Cobalt (Co)**
1		RFI2SB-16		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/1/2010 13:05	9530	0.7	36.3	117	10 U	13.5	7	4
1		RFI2SB-16		Soil		2.5	5	feet	TOTAL	mg/kg	9/1/2010 13:15	9730	0.1 U	20.4	137	10 U	0.2	6	5
1		RFI2SB-16		Soil		5	7	feet	UNKNOWN	mg/kg	9/1/2010 13:20	10400	5 U	8	168	5 U	1 U	13	6
1		RFI2SB-16		Soil		10	12	feet	UNKNOWN	mg/kg	9/1/2010 13:30	16700	6	20	116	5 U	1 U	29	14
1		RFI2SB-16		Soil		15	17	feet	UNKNOWN	mg/kg	9/1/2010 14:00	12700	5 U	10	124	5 U	1 U	12	7
1		RFI2SB-16		Soil		20	22	feet	UNKNOWN	mg/kg	9/1/2010 15:00	8500	5	10	76	5 U	1 U	12	6
1		RFI2SB-16		Soil		25	27	feet	UNKNOWN	mg/kg	9/1/2010 15:45	16500	6	184	132	5 U	1 U	13	10
1		RFI2SB-16		Soil		30	32	feet	UNKNOWN	mg/kg	9/1/2010 16:45	8550	5	90	73	5 U	1 U	18	5
1		RFI2SB-16		Soil		30	32	feet	UNKNOWN	mg/kg	9/1/2010 16:05	10000	5 U	154	63	5 U	1 U	12	6
1		RFI2SB-16		Soil		35	37	feet	UNKNOWN	mg/kg	9/1/2010 16:50	6360	5 U	122	44	5 U	4	10	5 U
1		RFI2SB-16		Soil		40	42	feet	UNKNOWN	mg/kg	9/1/2010 17:30	12000	6	403	48	5 U	2	9	5
1		RFI2SB-16		Soil		45	47	feet	UNKNOWN	mg/kg	9/2/2010 8:30	12800	5 U	5 U	22	5 U	1 U	5 U	5 U
1		RFI2SB-17		Soil		0	0.5	feet	TOTAL	mg/kg	8/26/2010 14:20	4780	0.4	8.3	100 U	10 U	3.8	11	5
1		RFI2SB-17		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/26/2010 14:25	9600	9	214	375	10 U	21	23	13
1		RFI2SB-17		Soil		2.5	5	feet	TOTAL	mg/kg	8/26/2010 14:40	12100	1.8	76	105	10 U	13.5	24	11
1		RFI2SB-17		Soil		5	7	feet	UNKNOWN	mg/kg	8/26/2010 15:00	12000	7	15	88	5 U	1 U	14	9
1		RFI2SB-17		Soil		10	12	feet	UNKNOWN	mg/kg	8/30/2010 10:30	14100	8	8	108	5 U	1 U	26	7
1		RFI2SB-17		Soil		10	12	feet	UNKNOWN	mg/kg	8/30/2010 10:25	12200	5	7	102	5 U	1 U	22	7
1		RFI2SB-17		Soil		15	17	feet	UNKNOWN	mg/kg	8/30/2010 10:50	8320	5 U	10	60	5 U	1 U	11	5 U
1		RFI2SB-17		Soil		20	22	feet	UNKNOWN	mg/kg	8/30/2010 11:00	10700	7	13	77	5 U	1 U	24	6
1		RFI2SB-17		Soil		25	27	feet	UNKNOWN	mg/kg	8/30/2010 11:30	7360	6	34	62	5 U	1 U	17	5
1		RFI2SB-17		Soil		30	32	feet	UNKNOWN	mg/kg	8/30/2010 11:45	10200	5 U	168	83	5 U	24	7	5
1		RFI2SB-17		Soil		35	37	feet	UNKNOWN	mg/kg	8/30/2010 12:30	7130	5 U	261	83	5 U	67	7	5 U
1		RFI2SB-17		Soil		40	42	feet	UNKNOWN	mg/kg	8/30/2010 14:45	20900	5	25	37	6	1 U	5 U	5 U
1		RFI2SB-17		Soil		45	47	feet	UNKNOWN	mg/kg	8/30/2010 16:20	15000	5 U	5 U	43	5	1 U	5 U	5 U
1		RFI2SB-17		Soil		47	49	feet	UNKNOWN	mg/kg	8/30/2010 16:50	28900	5 U	5 U	30	10	1 U	5 U	5 U
1		RFI2SB-18		Soil		0	0.5	feet	TOTAL	mg/kg	8/20/2010 11:05	6030	5.3	46	85	10 U	27.3	10	7
1		RFI2SB-18		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/20/2010 11:10	14300	1450	3270	2480	10 U	222	80	87
1		RFI2SB-18		Soil		2.5	5	feet	TOTAL	mg/kg	8/20/2010 11:15	14200	913	6790	1780	10 U	341	62	96
1		RFI2SB-18		Soil		5	6.5	feet	UNKNOWN	mg/kg	8/20/2010 11:20	7570	1070	11600	59	5 U	379	25	68
1		RFI2SB-18		Soil		10	11.5	feet	UNKNOWN	mg/kg	8/20/2010 11:25	10200	102	1710	98	5 U	2890	12	7
1		RFI2SB-18		Soil		15	16.5	feet	UNKNOWN	mg/kg	8/20/2010 11:35	7220	89	1260	112	5 U	2570	11	9
1		RFI2SB-18		Soil		20	21.5	feet	UNKNOWN	mg/kg	8/20/2010 11:40	11000	5 U	176	98	5 U	606	14	5 U
1		RFI2SB-18		Soil		25	26.5	feet	UNKNOWN	mg/kg	8/20/2010 11:50	27700	5 U	155	38	5 U	16	5 U	5 U
1		RFI2SB-2		Soil		0	0.5	feet	TOTAL	mg/kg	8/26/2010 9:45	12000	0.3	15.8	148	10 U	2	15	7
1		RFI2SB-2		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/26/2010 9:50	16400	14.8	521	148	10 U	151	7	7
1		RFI2SB-2		Soil		2.5	5	feet	TOTAL	mg/kg	8/26/2010 9:55	9070	23	525	100 U	10 U	117	13	8
1		RFI2SB-2		Soil		5	7	feet	UNKNOWN	mg/kg	8/26/2010 10:05	8210	8	154	59	5 U	21	12	7
1		RFI2SB-2		Soil		10	12	feet	UNKNOWN	mg/kg	8/26/2010 10:25	5530	5 U	33	58	5 U	6	6	5 U
1		RFI2SB-2		Soil		15	17	feet	UNKNOWN	mg/kg	9/7/2010 10:05	2620	5 U	27	41	5 U	4	5 U	5 U
1		RFI2SB-2		Soil		20	22	feet	UNKNOWN	mg/kg	9/7/2010 10:25	9450	5	25	83	5 U	2	13	6
1		RFI2SB-2		Soil		25	27	feet	UNKNOWN	mg/kg	9/7/2010 10:40	3420	5 U	7	19	5 U	1 U	9	5 U
1		RFI2SB-2		Soil		30	32	feet	UNKNOWN	mg/kg	9/7/2010 11:00	3950	5 U	6	30	5 U	1 U	6	5 U
1		RFI2SB-2		Soil		33	35	feet	UNKNOWN	mg/kg	9/7/2010 11:30	9560	5 U	5 U	33	5 U	1 U	5 U	5 U
1		RFI2SB-20		Soil		0	0.5	feet	TOTAL	mg/kg	8/16/2010 13:10	12600	11	110	558	10 U	23.2	39	28
1		RFI2SB-20		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/16/2010 13:12	18000	7.1	30.9	942	10 U	2.5	50	36
1		RFI2SB-20		Soil		2.5	5	feet	TOTAL	mg/kg	8/16/2010 13:15	18000	8.4	36.5	1200	10 U	1.3	48	39
1		RFI2SB-20		Soil		5	7	feet	UNKNOWN	mg/kg	8/16/2010 13:17	18000	5 U	56	1400	5 U	1 U	71	41
1		RFI2SB-20		Soil		10	12	feet	UNKNOWN	mg/kg	8/16/2010 13:30	12400	5 U	13	123	5 U	1 U	13	6
1		RFI2SB-20		Soil		15	17	feet	UNKNOWN	mg/kg	8/16/2010 13:40	13200	5 U	17	142	5 U	1 U	18	10
1		RFI2SB-20		Soil		20	22	feet	UNKNOWN	mg/kg	8/16/2010 14:05	15700	5 U	19	175	5 U	1 U	12	8
1		RFI2SB-20		Soil		20	22	feet	UNKNOWN	mg/kg	8/16/2010 14:10	17200	5 U	17	142	5 U	1 U	14	7
1		RFI2SB-20		Soil		25	27	feet	UNKNOWN	mg/kg	8/16/2010 14:15	11400	5 U	114	66	5 U	1 U	12	5 U
1		RFI2SB-20		Soil		30	32	feet	UNKNOWN	mg/kg	8/16/2010 14:30	8500	5 U	432	81	5 U	1 U	7	7
1		RFI2SB-20		Soil		35	37	feet	UNKNOWN	mg/kg	8/16/2010 14:40	12200	5 U	152	92	5 U	3	15	7
1		RFI2SB-20		Soil		40	42	feet	UNKNOWN	mg/kg	8/16/2010 15:00	13000	5 U	405	145	5 U	206	12	7
1		RFI2SB-20		Soil		44	46	feet	UNKNOWN	mg/kg	8/16/2010 15:15	26100	5 U	5	20	5	1 U	5 U	5
1		RFI2SB-21		Soil		0	0.5	feet	TOTAL	mg/kg	9/2/2010 13:30	7660	3.8	21.6	100 U	10 U	9.6	10	8
1		RFI2SB-21		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/2/2010 13:40	14100	0.5	15.2	179	10 U	3.4	13	7
1		RFI2SB-21		Soil		2.5	5	feet	TOTAL	mg/kg	9/2/2010 13:50	6510	0.5	23.8	100 U	10 U	0.3	12	7
1		RFI2SB-21		Soil		5	7	feet	UNKNOWN	mg/kg	9/2/2010 14:20	11200	6	9	74	5 U	1 U	17	5 U
1		RFI2SB-21		Soil		10	12	feet	UNKNOWN	mg/kg	9/2/2010 14:45	13800	6	29	79	5 U	1 U	22	16
1		RFI2SB-21		Soil		15	17	feet	UNKNOWN	mg/kg	9/2/2010 15:20	14600	7	17	91	5 U	1 U	17	10
1		RFI2SB-21		Soil		20	22	feet	UNKNOWN	mg/kg	9/2/2010 15:55	8510	5 U	9	41	5 U	1 U	11	5 U
1		RFI2SB-21		Soil		25	27	feet	UNKNOWN	mg/kg	9/2/2010 16:20	13600	5 U	9	123	5 U	1 U	14	7
1		RFI2SB-21		Soil		30	32	feet	UNKNOWN	mg/kg	9/3/2010 7:45	9380	5 U	275	83	5 U	62	7	7
1		RFI2SB-21		Soil		35	37	feet	UNKNOWN	mg/kg	9/3/2010 8:25	5120	5 U	64	27	5 U	1 U	12	5 U
1		RFI2SB-21		Soil		40	42	feet	UNKNOWN	mg/kg	9/3/2010 9:00	9310	6	271	66	5 U	2	13	6
1		RFI2SB-21		Soil		45	47	feet	UNKNOWN	mg/kg	9/3/2010 9:25	8370	5 U	157	49	5 U	1	5	5 U

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	**Remediated?**	**Station Name**	**Field Sample ID**	**Sample Matrix**	**Analytical Method**	**Sample Top**	**Sample Bottom**	**Depth Units**	**FilteredAnalysis**	**Reporting Units**	**Sample Date**	**Aluminum (Al)**	**Antimony (Sb)**	**Arsenic (As)**	**Barium (Ba)**	**Beryllium (Be)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Cobalt (Co)**
1		RFI2SB-21		Soil		50	52	feet	UNKNOWN	mg/kg	9/3/2010 10:10	8630	5 U	77	38	5 U	1 U	6	5 U
1		RFI2SB-21		Soil		55	51	feet	UNKNOWN	mg/kg	9/3/2010 10:45	38100	5 U	5 U	309	6	1 U	5 U	10
1		RFI2SB-4		Soil		0	0.5	feet	TOTAL	mg/kg	8/18/2010 14:15	8330	11	1460	297	10 U	160	7	6
1		RFI2SB-4		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/18/2010 14:20	7970	76	939	302	10 U	29.5	14	13
1		RFI2SB-4		Soil		2.5	5	feet	TOTAL	mg/kg	8/18/2010 14:25	7740	2.5	1420	100 U	10 U	136	5 U	2
1		RFI2SB-4		Soil		5	7	feet	UNKNOWN	mg/kg	8/18/2010 14:30	3540	5 U	640	21	5 U	19	5 U	5 U
1		RFI2SB-4		Soil		10	12	feet	UNKNOWN	mg/kg	8/19/2010 8:05	5560	9	394	80	5 U	281	5 U	5 U
1		RFI2SB-4		Soil		15	17	feet	UNKNOWN	mg/kg	8/19/2010 8:20	14000	5 U	105	127	5 U	90	13	6
1		RFI2SB-4		Soil		20	21.5	feet	UNKNOWN	mg/kg	8/20/2010 8:20	2030	5 U	15	14	5 U	1 U	6	5 U
1		RFI2SB-4		Soil		25	26.5	feet	UNKNOWN	mg/kg	8/20/2010 8:40	4410	5 U	25	31	5 U	1 U	5	5 U
1		RFI2SB-4		Soil		30	31.5	feet	UNKNOWN	mg/kg	8/20/2010 9:00	22900	5 U	8	63	7	1 U	5 U	5 U
1		RFI2SB-5		Soil		0	0.5	feet	TOTAL	mg/kg	8/18/2010 8:05	17000	224	1520	711	10 U	74	18	208
1		RFI2SB-5		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/18/2010 8:15	9890	49.3	874	481	10 U	450	15	32
1		RFI2SB-5		Soil		2.5	5	feet	TOTAL	mg/kg	8/18/2010 8:45	3610	0.1 U	561	100 U	10 U	126	5	5
1		RFI2SB-5		Soil		5	7	feet	UNKNOWN	mg/kg	8/18/2010 9:00	2520	5 U	278	24	5 U	31	22	5 U
1		RFI2SB-5		Soil		10	12	feet	UNKNOWN	mg/kg	8/18/2010 9:15	9840	5 U	174	137	5 U	47	9	6
1		RFI2SB-5		Soil		15	17	feet	UNKNOWN	mg/kg	8/18/2010 9:45	7110	5 U	487	48	5 U	372	13	5 U
1		RFI2SB-5		Soil		20	22	feet	UNKNOWN	mg/kg	8/18/2010 10:10	7560	5 U	11	52	5 U	46	9	5 U
1		RFI2SB-5		Soil		25	27	feet	UNKNOWN	mg/kg	8/18/2010 10:30	27700	5 U	5 U	30	5	1 U	5 U	5 U
1		RFI2SB-6		Soil		0	0.5	feet	TOTAL	mg/kg	8/16/2010 12:00	19500	67	354	1940	10 U	34	100	199
1		RFI2SB-6		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/16/2010 12:05	18900	1170	430	2050	10 U	34.4	99	236
1		RFI2SB-6		Soil		2.5	5	feet	TOTAL	mg/kg	8/16/2010 12:20	10700	146	1460	753	10 U	6700	38	43
1		RFI2SB-6		Soil		5	7	feet	UNKNOWN	mg/kg	8/16/2010 12:30	12400	5 U	161	130	5 U	3080	17	6
1		RFI2SB-6		Soil		10	12	feet	UNKNOWN	mg/kg	8/16/2010 12:40	8220	5 U	171	126	5 U	420	16	7
1		RFI2SB-6		Soil		15	17	feet	UNKNOWN	mg/kg	8/16/2010 13:00	13100	5 U	34	81	5 U	386	17	7
1		RFI2SB-6		Soil		20	22	feet	UNKNOWN	mg/kg	8/16/2010 13:20	11900	5 U	12	79	5 U	189	15	5 U
1		RFI2SB-6		Soil		25	27	feet	UNKNOWN	mg/kg	8/16/2010 13:50	21300	5 U	5 U	87	7	1 U	5 U	5 U
1		RFI2SB-7		Soil		0	0.5	feet	TOTAL	mg/kg	9/8/2010 15:10	6640	111	2070	342	10 U	471	43	75
1		RFI2SB-7		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/8/2010 15:20	7600	25.5	1110	231	10 U	82.3	14	14
1		RFI2SB-7		Soil		2.5	5	feet	TOTAL	mg/kg	9/8/2010 15:35	11500	0.7	25.8	100 U	10 U	16.5	22	10
1		RFI2SB-7		Soil		2.5	5	feet	TOTAL	mg/kg	9/8/2010 15:30	10700	0.8	29.4	100 U	10 U	12.8	20	8
1		RFI2SB-7		Soil		5	7	feet	UNKNOWN	mg/kg	9/8/2010 16:00	14300	6	12	99	5 U	16	18	8
1		RFI2SB-7		Soil		10	12	feet	UNKNOWN	mg/kg	9/9/2010 7:30	9550	5 U	13	79	5 U	6	11	5
1		RFI2SB-7		Soil		15	17	feet	UNKNOWN	mg/kg	9/9/2010 8:25	12900	5	910	156	5 U	1	39	10
1		RFI2SB-7		Soil		20	22	feet	UNKNOWN	mg/kg	9/9/2010 8:45	9020	5 U	175	73	5 U	1 U	13	6
1		RFI2SB-7		Soil		25	27	feet	UNKNOWN	mg/kg	9/9/2010 9:15	7760	5 U	120	42	5 U	112	8	5 U
1		RFI2SB-7		Soil		30	32	feet	UNKNOWN	mg/kg	9/9/2010 10:20	31600	5 U	123	55	7	1 U	5 U	5 U
1		RFI2SB-8		Soil		0	0.5	feet	UNKNOWN	mg/kg	8/12/2010 9:00	20700	307	557	2170	5 U	4	110	322
1		RFI2SB-8		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/12/2010 9:10	13900	298	1530	1090	5 U	852	72	167
1		RFI2SB-8		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/12/2010 9:30	12300	5 U	7	96	5 U	3	9	5 U
1		RFI2SB-8		Soil		5	7	feet	UNKNOWN	mg/kg	8/12/2010 9:45	13500	5 U	6	110	5 U	1 U	9	5 U
1		RFI2SB-8		Soil		10	12	feet	UNKNOWN	mg/kg	8/12/2010 10:10	8820	5 U	21	87	5 U	1 U	17	5 U
1		RFI2SB-8		Soil		15	16	feet	UNKNOWN	mg/kg	8/12/2010 10:35	18300	5 U	9	188	5 U	1 U	12	14
1		RFI2SB-8		Soil		20	20.5	feet	UNKNOWN	mg/kg	8/12/2010 11:00	13200	5 U	12	230	5 U	1 U	17	9
1		RFI2SB-8		Soil		25	26.8	feet	UNKNOWN	mg/kg	8/12/2010 11:20	9210	5 U	118	50	5 U	1 U	15	5 U
1		RFI2SB-8		Soil		30	30.8	feet	UNKNOWN	mg/kg	8/12/2010 13:50	12200	5 U	52	86	5 U	1 U	16	5 U
1		RFI2SB-8		Soil		35	37	feet	UNKNOWN	mg/kg	8/12/2010 14:10	5570	5 U	54	21	5 U	14	8	5 U
1		RFI2SB-8		Soil		40	41	feet	UNKNOWN	mg/kg	8/12/2010 15:40	12400	5 U	124	135	5 U	52	15	5 U
1		RFI2SB-8		Soil		45	47	feet	UNKNOWN	mg/kg	8/12/2010 16:25	36200	5 U	23	76	6	1 U	5 U	5 U
1		RFI2SB-9		Soil		0	0.5	feet	TOTAL	mg/kg	8/17/2010 7:50	17300	157	1170	598	10 U	151	59	283
1		RFI2SB-9		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/17/2010 7:55	9930	409	1240	458	10 U	924	31	73
1		RFI2SB-9		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/17/2010 18:20	10900	174	805	296	10 U	490	15	44
1		RFI2SB-9		Soil		2.5	5	feet	TOTAL	mg/kg	8/17/2010 8:00	12200	0.1 U	8.9	123	10 U	7.2	9	7
1		RFI2SB-9		Soil		5	7	feet	UNKNOWN	mg/kg	8/17/2010 8:10	11900	5 U	12	141	5 U	2	9	5
1		RFI2SB-9		Soil		10	12	feet	UNKNOWN	mg/kg	8/17/2010 8:35	9730	5 U	6	108	5 U	1 U	10	6
1		RFI2SB-9		Soil		15	17	feet	UNKNOWN	mg/kg	8/17/2010 8:55	11300	5 U	11	88	5 U	1 U	12	7
1		RFI2SB-9		Soil		20	22	feet	UNKNOWN	mg/kg	8/17/2010 9:40	13600	5 U	9	140	5 U	1 U	16	9
1		RFI2SB-9		Soil		25	27	feet	UNKNOWN	mg/kg	8/17/2010 10:20	9500	5 U	7	143	5 U	1 U	14	8
1		RFI2SB-9		Soil		30	32	feet	UNKNOWN	mg/kg	8/17/2010 16:00	7280	5 U	7	86	5 U	34	12	6
1		RFI2SB-9		Soil		30	32	feet	UNKNOWN	mg/kg	8/17/2010 10:30	6290	5 U	6	51	5 U	19	12	5 U
1		RFI2SB-9		Soil		35	37	feet	UNKNOWN	mg/kg	8/17/2010 11:00	15200	5 U	9	31	5 U	28	5 U	5 U
1		UOP-SS17		Soil		0	0.5	feet	TOTAL	mg/kg	8/9/2010 12:45	5830	5.5	55	107	10 U	11.7	15	8
1		UOP-SS17		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/9/2010 12:55	4010	2.8	39	101	10 U	4.7	10	6
1		UOP-SS17		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/9/2010 13:05	3720	2.6	59	100 U	10 U	5.1	9	4 U
1		UOP-SS9		Soil		0	0.5	feet	TOTAL	mg/kg	8/9/2010 9:55	3250	12.4	78	100 U	10 U	32.7	5 U	2
1		UOP-SS9		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/9/2010 10:20	11400	8	142	145	10 U	31.9	13	6
1		UOP-SS9		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/9/2010 10:10	11400	2.7	90	139	10 U	20.4	12	6
1		UOP-SS9		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/9/2010 10:35	14000	0.3	16	213	10 U	1.1	19	6
1		UOS-SS22		Soil		0	0.5	feet	TOTAL	mg/kg	8/11/2010 8:50	11800	67	307	163	10 U	124	18	9

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		UOS-SS22		Soil		0	0.5	feet	TOTAL	mg/kg	8/4/2010 7:50	12100	44.6	214	146	10 U	110	18	9
1		UOS-SS8		Soil		0	0.5	feet	TOTAL	mg/kg	8/4/2010 8:10	11500	0.9	10	117	10 U	5.9	13	5
1		UOS-SS8		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/4/2010 8:25	7360	266	1560	309	10 U	557	15	54
1		UOS-SS8		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/4/2010 8:40	6380	107	799	170	10 U	185	12	16
1		UPS-SS11		Soil		0	0.5	feet	TOTAL	mg/kg	8/6/2010 9:00	11400	77.4	313	797	10 U	57.4	26	9
1		UPS-SS11		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/6/2010 9:20	9530	14	259	1390	10 U	36.5	22	12
1		UPS-SS11		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/6/2010 9:35	11600	10.7	284	838	10 U	33.2	8	23
1		UPS-SS12		Soil		0	0.5	feet	TOTAL	mg/kg	8/5/2010 11:45	7890	163	1020	608	10 U	204	22	43
1		UPS-SS12		Soil		0.5	1.33	feet	UNKNOWN	mg/kg	8/5/2010 12:00	8000	222	1600	715	10 U	188	29	36
1		UPS-SS9		Soil		0	0.5	feet	TOTAL	mg/kg	8/5/2010 8:00	7310	38.8	182	100 U	10 U	74.2	12	6
1		UPS-SS9		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/5/2010 8:15	8100	35	215	134	10 U	70.9	10	5
1		UPS-SS9		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/5/2010 8:30	6540	3.6	30	100 U	10 U	5.7	11	4
1		ACP1	ACP1-A	Soil	SW6010B	0	0.33	feet			10/27/2008 13:45	5090							
1		ACP1	ACP1-A	Soil	SW6020	0	0.33	feet			10/27/2008 13:45		65	302	111	5 U	385	31	21
1		ACP1	ACP1-A	Soil	SW7471A	0	0.33	feet			10/27/2008 13:45								
1		ACP1	ACP1-B	Soil	SW6010B	0.33	1	feet			10/27/2008 13:50			109			37		
1		ACP1	ACP1-C	Soil	SW6010B	1	2	feet			10/27/2008 13:52			413			435		
1		ACP1	ACP1-D	Soil	SW6010B	2	4	feet			10/27/2008 13:54			52			11		
1		ACP1	ACP1-E	Soil	SW6010B	4	6	feet			10/27/2008 13:57			71			27		
1		ACP1	ACP1-F	Soil	SW6010B	6	8	feet			10/27/2008 13:59			33			19		
1		ACP1	ACP1-G	Soil	SW6010B	8	10	feet			10/27/2008 14:08			32			20		
1		ACP1	ACP1-H	Soil	SW6010B	10	12	feet			10/27/2008 14:15			27			4		
1		ACP1	ACP1-I	Soil	SW6010B	12	15	feet			10/27/2008 14:22	6350					10		
1		ACP1	ACP1-I	Soil	SW6020	12	15	feet			10/27/2008 14:22		5 U	21	84	5 U		9	5
1		ACP1	ACP1-I	Soil	SW7471A	12	15	feet			10/27/2008 14:22								
1		ACP2	ACP2-A	Soil	SW6010B	0	0.33	feet			10/27/2008 14:40	7430					160		
1		ACP2	ACP2-A	Soil	SW6020	0	0.33	feet			10/27/2008 14:40		64	1000	308	5 U		19	13
1		ACP2	ACP2-A	Soil	SW7471A	0	0.33	feet			10/27/2008 14:40								
1		ACP2	ACP2-B	Soil	SW6010B	0.33	1	feet			10/27/2008 14:44			50			25		
1		ACP2	ACP2-C	Soil	SW6010B	1	2	feet			10/27/2008 14:46			27			1		
1		ACP2	ACP2-D	Soil	SW6010B	2	4	feet			10/27/2008 14:48			24			1		
1		ACP2	ACP2-E	Soil	SW6010B	4	6	feet			10/27/2008 14:50			31			3		
1		ACP2	ACP2-F	Soil	SW6010B	6	8	feet			10/27/2008 14:53			39			1		
1		ACP2	ACP2-G	Soil	SW6010B	8	10	feet			10/27/2008 14:55			30			1 U		
1		ACP2	ACP2-H	Soil	SW6010B	10	12	feet			10/27/2008 14:59			22			1 U		
1		ACP2	ACP2-I	Soil	SW6010B	12	15	feet			10/27/2008 15:09	9540		31					
1		ACP2	ACP2-I	Soil	SW6020	12	15	feet			10/27/2008 15:09		5 U		50	5 U	1 U	14	6
1		ACP2	ACP2-I	Soil	SW7471A	12	15	feet			10/27/2008 15:09								
1		ACP2	ACP2-I2	Soil	SW6010B	12	15	feet			10/27/2008 15:11	12000							
1		ACP2	ACP2-I2	Soil	SW6020	12	15	feet			10/27/2008 15:11		5 U	28	86	5 U	1 U	17	8
1		ACP2	ACP2-I2	Soil	SW7471A	12	15	feet			10/27/2008 15:11								
1		AP-1	AP-1	Soil	SW6010B	0	0	feet			12/12/2006 12:20								
1		AP-1	AP-1	Soil	SW6020	0	0	feet			12/12/2006 12:20			1150			226		
1		AP-10	AP-10	Soil	SW6010B	0	0	feet			12/12/2006 10:50			2160			632		
1		AP-11	AP-11	Soil	SW6010B	0	0	feet			12/12/2006 10:40			2130			1190		
1		AP-12	AP-12	Soil	SW6010B	0	0	feet			12/12/2006 10:30			3720			1690		
1		AP-13	AP-13	Soil	SW6010B	0	0	feet			12/12/2006 10:20			1740			732		
1		AP-14	AP-14	Soil	SW6010B	0	0	feet			12/12/2006 10:10			10600			4550		
1		AP-15	AP-15	Soil	SW6010B	0	0	feet			12/12/2006 10:00			908			449		
1		AP-16	AP-16	Soil	SW6010B	0	0	feet			12/12/2006 9:50			1240			544		
1		AP-17	AP-17	Soil	SW6010B	0	0	feet			12/12/2006 9:40			1650			843		
1		AP-18	AP-18	Soil	SW6010B	0	0	feet			12/12/2006 9:30			729			382		
1		AP-19	AP-19	Soil	SW6010B	0	0	feet			12/12/2006 9:20			1160			581		
1		AP-2	AP-2	Soil	SW6010B	0	0	feet			12/12/2006 12:10			2680			1020		
1		AP-3	AP-3	Soil	SW6010B	0	0	feet			12/12/2006 12:00			1610			836		
1		AP-4	AP-4	Soil	SW6010B	0	0	feet			12/12/2006 11:50			764			527		
1		AP-5	AP-5	Soil	SW6010B	0	0	feet			12/12/2006 11:40			4670			3080		
1		AP-6	AP-6	Soil	SW6010B	0	0	feet			12/12/2006 11:30			2170			2300		
1		AP-7	AP-7	Soil	SW6010B	0	0	feet			12/12/2006 11:20			1130			869		
1		AP-8	AP-8	Soil	SW6010B	0	0	feet			12/12/2006 11:10			1910			1060		
1		AP-9	AP-9	Soil	SW6010B	0	0	feet			12/12/2006 11:00			548			412		
1		APSD-11	APSD-11-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			850			244		
1		APSD-11	APSD-11-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			1266			329		
1		APSD-11	APSD-11-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			81			9		
1		APSD-11	APSD-11-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			217			37		
1		APSD-11	APSD-11-5	Soil	EDXRF	8	10	feet			10/20/1993 0:00			130			24		
1		APSD-11	APSD-11-6	Soil	EDXRF	10	12	feet			10/20/1993 0:00			112			11		
1		APSD-11	APSD-11-7	Soil	EDXRF	12	14	feet			10/20/1993 0:00			59			6		
1		APSD-12	APSD-12-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			881			158		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		APSD-12	APSD-12-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			738			396		
1		APSD-12	APSD-12-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			191			49		
1		APSD-12	APSD-12-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			68			24		
1		APSD-12	APSD-12-6	Soil	EDXRF	10	12	feet			10/20/1993 0:00			94			24		
1		APSD-12	APSD-12-7	Soil	EDXRF	12	14	feet			10/20/1993 0:00			80			7		
1		APSD-13	APSD-13-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			7433			111		
1		APSD-13	APSD-13-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			7443			107		
1		APSD-13	APSD-13-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			7551			130		
1		APSD-13	APSD-13-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			5952			127		
1		APSD-13	APSD-13-5	Soil	EDXRF	8	10	feet			10/25/1993 0:00			5167			102		
1		APSD-13	APSD-13-6	Soil	EDXRF	10	12	feet			10/25/1993 0:00			5757			81		
1		APSD-13	APSD-13-7	Soil	EDXRF	12	14	feet			10/25/1993 0:00			7194			113		
1		APSD-13	APSD-13-8	Soil	EDXRF	14	16	feet			10/25/1993 0:00			2724			101		
1		APSD-13	APSD-13-9	Soil	EDXRF	16	18	feet			10/25/1993 0:00			2324			172		
1		APSD-13	APSD-13-10	Soil	EDXRF	18	19	feet			10/25/1993 0:00			1233			165		
1		APSD-13	APSD-13-11	Soil	EDXRF	19	21	feet			10/25/1993 0:00			1760			176		
1		APSD-13	APSD-13-12	Soil	EDXRF	21	23	feet			10/25/1993 0:00			945			263		
1		APSD-14	APSD-14-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			3379			99		
1		APSD-14	APSD-14-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			15778			349		
1		APSD-14	APSD-14-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			9319			485		
1		APSD-14	APSD-14-5	Soil	EDXRF	8	10	feet			10/20/1993 0:00			10686			489		
1		APSD-14	APSD-14-7	Soil	EDXRF	12	14	feet			10/20/1993 0:00			13842			509		
1		APSD-14	APSD-14-8	Soil	EDXRF	14	16	feet			10/20/1993 0:00			1232			965		
1		APSD-7	APSD-7-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			1256			336		
1		APSD-7	APSD-7-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			293			152		
1		APSD-7	APSD-7-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			202			50		
1		APSD-7	APSD-7-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			378			46		
1		APSD-7	APSD-7-8	Soil	EDXRF	10	16	feet			10/20/1993 0:00			443			47		
1		APSD-8	APSD-8-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			509			116		
1		APSD-8	APSD-8-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			352			19		
1		APSD-8	APSD-8-5	Soil	EDXRF	8	10	feet			10/20/1993 0:00			320			32		
1		APSD-8	APSD-8-6	Soil	EDXRF	10	12	feet			10/20/1993 0:00			326			16		
1		APSD-8	APSD-8-7	Soil	EDXRF	12	14	feet			10/20/1993 0:00			93			1		
1		APSD-8	APSD-8-8	Soil	EDXRF	14	16	feet			10/20/1993 0:00			68			2		
1		BFB1	BFB1-A	Soil	SW6010B	0	0.33	feet			10/23/2008 15:02	11600		930	124	5 U	1790	16	6
1		BFB1	BFB1-A	Soil	SW6020	0	0.33	feet			10/23/2008 15:02		5 U						
1		BFB1	BFB1-A	Soil	SW7471A	0	0.33	feet			10/23/2008 15:02								
1		BFB1	BFB1-B	Soil	SW6010B	0.33	1	feet			10/23/2008 15:05			15			6		
1		BFB1	BFB1-C	Soil	SW6010B	1	2	feet			10/23/2008 15:07			5 U			3		
1		BFB1	BFB1-D	Soil	SW6010B	2	4	feet			10/23/2008 15:09			5 U			3		
1		BFB1	BFB1-E	Soil	SW6010B	4	6	feet			10/23/2008 15:11			8			4		
1		BFB1	BFB1-F	Soil	SW6010B	6	8	feet			10/23/2008 15:12			14			3		
1		BFB1	BFB1-G	Soil	SW6010B	8	10	feet			10/23/2008 15:14			38			8		
1		BFB1	BFB1-H	Soil	SW6010B	10	12	feet			10/23/2008 15:16			15			8		
1		BFB1	BFB1-I	Soil	SW6010B	12	15	feet			10/23/2008 15:30	8090		26	34	5 U		23	9
1		BFB1	BFB1-I	Soil	SW6020	12	15	feet			10/23/2008 15:30		5 U				1 U		
1		BFB1	BFB1-I	Soil	SW7471A	12	15	feet			10/23/2008 15:30								
1		BFB2	BFB2-A	Soil	SW6010B	0	0.33	feet			10/23/2008 15:48	13700		2890	150	5 U	2720	16	12
1		BFB2	BFB2-A	Soil	SW6020	0	0.33	feet			10/23/2008 15:48		36						
1		BFB2	BFB2-A	Soil	SW7471A	0	0.33	feet			10/23/2008 15:48								
1		BFB2	BFB2-B	Soil	SW6010B	0.33	1	feet			10/23/2008 15:50			1370			202		
1		BFB2	BFB2-C	Soil	SW6010B	1	2	feet			10/23/2008 15:52			742			148		
1		BFB2	BFB2-D	Soil	SW6010B	2	4	feet			10/23/2008 15:53			192			10		
1		BFB2	BFB2-D2	Soil	SW6010B	2	4	feet			10/23/2008 15:54			252			12		
1		BFB2	BFB2-E	Soil	SW6010B	4	6	feet			10/23/2008 15:55			128			3		
1		BFB2	BFB2-F	Soil	SW6010B	6	8	feet			10/23/2008 15:56			105			3		
1		BFB2	BFB2-G	Soil	SW6010B	8	10	feet			10/23/2008 15:58			87			3		
1		BFB2	BFB2-H	Soil	SW6010B	10	12	feet			10/23/2008 16:00			135			3		
1		BFB2	BFB2-I	Soil	SW6010B	12	15	feet			10/23/2008 16:05	13800			136	5 U		14	6
1		BFB2	BFB2-I	Soil	SW6020	12	15	feet			10/23/2008 16:05		5 U	130			1 U		
1		BFB2	BFB2-I	Soil	SW7471A	12	15	feet			10/23/2008 16:05								
1		BFB3	BFB3-A	Soil	SW6010B	0	0.33	feet			10/23/2008 16:19	14100		1850	300	5 U	762	15	6
1		BFB3	BFB3-A	Soil	SW6020	0	0.33	feet			10/23/2008 16:19		5 U						
1		BFB3	BFB3-A	Soil	SW7471A	0	0.33	feet			10/23/2008 16:19								
1		BFB3	BFB3-B	Soil	SW6010B	0.33	1	feet			10/23/2008 16:21			23			4		
1		BFB3	BFB3-B2	Soil	SW6010B	0.33	1	feet			10/23/2008 16:22			21			1		
1		BFB3	BFB3-C	Soil	SW6010B	1	2	feet			10/23/2008 16:23			34			9		
1		BFB3	BFB3-D	Soil	SW6010B	2	4	feet			10/23/2008 16:24			13			2		
1		BFB3	BFB3-E	Soil	SW6010B	4	6	feet			10/23/2008 16:25			22			2		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		BFB3	BFB3-F	Soil	SW6010B	6	8	feet			10/23/2008 16:27			12			3		
1		BFB3	BFB3-G	Soil	SW6010B	8	10	feet			10/23/2008 16:29			72			17		
1		BFB3	BFB3-H	Soil	SW6010B	10	12	feet			10/23/2008 16:32			19			5		
1		BFB3	BFB3-I	Soil	SW6010B	12	15	feet			10/23/2008 16:38	4960				5 U			
1		BFB3	BFB3-I	Soil	SW6020	12	15	feet			10/23/2008 16:38		5 U	7	42		3	13	5 U
1		BFB3	BFB3-I	Soil	SW7471A	12	15	feet			10/23/2008 16:38								
1		BFB4	BFB4-A	Soil	SW6010B	0	0.33	feet			10/24/2008 8:15	4600	121	1760	189	5 U	17300		
1		BFB4	BFB4-A	Soil	SW6020	0	0.33	feet			10/24/2008 8:15							13	14
1		BFB4	BFB4-A	Soil	SW7471A	0	0.33	feet			10/24/2008 8:15								
1		BFB4	BFB4-B	Soil	SW6010B	0.33	1	feet			10/24/2008 8:17			1170			6820		
1		BFB4	BFB4-C	Soil	SW6010B	1	2	feet			10/24/2008 8:20			3440			9200		
1		BFB4	BFB4-D	Soil	SW6010B	2	4	feet			10/24/2008 8:21			121			314		
1		BFB4	BFB4-E	Soil	SW6010B	4	6	feet			10/24/2008 8:23			135			408		
1		BFB4	BFB4-F	Soil	SW6010B	6	8	feet			10/24/2008 8:26			225			960		
1		BFB4	BFB4-G	Soil	SW6010B	8	10	feet			10/24/2008 8:27			17			20		
1		BFB4	BFB4-H	Soil	SW6010B	10	12	feet			10/24/2008 8:30			17			24		
1		BFB4	BFB4-I	Soil	SW6010B	12	15	feet			10/24/2008 8:35	7730							
1		BFB4	BFB4-I	Soil	SW6020	12	15	feet			10/24/2008 8:35		5 U	8	60	5 U	3	13	5 U
1		BFB4	BFB4-I	Soil	SW7471A	12	15	feet			10/24/2008 8:35								
1		BFB5	BFB5-A	Soil	SW6010B	0	0.33	feet			10/24/2008 9:04	8810	102	3520	180		5270		
1		BFB5	BFB5-A	Soil	SW6020	0	0.33	feet			10/24/2008 9:04					5 U		14	10
1		BFB5	BFB5-A	Soil	SW7471A	0	0.33	feet			10/24/2008 9:04								
1		BFB5	BFB5-B	Soil	SW6010B	0.33	1	feet			10/24/2008 9:07			462			1030		
1		BFB5	BFB5-C	Soil	SW6010B	1	2	feet			10/24/2008 9:08			1220			789		
1		BFB5	BFB5-D	Soil	SW6010B	2	4	feet			10/24/2008 9:10			1030			1290		
1		BFB5	BFB5-E	Soil	SW6010B	4	6	feet			10/24/2008 9:13			50			4		
1		BFB5	BFB5-F	Soil	SW6010B	6	8	feet			10/24/2008 9:14			65			101		
1		BFB5	BFB5-F2	Soil	SW6010B	6	8	feet			10/24/2008 9:15			71			247		
1		BFB5	BFB5-G	Soil	SW6010B	8	10	feet			10/24/2008 9:17			29			5		
1		BFB5	BFB5-H	Soil	SW6010B	10	12	feet			10/24/2008 9:24			24			4		
1		BFB5	BFB5-I	Soil	SW6010B	12	15	feet			10/24/2008 9:29	8800		39			29		
1		BFB5	BFB5-I	Soil	SW6020	12	15	feet			10/24/2008 9:29		5 U		66	5 U		13	6
1		BFB5	BFB5-I	Soil	SW7471A	12	15	feet			10/24/2008 9:29								
1		BLF1	BLF1-A	Soil	SW6010B	0	0.33	feet			10/27/2008 15:20	7820	153	3580	114		9680		
1		BLF1	BLF1-A	Soil	SW6020	0	0.33	feet			10/27/2008 15:20					5 U		15	11
1		BLF1	BLF1-A	Soil	SW7471A	0	0.33	feet			10/27/2008 15:20								
1		BLF1	BLF1-B	Soil	SW6010B	0.33	1	feet			10/27/2008 15:23			145			873		
1		BLF1	BLF1-C	Soil	SW6010B	1	2	feet			10/27/2008 15:26			55			220		
1		BLF1	BLF1-D	Soil	SW6010B	2	4	feet			10/27/2008 15:29			56			194		
1		BLF1	BLF1-E	Soil	SW6010B	4	6	feet			10/27/2008 15:32			62			290		
1		BLF1	BLF1-F	Soil	SW6010B	6	8	feet			10/27/2008 15:36			82			523		
1		BLF1	BLF1-G	Soil	SW6010B	8	10	feet			10/27/2008 15:42			25			29		
1		BLF1	BLF1-H	Soil	SW6010B	10	12	feet			10/27/2008 15:47			23			95		
1		BLF1	BLF1-I	Soil	SW6010B	12	15	feet			10/27/2008 15:55	10300		19		5 U	7		
1		BLF1	BLF1-I	Soil	SW6020	12	15	feet			10/27/2008 15:55		5 U		220			12	12
1		BLF1	BLF1-I	Soil	SW7471A	12	15	feet			10/27/2008 15:55								
1		BLF2	BLF2-A	Soil	SW6010B	0	0.33	feet			10/27/2008 16:10	9490		1100					
1		BLF2	BLF2-A	Soil	SW6020	0	0.33	feet			10/27/2008 16:10		20		172	5 U	894	12	7
1		BLF2	BLF2-A	Soil	SW7471A	0	0.33	feet			10/27/2008 16:10								
1		BLF2	BLF2-B	Soil	SW6010B	0.33	1	feet			10/27/2008 16:15			1500			1550		
1		BLF2	BLF2-B2	Soil	SW6010B	0.33	1	feet			10/27/2008 16:16			1590			1610		
1		BLF2	BLF2-C	Soil	SW6010B	1	2	feet			10/27/2008 16:17			2200			1920		
1		BLF2	BLF2-D	Soil	SW6010B	2	4	feet			10/27/2008 16:19			757			312		
1		BLF2	BLF2-E	Soil	SW6010B	4	6	feet			10/27/2008 16:20			1020			508		
1		BLF2	BLF2-F	Soil	SW6010B	6	8	feet			10/27/2008 16:23			2250			753		
1		BLF2	BLF2-G	Soil	SW6010B	8	10	feet			10/27/2008 16:28			740			290		
1		BLF2	BLF2-H	Soil	SW6010B	10	12	feet			10/27/2008 16:32			1420			541		
1		BLF2	BLF2-I	Soil	SW6010B	12	15	feet			10/27/2008 16:39	8400					160		
1		BLF2	BLF2-I	Soil	SW6020	12	15	feet			10/27/2008 16:39		5 U	649	71	5 U		10	5 U
1		BLF2	BLF2-I	Soil	SW7471A	12	15	feet			10/27/2008 16:39								
1		BLF3	BLF3-A	Soil	SW6010B	0	0.33	feet			10/28/2008 8:10	7660		2400					
1		BLF3	BLF3-A	Soil	SW6020	0	0.33	feet			10/28/2008 8:10		37		191	5 U	648	8	5
1		BLF3	BLF3-A	Soil	SW7471A	0	0.33	feet			10/28/2008 8:10								
1		BLF3	BLF3-B	Soil	SW6010B	0.33	1	feet			10/28/2008 8:30			1330			1540		
1		BLF3	BLF3-C	Soil	SW6010B	1	2	feet			10/28/2008 8:32			907			1390		
1		BLF3	BLF3-D	Soil	SW6010B	2	4	feet			10/28/2008 8:35			901			404		
1		BLF3	BLF3-E	Soil	SW6010B	4	6	feet			10/28/2008 8:36	9100		217					
1		BLF3	BLF3-E	Soil	SW6020	4	6	feet			10/28/2008 8:36		12		640	5 U	83	5	5 U
1		BLF3	BLF3-E	Soil	SW7471A	4	6	feet			10/28/2008 8:36								

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		BLF4	BLF4-A	Soil	SW6010B	0	0.33	feet			10/28/2008 8:45	5430		1050					
1		BLF4	BLF4-A	Soil	SW6020	0	0.33	feet			10/28/2008 8:45		24		192	5 U	494	7	5
1		BLF4	BLF4-A	Soil	SW7471A	0	0.33	feet			10/28/2008 8:45								
1		BLF4	BLF4-B	Soil	SW6010B	0.33	1	feet			10/28/2008 8:50			125			6		
1		BLF4	BLF4-C	Soil	SW6010B	1	2	feet			10/28/2008 8:52			111			3		
1		BLF4	BLF4-D	Soil	SW6010B	2	4	feet			10/28/2008 8:55	3510		33					
1		BLF4	BLF4-D	Soil	SW6020	2	4	feet			10/28/2008 8:55		5 U		12	5 U	30	5 U	5 U
1		BLF4	BLF4-D	Soil	SW7471A	2	4	feet			10/28/2008 8:55								
1		BLF5	BLF5-G	Soil	SW6010B	0	0	feet			10/28/2008 9:39	12400		69					
1		BLF5	BLF5-G	Soil	SW6020	0	0	feet			10/28/2008 9:39		5 U		129	5 U	1	15	6
1		BLF5	BLF5-G	Soil	SW7471A	0	0	feet			10/28/2008 9:39								
1		BLF5	BLF5-A	Soil	SW6010B	0	0.33	feet			10/28/2008 9:25	8800							
1		BLF5	BLF5-A	Soil	SW6020	0	0.33	feet			10/28/2008 9:25		18	797	545	5 U	172	6	5 U
1		BLF5	BLF5-A	Soil	SW7471A	0	0.33	feet			10/28/2008 9:25								
1		BLF5	BLF5-B	Soil	SW6010B	0.33	1	feet			10/28/2008 9:28			28			15		
1		BLF5	BLF5-C	Soil	SW6010B	1	2	feet			10/28/2008 9:31			17			5		
1		BLF5	BLF5-D	Soil	SW6010B	2	4	feet			10/28/2008 9:33			25			29		
1		BLF5	BLF5-E	Soil	SW6010B	4	6	feet			10/28/2008 9:35			14			4		
1		BLF5	BLF5-E2	Soil	SW6010B	6	8	feet			10/28/2008 9:37			8			6		
1		BLF5	BLF5-F	Soil	SW6010B	8	10	feet			10/28/2008 9:36			546			34		
1		BLF6	BLF6-A	Soil	SW6010B	0	0	feet			10/28/2008 9:52	12100							
1		BLF6	BLF6-A	Soil	SW6020	0	0	feet			10/28/2008 9:52		17	680	874	5 U	526	14	9
1		BLF6	BLF6-A	Soil	SW7471A	0	0	feet			10/28/2008 9:52								
1		BLF6	BLF6-B	Soil	SW6010B	0	0	feet			10/28/2008 9:54			247			700		
1		BLF6	BLF6-C	Soil	SW6010B	0	0	feet			10/28/2008 9:56			900			483		
1		BLF6	BLF6-D	Soil	SW6010B	0	0	feet			10/28/2008 9:58			389			110		
1		BLF6	BLF6-E	Soil	SW6010B	0	0	feet			10/28/2008 10:00	2060							
1		BLF6	BLF6-E	Soil	SW6020	0	0	feet			10/28/2008 10:00		5 U	646	28	5 U	53	5 U	5 U
1		BLF6	BLF6-E	Soil	SW7471A	0	0	feet			10/28/2008 10:00								
1		BLF7	BLF7-A	Soil	SW6010B	0	0.33	feet			10/28/2008 10:10	6700	110	1720	380		2200		
1		BLF7	BLF7-A	Soil	SW6020	0	0.33	feet			10/28/2008 10:10					5 U		17	29
1		BLF7	BLF7-A	Soil	SW7471A	0	0.33	feet			10/28/2008 10:10								
1		BLF7	BLF7-B	Soil	SW6010B	0.33	1	feet			10/28/2008 10:12			1520			456		
1		BLF7	BLF7-C	Soil	SW6010B	1	2	feet			10/28/2008 10:14			29400			11200		
1		BLF7	BLF7-C2	Soil	SW6010B	2	4	feet			10/28/2008 10:16			23700			10100		
1		BLF7	BLF7-D	Soil	SW6010B	2	4	feet			10/28/2008 10:15			1600			216		
1		BLF7	BLF7-E	Soil	SW6010B	4	6	feet			10/28/2008 10:17			1720			91		
1		BLF7	BLF7-F	Soil	SW6010B	6	8	feet			10/28/2008 10:20			887			152		
1		BLF7	BLF7-G	Soil	SW6010B	8	10	feet			10/28/2008 10:23			1220			260		
1		BLF7	BLF7-H	Soil	SW6010B	10	12	feet			10/28/2008 10:35			652			580		
1		BLF7	BLF7-I	Soil	SW6010B	12	15	feet			10/28/2008 10:44	4670		186			137		
1		BLF7	BLF7-I	Soil	SW6020	12	15	feet			10/28/2008 10:44		5 U		58	5 U		6	5 U
1		BLF7	BLF7-I	Soil	SW7471A	12	15	feet			10/28/2008 10:44								
1		DH-30	IMMS-9910-270	Soil	EDXRF	1	3	feet			11/20/1999 0:00			1288			234		
1		DH-30	IMMS-9910-271	Soil	EDXRF	3.5	5.5	feet			11/20/1999 0:00			6739			3011		
1		DH-30	IMMS-9910-272	Soil	EDXRF	8	10	feet			11/20/1999 0:00			754			1465		
1		DH-30	IMMS-9910-273	Soil	EDXRF	10	12	feet			11/20/1999 0:00			731			1081		
1		DH-30	IMMS-9910-274	Soil	EDXRF	15	17	feet			11/21/1999 0:00			160			1686		
1		DH-30	IMMS-9910-275	Soil	EDXRF	20	22	feet			11/21/1999 0:00			502			610		
1		DH-31	IMMS-9910-195	Soil	EDXRF	0	1.5	feet			10/26/1999 0:00			8967			221		
1		DH-31	IMMS-9910-196	Soil	EDXRF	2	4	feet			10/26/1999 0:00			724			35		
1		DH-31	IMMS-9910-197	Soil	EDXRF	4	6.5	feet			10/26/1999 0:00			3906			85		
1		DH-31	IMMS-9910-199	Soil	EDXRF	8	10	feet			11/1/1999 0:00			296			10 U		
1		DH-31	IMMS-9910-200	Soil	EDXRF	10	12	feet			11/1/1999 0:00			335			10 U		
1		DH-31	IMMS-9910-201	Soil	EDXRF	15	17	feet			11/1/1999 0:00			370			10 U		
1		DH-31	IMMS-9910-202	Soil	EDXRF	20	22	feet			11/1/1999 0:00		0.001 U	0.081	0.023	0.001 U	0.001 U	0.0078	0.005 U
1		DH-31	IMMS-9910-203	Soil	EDXRF	25	27	feet			11/3/1999 0:00			159			274		
1		DH-32	IMMS-9910-167	Soil	EDXRF	0	2	feet			10/22/1999 0:00			494			28		
1		DH-32	IMMS-9910-168	Soil	EDXRF	2	4	feet			10/22/1999 0:00			19			10 U		
1		DH-32	IMMS-9910-169	Soil	EDXRF	4	6	feet			10/22/1999 0:00			15			10 U		
1		DH-32	IMMS-9910-170	Soil	EDXRF	6	8	feet			10/22/1999 0:00			25			10 U		
1		DH-32	IMMS-9910-171	Soil	EDXRF	8	10	feet			10/22/1999 0:00			39			10 U		
1		DH-32	IMMS-9910-172	Soil	EDXRF	10	12	feet			10/22/1999 0:00			14			10 U		
1		DH-32	IMMS-9910-173	Soil	EDXRF	15	17	feet			10/22/1999 0:00			13			10 U		
1		DH-32	IMMS-9910-174	Soil	EDXRF	20	22	feet			10/22/1999 0:00			19			10 U		
1		DH-32	IMMS-9910-175	Soil	EDXRF	25	27	feet			10/22/1999 0:00			391			245		
1		DH-33	IMMS-9910-213	Soil	EDXRF	0	2	feet			11/5/1999 0:00			139			11		
1		DH-33	IMMS-9910-214	Soil	EDXRF	2	4	feet			11/5/1999 0:00			65			10 U		
1		DH-33	IMMS-9910-215	Soil	EDXRF	4	6	feet			11/5/1999 0:00			43			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		DH-33	IMMS-9910-216	Soil	EDXRF	6	8	feet			11/5/1999 0:00			28			10 U		
1		DH-33	IMMS-9910-217	Soil	EDXRF	8	10	feet			11/6/1999 0:00			33			10 U		
1		DH-33	IMMS-9910-218	Soil	EDXRF	12.5	14.2	feet			11/6/1999 0:00			14			10 U		
1		DH-33	IMMS-9910-219	Soil	EDXRF	15	17	feet			11/6/1999 0:00			13			10 U		
1		DH-33	IMMS-9910-220	Soil	EDXRF	20	22	feet			11/6/1999 0:00			11			10 U		
1		DH-33	IMMS-9910-221	Soil	EDXRF	30	32	feet			11/6/1999 0:00			456			51		
1		DH-34	IMMS-9910-204	Soil	EDXRF	0	2	feet			11/4/1999 0:00			1399			59		
1		DH-34	IMMS-9910-205	Soil	EDXRF	2	4	feet			11/4/1999 0:00			418			18		
1		DH-34	IMMS-9910-206	Soil	EDXRF	4	6	feet			11/4/1999 0:00			323			10 U		
1		DH-34	IMMS-9910-207	Soil	EDXRF	6	8	feet			11/4/1999 0:00			108			10 U		
1		DH-34	IMMS-9910-208	Soil	EDXRF	8	10	feet			11/4/1999 0:00			98			10 U		
1		DH-34	IMMS-9910-209	Soil	EDXRF	10	12	feet			11/4/1999 0:00			201			10 U		
1		DH-34	IMMS-9910-210	Soil	EDXRF	15	17	feet			11/4/1999 0:00			201			10 U		
1		DH-34	IMMS-9910-211	Soil	EDXRF	20	22	feet			11/4/1999 0:00			232			10 U		
1		DH-34	IMMS-9910-212	Soil	EDXRF	25	27	feet			11/4/1999 0:00			574			10 U		
1		DH-35	IMMS-9910-186	Soil	EDXRF	0	2	feet			10/25/1999 0:00			2346			538		
1		DH-35	IMMS-9910-187	Soil	EDXRF	2	4	feet			10/25/1999 0:00			1491			445		
1		DH-35	IMMS-9910-188	Soil	EDXRF	4	6	feet			10/25/1999 0:00			91			10 U		
1		DH-35	IMMS-9910-189	Soil	EDXRF	6	8	feet			10/25/1999 0:00			222			10 U		
1		DH-35	IMMS-9910-190	Soil	EDXRF	8	10	feet			10/25/1999 0:00			83			10 U		
1		DH-35	IMMS-9910-191	Soil	EDXRF	10	12	feet			10/25/1999 0:00			72			10 U		
1		DH-35	IMMS-9910-192	Soil	EDXRF	15	17	feet			10/25/1999 0:00			90			10 U		
1		DH-35	IMMS-9910-193	Soil	EDXRF	20	22	feet			10/25/1999 0:00			128			57		
1		DH-35	IMMS-9910-194	Soil	EDXRF	25	27	feet			10/26/1999 0:00			221			567		
1		DH-36	IMMS-9910-143	Soil	EDXRF	0.5	2	feet			10/11/1999 0:00			447			34		
1		DH-36	IMMS-9910-144	Soil	EDXRF	2	2.2	feet			10/11/1999 0:00			23			10 U		
1		DH-36	IMMS-9910-145	Soil	EDXRF	4	6	feet			10/12/1999 0:00			27			10 U		
1		DH-36	IMMS-9910-146	Soil	EDXRF	6	8	feet			10/12/1999 0:00			21			10 U		
1		DH-36	IMMS-9910-147	Soil	EDXRF	15	16	feet			10/12/1999 0:00			10 U			10 U		
1		DH-36	IMMS-9910-148	Soil	EDXRF	22	24	feet			10/12/1999 0:00			88			10 U		
1		DH-36	IMMS-9910-149	Soil	EDXRF	24	26	feet			10/12/1999 0:00			161			10 U		
1		DH-36	IMMS-9910-150	Soil	EDXRF	26	28	feet			10/12/1999 0:00			239			14		
1		DH-36	IMMS-9910-151	Soil	EDXRF	30	32	feet			10/12/1999 0:00			367			42		
1		DH-37	IMMS-9910-276	Soil	EDXRF	1	3	feet			11/21/1999 0:00			916			93		
1		DH-37	IMMS-9910-277	Soil	EDXRF	3	5	feet			11/21/1999 0:00			297			17		
1		DH-37	IMMS-9910-278	Soil	EDXRF	5	7	feet			11/21/1999 0:00			191			10 U		
1		DH-37	IMMS-9910-279	Soil	EDXRF	8	10	feet			11/21/1999 0:00			304			10 U		
1		DH-37	IMMS-9910-280	Soil	EDXRF	10	12	feet			11/21/1999 0:00			195			10 U		
1		DH-37	IMMS-9910-281	Soil	EDXRF	30	32	feet			11/21/1999 0:00			322			96		
1		DH-38	IMMS-9910-176	Soil	EDXRF	0	2	feet			10/23/1999 0:00			1906			347		
1		DH-38	IMMS-9910-177	Soil	EDXRF	2	4	feet			10/23/1999 0:00			72			227		
1		DH-38	IMMS-9910-178	Soil	EDXRF	4	6	feet			10/23/1999 0:00			259			36		
1		DH-38	IMMS-9910-179	Soil	EDXRF	6	8	feet			10/23/1999 0:00			130			28		
1		DH-38	IMMS-9910-180	Soil	EDXRF	8	10	feet			10/24/1999 0:00			346			120		
1		DH-38	IMMS-9910-181	Soil	EDXRF	10	12	feet			10/24/1999 0:00			146			10 U		
1		DH-38	IMMS-9910-182	Soil	EDXRF	15	17	feet			10/24/1999 0:00			173			10 U		
1		DH-38	IMMS-9910-183	Soil	EDXRF	20	22	feet			10/24/1999 0:00			680			10 U		
1		DH-38	IMMS-9910-184	Soil	EDXRF	25	27	feet			10/24/1999 0:00			519			533		
1		DH-38	IMMS-9910-185	Soil	EDXRF	30	32	feet			10/24/1999 0:00			187			903		
1		DH-39	IMMS-9910-310	Soil	EDXRF	1	3	feet			11/16/1999 0:00			386			426		
1		DH-39	IMMS-9910-311	Soil	EDXRF	3	5	feet			11/16/1999 0:00			131			17		
1		DH-39	IMMS-9910-312	Soil	EDXRF	5	7	feet			11/16/1999 0:00			13			10 U		
1		DH-39	IMMS-9910-313	Soil	EDXRF	9	11	feet			11/16/1999 0:00			14			10 U		
1		DH-39	IMMS-9910-314	Soil	EDXRF	11	13	feet			11/16/1999 0:00			18			10 U		
1		DH-39	IMMS-9910-315	Soil	EDXRF	15	16.5	feet			11/16/1999 0:00			12			10 U		
1		DH-39	IMMS-9910-316	Soil	EDXRF	20	21.5	feet			11/16/1999 0:00			13			10 U		
1		DH-39	IMMS-9910-317	Soil	EDXRF	25	26.5	feet			11/17/1999 0:00			14			10 U		
1		DH-39	IMMS-9910-318	Soil	EDXRF	30	31.5	feet			11/17/1999 0:00			10 U			10 U		
1		DH-39	IMMS-9910-319	Soil	EDXRF	35	36.5	feet			11/17/1999 0:00			10 U			10 U		
1		DH-40	IMMS-9910-251	Soil	EDXRF	1	2.5	feet			11/17/1999 0:00			1683			486		
1		DH-40	IMMS-9910-252	Soil	EDXRF	4	5.5	feet			11/17/1999 0:00			47			16		
1		DH-40	IMMS-9910-253	Soil	EDXRF	5.5	7	feet			11/17/1999 0:00			14			10 U		
1		DH-40	IMMS-9910-254	Soil	EDXRF	7	8.5	feet			11/18/1999 0:00			23			10 U		
1		DH-40	IMMS-9910-255	Soil	EDXRF	8.5	10	feet			11/18/1999 0:00			14			10 U		
1		DH-40	IMMS-9910-256	Soil	EDXRF	15	16.5	feet			11/18/1999 0:00			997			80		
1		DH-40	IMMS-9910-257	Soil	EDXRF	20	21.5	feet			11/18/1999 0:00			98			21		
1		DH-40	IMMS-9910-258	Soil	EDXRF	25	27	feet			11/18/1999 0:00			124			10 U		
1		DH-41	IMMS-9910-232	Soil	EDXRF	0.5	2	feet			11/9/1999 0:00			152			138		
1		DH-41	IMMS-9910-233	Soil	EDXRF	2	3.5	feet			11/9/1999 0:00			374			165		

Screening Level (mg/kg)												Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
												Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
												on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		DH-41	IMMS-9910-234	Soil	EDXRF	4	5.5	feet			11/9/1999 0:00			2088			270		
1		DH-41	IMMS-9910-235	Soil	EDXRF	6	7.5	feet			11/9/1999 0:00			895			56		
1		DH-41	IMMS-9910-236	Soil	EDXRF	8	9.5	feet			11/9/1999 0:00			1052			113		
1		DH-41	IMMS-9910-237	Soil	EDXRF	10	11.5	feet			11/9/1999 0:00			2223			10		
1		DH-41	IMMS-9910-238	Soil	EDXRF	15	16.5	feet			11/9/1999 0:00			1553			10 U		
1		DH-41	IMMS-9910-239	Soil	EDXRF	20	21.5	feet			11/9/1999 0:00			846			16		
1		DH-42	IMMS-9910-222	Soil	EDXRF	0	2	feet			11/7/1999 0:00			5595			709		
1		DH-42	IMMS-9910-223	Soil	EDXRF	2	4	feet			11/7/1999 0:00			9316			848		
1		DH-42	IMMS-9910-224	Soil	EDXRF	4	6	feet			11/7/1999 0:00			7040			781		
1		DH-42	IMMS-9910-225	Soil	EDXRF	6	8	feet			11/7/1999 0:00			2707			445		
1		DH-42	IMMS-9910-226	Soil	EDXRF	8	10	feet			11/7/1999 0:00			281			114		
1		DH-42	IMMS-9910-227	Soil	EDXRF	10	12	feet			11/7/1999 0:00			212			59		
1		DH-42	IMMS-9910-228	Soil	EDXRF	15	16.5	feet			11/8/1999 0:00			164			56		
1		DH-42	IMMS-9910-229	Soil	EDXRF	20	20.5	feet			11/8/1999 0:00			299			89		
1		DH-42	IMMS-9910-230	Soil	EDXRF	25	26.5	feet			11/8/1999 0:00			210			79		
1		DH-42	IMMS-9910-231	Soil	EDXRF	30	31.5	feet			11/8/1999 0:00			267			76		
1		DH-43	IMMS-9910-300	Soil	EDXRF	0.5	2	feet			11/15/1999 0:00			44			10		
1		DH-43	IMMS-9910-301	Soil	EDXRF	2	4	feet			11/15/1999 0:00			84			16		
1		DH-43	IMMS-9910-302	Soil	EDXRF	6	8	feet			11/15/1999 0:00			11			10 U		
1		DH-43	IMMS-9910-303	Soil	EDXRF	8	10	feet			11/15/1999 0:00			14			10 U		
1		DH-43	IMMS-9910-304	Soil	EDXRF	10	12	feet			11/15/1999 0:00			24			10 U		
1		DH-43	IMMS-9910-305	Soil	EDXRF	19	21	feet			11/15/1999 0:00			15			10 U		
1		DH-43	IMMS-9910-306	Soil	EDXRF	25	26.5	feet			11/15/1999 0:00			41			13		
1		DH-43	IMMS-9910-307	Soil	EDXRF	30	31.5	feet			11/15/1999 0:00			231			55		
1		DH-43	IMMS-9910-308	Soil	EDXRF	35	37	feet			11/16/1999 0:00			384			114		
1		DH-43	IMMS-9910-309	Soil	EDXRF	40	41	feet			11/16/1999 0:00			98			104		
1		DH-44	IMMS-9910-259	Soil	EDXRF	0	1.5	feet			11/18/1999 0:00			52			58		
1		DH-44	IMMS-9910-260	Soil	EDXRF	1.5	3	feet			11/18/1999 0:00			1354			300		
1		DH-44	IMMS-9910-261	Soil	EDXRF	4.5	6	feet			11/18/1999 0:00			19			10 U		
1		DH-44	IMMS-9910-262	Soil	EDXRF	6	7.5	feet			11/18/1999 0:00			18			10 U		
1		DH-44	IMMS-9910-263	Soil	EDXRF	8	9.5	feet			11/19/1999 0:00			15			10		
1		DH-44	IMMS-9910-264	Soil	EDXRF	10	11.5	feet			11/19/1999 0:00			38			10 U		
1		DH-44	IMMS-9910-266	Soil	EDXRF	15	17	feet			11/19/1999 0:00			33			10 U		
1		DH-44	IMMS-9910-267	Soil	EDXRF	20	21.5	feet			11/19/1999 0:00			250			82		
1		DH-44	IMMS-9910-268	Soil	EDXRF	25	26.5	feet			11/19/1999 0:00			119			243		
1		DH-44	IMMS-9910-269	Soil	EDXRF	30	31.5	feet			11/19/1999 0:00			21			10 U		
1		DH-45	IMMS-9910-240	Soil	EDXRF	0.5	2	feet			11/10/1999 0:00			2186			355		
1		DH-45	IMMS-9910-241	Soil	EDXRF	3	5	feet			11/10/1999 0:00			1194			118		
1		DH-45	IMMS-9910-242	Soil	EDXRF	5	7	feet			11/10/1999 0:00			2517			243		
1		DH-45	IMMS-9910-243	Soil	EDXRF	8	10	feet			11/12/1999 0:00			561			138		
1		DH-45	IMMS-9910-244	Soil	EDXRF	10	12	feet			11/12/1999 0:00			793			129		
1		DH-45	IMMS-9910-245	Soil	EDXRF	15	17	feet			11/12/1999 0:00			472			816		
1		DH-46	IMMS-9910-282	Soil	EDXRF	0.5	2.5	feet			11/23/1999 0:00			611			148		
1		DH-46	IMMS-9910-283	Soil	EDXRF	2.5	4.5	feet			11/23/1999 0:00			595			93		
1		DH-46	IMMS-9910-284	Soil	EDXRF	4.5	6.5	feet			11/23/1999 0:00			308			37		
1		DH-46	IMMS-9910-285	Soil	EDXRF	6.5	8.5	feet			11/23/1999 0:00			250			10 U		
1		DH-46	IMMS-9910-286	Soil	EDXRF	8.5	10.5	feet			11/23/1999 0:00			218			22		
1		DH-46	IMMS-9910-287	Soil	EDXRF	10.5	12.5	feet			11/23/1999 0:00			470			31		
1		DH-46	IMMS-9910-288	Soil	EDXRF	15	17	feet			11/23/1999 0:00			153			10 U		
1		DH-47	IMMS-9910-246	Soil	EDXRF	0.5	2.5	feet			11/15/1999 0:00			1294			298		
1		DH-47	IMMS-9910-247	Soil	EDXRF	2.5	4.5	feet			11/15/1999 0:00			4456			222		
1		DH-47	IMMS-9910-248	Soil	EDXRF	4.5	6.5	feet			11/15/1999 0:00			110			10 U		
1		DH-47	IMMS-9910-249	Soil	EDXRF	6.5	8.5	feet			11/15/1999 0:00			202			10 U		
1		DH-47	IMMS-9910-250	Soil	EDXRF	15	15.5	feet			11/15/1999 0:00			306			10 U		
1		DH-49	IMMS-9910-120	Soil	EDXRF	0	2	feet			10/9/1999 0:00			229			73		
1		DH-49	IMMS-9910-121	Soil	EDXRF	2	4	feet			10/9/1999 0:00			18			10 U		
1		DH-49	IMMS-9910-122	Soil	EDXRF	4	6	feet			10/9/1999 0:00			14			10 U		
1		DH-49	IMMS-9910-123	Soil	EDXRF	6	8	feet			10/9/1999 0:00			11			10 U		
1		DH-49	IMMS-9910-124	Soil	EDXRF	8	10	feet			10/9/1999 0:00			11			10 U		
1		DH-49	IMMS-9910-125	Soil	EDXRF	10	12	feet			10/9/1999 0:00			11			10 U		
1		DH-49	IMMS-9910-126	Soil	EDXRF	14	16	feet			10/9/1999 0:00			10			10 U		
1		DH-49	IMMS-9910-127	Soil	EDXRF	19	21	feet			10/9/1999 0:00			16			10 U		
1		DH-49	IMMS-9910-128	Soil	EDXRF	24	26	feet			10/9/1999 0:00			13			10 U		
1		DH-49	IMMS-9910-129	Soil	EDXRF	29	31	feet			10/9/1999 0:00			95			10 U		
1		DH-49	IMMS-9910-130	Soil	EDXRF	34	36	feet			10/9/1999 0:00			17			10 U		
1		DH-50	IMMS-9910-109	Soil	EDXRF	0	2	feet			10/7/1999 0:00			19			10 U		
1		DH-50	IMMS-9910-110	Soil	EDXRF	2	4	feet			10/7/1999 0:00			30			10 U		
1		DH-50	IMMS-9910-111	Soil	EDXRF	4	6	feet			10/7/1999 0:00			10			10 U		
1		DH-50	IMMS-9910-112	Soil	EDXRF	6	8	feet			10/7/1999 0:00			12			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		DH-50	IMMS-9910-113	Soil	EDXRF	8	10	feet			10/7/1999 0:00			20			10 U		
1		DH-50	IMMS-9910-114	Soil	EDXRF	11	13	feet			10/8/1999 0:00			27			10 U		
1		DH-50	IMMS-9910-115	Soil	EDXRF	14	16	feet			10/8/1999 0:00			12			10 U		
1		DH-50	IMMS-9910-116	Soil	EDXRF	19	21	feet			10/8/1999 0:00			10 U			10 U		
1		DH-50	IMMS-9910-117	Soil	EDXRF	24	26	feet			10/8/1999 0:00			12			10 U		
1		DH-50	IMMS-9910-118	Soil	EDXRF	29	31	feet			10/8/1999 0:00			47			10 U		
1		DH-50	IMMS-9910-119	Soil	EDXRF	34	36	feet			10/8/1999 0:00			236			10 U		
1		DH-51	IMMS-9910-100	Soil	EDXRF	0	2	feet			10/5/1999 0:00			190			53		
1		DH-51	IMMS-9910-101	Soil	EDXRF	2	4	feet			10/5/1999 0:00			177			43		
1		DH-51	IMMS-9910-102	Soil	EDXRF	4	6	feet			10/5/1999 0:00			152			69		
1		DH-51	IMMS-9910-103	Soil	EDXRF	6	7	feet			10/5/1999 0:00			102			10 U		
1		DH-51	IMMS-9910-104	Soil	EDXRF	8	10	feet			10/5/1999 0:00			217			10 U		
1		DH-51	IMMS-9910-105	Soil	EDXRF	10	12	feet			10/5/1999 0:00			149			10 U		
1		DH-51	IMMS-9910-106	Soil	EDXRF	14.5	16.5	feet			10/5/1999 0:00			96			10 U		
1		DH-51	IMMS-9910-107	Soil	EDXRF	24.5	26.5	feet			10/6/1999 0:00			16			10 U		
1		DH-51	IMMS-9910-108	Soil	EDXRF	29.5	31.2	feet			10/6/1999 0:00			21			10 U		
1		DH-52	IMMS-9910-160	Soil	EDXRF	0	2	feet			10/20/1999 0:00			338			20		
1		DH-52	IMMS-9910-161	Soil	EDXRF	2	4	feet			10/20/1999 0:00			99			10 U		
1		DH-52	IMMS-9910-162	Soil	EDXRF	4	6	feet			10/20/1999 0:00			122			10 U		
1		DH-52	IMMS-9910-163	Soil	EDXRF	6	8	feet			10/20/1999 0:00			104			10 U		
1		DH-52	IMMS-9910-164	Soil	EDXRF	8	10	feet			10/20/1999 0:00			78			10 U		
1		DH-52	IMMS-9910-165	Soil	EDXRF	10	12	feet			10/20/1999 0:00			123			10 U		
1		DH-52	IMMS-9910-166	Soil	EDXRF	15	17	feet			10/20/1999 0:00			121			10 U		
1		DH-53	IMMS-9910-152	Soil	EDXRF	0	2	feet			10/18/1999 0:00			44			10 U		
1		DH-53	IMMS-9910-152D	Soil	EDXRF	0.2	0.2	feet			10/18/1999 0:00			60			10 U		
1		DH-53	IMMS-9910-154	Soil	EDXRF	2	4	feet			10/18/1999 0:00			53			10 U		
1		DH-53	IMMS-9910-155	Soil	EDXRF	4	6	feet			10/18/1999 0:00			84			10 U		
1		DH-53	IMMS-9910-156	Soil	EDXRF	6	8	feet			10/19/1999 0:00			138			10 U		
1		DH-53	IMMS-9910-157	Soil	EDXRF	8	10	feet			10/19/1999 0:00			102			10 U		
1		DH-53	IMMS-9910-158	Soil	EDXRF	10	12	feet			10/19/1999 0:00			124			10 U		
1		DH-53	IMMS-9910-159	Soil	EDXRF	15	17	feet			10/19/1999 0:00			63			10 U		
1		DH-55	DH-55-1	Soil	Unknown	0	5	feet			6/15/2001 12:30			762			83		
1		DH-55	DH-55-2	Soil	Unknown	5	10	feet			6/15/2001 12:40			133			10 U		
1		DH-55	DH-55-3	Soil	Unknown	10	15	feet			6/15/2001 12:55			98			10 U		
1		DH-55	DH-55-4	Soil	Unknown	15	20	feet			6/15/2001 13:15			77			10 U		
1		DH-55	DH-55-5	Soil	Unknown	20	25	feet			6/15/2001 13:30			83			10 U		
1		DH-55	DH-55-6	Soil	Unknown	25	30	feet			6/15/2001 13:45			114			10 U		
1		DH-55	DH-55-7	Soil	Unknown	30	35	feet			6/15/2001 14:00			115			10 U		
1		DH-55	DH-55-8	Soil	Unknown	35	40	feet			6/15/2001 14:30			179			10 U		
1		DH-55	DH-55-9	Soil	Unknown	40	45	feet			6/15/2001 14:45			67			10 U		
1		DH-55	DH-55-10	Soil	Unknown	45	50	feet			6/15/2001 15:00			86			10 U		
1		DH-55	DH-55-11	Soil	Unknown	50	55	feet			6/15/2001 15:15			65			10 U		
1		DH-55	DH-55-12	Soil	Unknown	55	60	feet			6/15/2001 16:00			93			10 U		
1		DH-55	DH-55-13	Soil	Unknown	60	65	feet			6/15/2001 16:15			145			10 U		
1		DH-55	DH-55-14	Soil	Unknown	65	70	feet			6/15/2001 16:30			116			10 U		
1		DH-55	DH-55-15	Soil	Unknown	70	75	feet			6/15/2001 17:00			189			10 U		
1		DH-55	DH-55-16	Soil	Unknown	75	80	feet			6/15/2001 18:30			27			10 U		
1		DH-55	DH-55-17	Soil	Unknown	80	85	feet			6/17/2001 9:00			32			10 U		
1		DH-55	DH-55-18	Soil	Unknown	85	90	feet			6/17/2001 9:45			36			10 U		
1		DH-55	DH-55-19	Soil	Unknown	90	95	feet			6/17/2001 10:30			23			10 U		
1		DH-56	DH-56-1	Soil	Unknown	0	5	feet			6/2/2001 17:00			150			10 U		
1		DH-56	DH-56-2	Soil	Unknown	5	10	feet			6/2/2001 17:30			108			10 U		
1		DH-56	DH-56-3	Soil	Unknown	10	15	feet			6/2/2001 17:40			41			10 U		
1		DH-56	DH-56-4	Soil	Unknown	15	20	feet			6/2/2001 17:50			38			10 U		
1		DH-56	DH-56-5	Soil	Unknown	20	25	feet			6/2/2001 18:00			105			10 U		
1		DH-56	DH-56-6	Soil	Unknown	25	30	feet			6/2/2001 18:15			103			10 U		
1		DH-56	DH-56-7	Soil	Unknown	30	35	feet			6/2/2001 18:35			75			10 U		
1		DH-56	DH-56-8	Soil	Unknown	35	40	feet			6/2/2001 18:50			62			10 U		
1		DH-56	DH-56-9	Soil	Unknown	40	45	feet			6/2/2001 19:00			99			10 U		
1		DH-56	DH-56-10	Soil	Unknown	45	50	feet			6/3/2001 9:00			76			10 U		
1		DH-56	DH-56-11	Soil	Unknown	50	55	feet			6/3/2001 9:15			117			10 U		
1		DH-56	DH-56-12	Soil	Unknown	55	60	feet			6/3/2001 9:40			126			10 U		
1		DH-56	DH-56-13	Soil	Unknown	60	65	feet			6/6/2001 14:00			102			10 U		
1		DH-56	DH-56-14	Soil	Unknown	65	67	feet			6/6/2001 14:10			377			36		
1		DH-56	DH-56-15	Soil	Unknown	67	69	feet			6/6/2001 14:25			10 U			10 U		
1		DH-56	DH-56-17	Soil	Unknown	80	82	feet			6/14/2001 12:25			40			10 U		
1		DH-57	DH-57-1	Soil	Unknown	0	2	feet			5/14/2001 15:35			74			18		
1		DH-57	DH-57-2	Soil	Unknown	2	4	feet			5/14/2001 18:22			1986			453		
1		DH-57	DH-57-3	Soil	Unknown	4	6	feet			5/14/2001 18:20			362			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		DH-57	DH-57-4	Soil	Unknown	6	8	feet			5/14/2001 18:45			259			10 U		
1		DH-57	DH-57-5	Soil	Unknown	8	10	feet			5/14/2001 9:30			226			10 U		
1		DH-57	DH-57-6	Soil	Unknown	10	12	feet			5/14/2001 10:00			262			10 U		
1		DH-57	DH-57-7	Soil	Unknown	15	17	feet			5/15/2001 10:15			348			10 U		
1		DH-57	DH-57-8	Soil	Unknown	20	22	feet			5/15/2001 11:30			123			10 U		
1		DH-57	DH-57-9	Soil	Unknown	25	27	feet			5/15/2001 15:00			303			10 U		
1		DH-58	DH-58-1	Soil	Unknown	0	2	feet			5/30/2001 11:40			201			49		
1		DH-58	DH-58-2	Soil	Unknown	2	4	feet			5/30/2001 11:45			152			44		
1		DH-58	DH-58-3	Soil	Unknown	4	6	feet			5/30/2001 11:55			22			10 U		
1		DH-58	DH-58-4	Soil	Unknown	6	8	feet			5/30/2001 12:00			28			10 U		
1		DH-58	DH-58-5	Soil	Unknown	8	10	feet			5/30/2001 12:10			24			10 U		
1		DH-58	DH-58-6	Soil	Unknown	10	12	feet			5/30/2001 13:40			36			10 U		
1		DH-58	DH-58-7	Soil	Unknown	12	14	feet			5/30/2001 14:20			86			10 U		
1		DH-58	DH-58-8	Soil	Unknown	14	16	feet			5/30/2001 14:40			92			10 U		
1		DH-58	DH-58-9	Soil	Unknown	16	18	feet			5/30/2001 15:00			94			10 U		
1		DH-58	DH-58-10	Soil	Unknown	18	20	feet			5/30/2001 15:15			103			10 U		
1		DH-58	DH-58-12	Soil	Unknown	22	24	feet			5/30/2001 15:55			92			10 U		
1		DH-59	DH-59-1	Soil	Unknown	0	2	feet			5/23/2001 14:50			4567			400		
1		DH-59	DH-59-2	Soil	Unknown	2	4	feet			5/23/2001 14:55			1476			423		
1		DH-59	DH-59-3	Soil	Unknown	4	6	feet			5/23/2001 15:30			28			37		
1		DH-59	DH-59-5	Soil	Unknown	8	10	feet			5/23/2001 16:15			47			64		
1		DH-59	DH-59-6	Soil	Unknown	10	12	feet			5/23/2001 16:30			111			47		
1		DH-59	DH-59-7	Soil	Unknown	15	17	feet			5/23/2001 17:55			13			10		
1		DH-59	DH-59-8	Soil	Unknown	20	22	feet			5/23/2001 18:15			224			324		
1		DH-59	DH-59-9	Soil	Unknown	25	27	feet			5/23/2001 18:50			169			60		
1		DH-60	DH-60-1	Soil	Unknown	0	2	feet			5/12/2001 10:55			180			643		
1		DH-60	DH-60-2	Soil	Unknown	2	4	feet			5/12/2001 11:00			17			19		
1		DH-60	DH-60-3	Soil	Unknown	4	6	feet			5/12/2001 11:10			70			215		
1		DH-60	DH-60-4	Soil	Unknown	6	8	feet			5/12/2001 11:20			38			98		
1		DH-60	DH-60-5	Soil	Unknown	8	10	feet			5/12/2001 12:00			10 U			10 U		
1		DH-60	DH-60-6	Soil	Unknown	10	12	feet			5/12/2001 12:30			21			19		
1		DH-60	DH-60-7	Soil	Unknown	15	17	feet			5/12/2001 16:30			10 U			10 U		
1		DH-60	DH-60-8	Soil	Unknown	20	22	feet			5/12/2001 17:00			10 U			10 U		
1		DH-60	DH-60-9	Soil	Unknown	25	27	feet			5/12/2001 17:40			10 U			10 U		
1		DH-60	DH-60-10	Soil	Unknown	30	32	feet			5/12/2001 18:25			10 U			10 U		
1		DH-60	DH-60-11	Soil	Unknown	35	37	feet			5/12/2001 19:05			13			10 U		
1		DH-61	DH-61-1	Soil	Unknown	0	2	feet			5/8/2001 14:45			109			29		
1		DH-61	DH-61-3	Soil	Unknown	2	6	feet			5/8/2001 15:00			467			68		
1		DH-61	DH-61-4	Soil	Unknown	6	8	feet			5/8/2001 16:00			15			10 U		
1		DH-61	DH-61-5	Soil	Unknown	8	10	feet			5/8/2001 17:15			18			10 U		
1		DH-61	DH-61-6	Soil	Unknown	10	12	feet			5/8/2001 17:30			13			10 U		
1		DH-61	DH-61-7	Soil	Unknown	15	17	feet			5/8/2001 17:55			14			10 U		
1		DH-61	DH-61-9	Soil	Unknown	25	27	feet			5/9/2001 10:15			13			10 U		
1		DH-61	DH-61-10	Soil	Unknown	30	32	feet			5/9/2001 11:25			10 U			10 U		
1		DH-62	DH-62-10	Soil	Unknown	30	32	feet			5/9/2001 18:30			10 U			10 U		
1		DH-62	DH-62-11	Soil	Unknown	37	39	feet			5/10/2001 11:45			10 U			10 U		
1		DH-62	DH-62-12	Soil	Unknown	40	42	feet			5/10/2001 12:00			10 U			10 U		
1		DH-62	DH-62-13	Soil	Unknown	45	47	feet			5/10/2001 12:15			10 U			10 U		
1		DH-62	DH-62-14	Soil	Unknown	50	52	feet			5/10/2001 12:30			10 U			10 U		
1		DH-62	DH-62-15	Soil	Unknown	55	57	feet			5/10/2001 14:00			10 U			10 U		
1		DH-62	DH-62-16	Soil	Unknown	60	61	feet			5/10/2001 14:45			10 U			10 U		
1		DH-62	DH-62-17	Soil	Unknown	65	66.5	feet			5/10/2001 15:00			10 U			10 U		
1		DH-62	DH-62-18	Soil	Unknown	70	72	feet			5/10/2001 16:00			10 U			10 U		
1		DH-62	DH-62-19	Soil	Unknown	75	77	feet			5/10/2001 17:30			10 U			10 U		
1		DH-64	DH-64-1	Soil	Unknown	0	2	feet			5/21/2001 10:45			22			10 U		
1		DH-64	DH-64-2	Soil	Unknown	2	4	feet			5/21/2001 10:50			21			10 U		
1		DH-64	DH-64-3	Soil	Unknown	4	6	feet			5/21/2001 11:05			14			10 U		
1		DH-64	DH-64-4	Soil	Unknown	6	8	feet			5/21/2001 11:15			10 U			10 U		
1		DH-64	DH-64-5	Soil	Unknown	8	10	feet			5/21/2001 11:45			18			10 U		
1		DH-64	DH-64-6	Soil	Unknown	10	12	feet			5/21/2001 12:00			34			10 U		
1		DH-64	DH-64-7	Soil	Unknown	15	17	feet			5/21/2001 14:20			11			10 U		
1		DH-64	DH-64-8	Soil	Unknown	20	22	feet			5/21/2001 16:00			15			10 U		
1		DH-64	DH-64-9	Soil	Unknown	25	27	feet			5/22/2001 9:30			19			10 U		
1		DH-64	DH-64-10	Soil	Unknown	30	32	feet			5/22/2001 9:45			499			10 U		
1		DH-64	DH-64-11	Soil	Unknown	35	37	feet			5/22/2001 10:00			214			10 U		
1		DH-64	DH-64-12	Soil	Unknown	40	42	feet			5/22/2001 10:15			130			10 U		
1		DH-64	DH-64-13	Soil	Unknown	45	47	feet			5/22/2001 11:30			301			10 U		
1		DH-64	DH-64-14	Soil	Unknown	50	52	feet			5/22/2001 13:00			293			10 U		
1		DH-64	DH-64-15	Soil	Unknown	55	57	feet			5/22/2001 14:30			26			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		DH-65	DH-65-1	Soil	Unknown	0	5	feet			6/15/2001 9:00			115			10 U		
1		DH-65	DH-65-2	Soil	Unknown	5	10	feet			6/15/2001 9:10			69			10 U		
1		DH-65	DH-65-3	Soil	Unknown	10	15	feet			6/15/2001 9:20			28			10 U		
1		DH-65	DH-65-4	Soil	Unknown	15	20	feet			6/15/2001 9:30			69			10 U		
1		DH-65	DH-65-5	Soil	Unknown	20	25	feet			6/15/2001 9:40			17			10 U		
1		DH-65	DH-65-6	Soil	Unknown	25	30	feet			6/15/2001 9:55			20			10 U		
1		DH-65	DH-65-7	Soil	Unknown	30	35	feet			6/15/2001 10:05			27			10 U		
1		DH-65	DH-65-8	Soil	Unknown	35	40	feet			6/15/2001 10:20			36			10 U		
1		DH-65	DH-65-9	Soil	Unknown	40	45	feet			6/15/2001 10:30			21			10 U		
1		DH-65	DH-65-10	Soil	Unknown	45	50	feet			6/15/2001 11:00			18			10 U		
1		DH-65	DH-65-11	Soil	Unknown	50	55	feet			6/15/2001 11:15			20			10 U		
1		DH-65	DH-65-12	Soil	Unknown	55	60	feet			6/15/2001 11:30			97			10 U		
1		DH-66S	DH-66-01	Soil	EDXRF	0	2	feet			7/22/2002 9:00			1052			392		
1		DH-66S	DH-66-02	Soil	EDXRF	3	5	feet			7/22/2002 9:10			127			97		
1		DH-66S	DH-66-03	Soil	EDXRF	6	8	feet			7/22/2002 9:20			178			103		
1		DH-66S	DH-66-04	Soil	EDXRF	9	11	feet			7/22/2002 10:20			15			10 U		
1		DH-66S	DH-66-05	Soil	EDXRF	15	17	feet			7/22/2002 10:50			27			10 U		
1		DH-66S	DH-66-07	Soil	EDXRF	25	27	feet			7/22/2002 12:00			14			10 U		
1		DH-66S	DH-66-08	Soil	EDXRF	30	32	feet			7/22/2002 12:40			14			10 U		
1		DH-66S	DH-66-09	Soil	EDXRF	35	27	feet			7/22/2002 14:10			10 U			10 U		
1		DH-66S	DH-66-10	Soil	EDXRF	40	42	feet			7/22/2002 15:00			13			10 U		
1		DH-66S	DH-66-11	Soil	EDXRF	45	57	feet			7/22/2002 15:50			22			10 U		
1		DH-66S	DH-66-12	Soil	EDXRF	50	52	feet			7/22/2002 17:00			11			10 U		
1		DH-68	DH-68-01	Soil	SW6010B	0	2	feet			4/1/2008 9:00	13400		671	1460	5 U	225	17.5	43.8
1		DH-68	DH-68-01	Soil	SW6020	0	2	feet			4/1/2008 9:00		145						
1		DH-68	DH-68-01	Soil	SW7471A	0	2	feet			4/1/2008 9:00								
1		DH-68	DH-68-02	Soil	SW6010B	2	4	feet			4/1/2008 9:10			306			62.9		
1		DH-68	DH-68-03	Soil	SW6010B	4	6	feet			4/1/2008 9:20			185			34.1		
1		DH-68	DH-68-04	Soil	SW6010B	6	8	feet			4/1/2008 9:35			218			32.8		
1		DH-68	DH-68-05	Soil	SW6010B	8	10	feet			4/1/2008 9:45			203			33.5		
1		DH-68	DH-68-06	Soil	SW6010B	10	12	feet			4/1/2008 9:55			252			40.8		
1		DH-68	DH-68-08	Soil	SW6010B	15	17	feet			4/1/2008 10:15			309			36.3		
1		DH-68	DH-68-10	Soil	SW6010B	20	22	feet			4/1/2008 10:35			238			45		
1		DH-68	DH-68-12	Soil	SW6010B	25	27	feet			4/1/2008 10:55			307			36		
1		DH-68	DH-68-14	Soil	SW6010B	30	32	feet			4/1/2008 11:15			245			32.9		
1		DH-68	DH-68-14A	Soil	SW6010B	30	32	feet			4/1/2008 11:20			244			31.5		
1		DH-68	DH-68-16	Soil	SW6010B	35	37	feet			4/1/2008 11:30			264			29.4		
1		DH-68	DH-68-18	Soil	SW6010B	40	42	feet			4/1/2008 11:40			34.1			2.5		
1		DH-68	DH-68-20	Soil	SW6010B	45	47	feet			4/1/2008 12:00			16			1.7		
1		DH-68	DH-68-22	Soil	SW6010B	50	52	feet			4/1/2008 12:30	6850	5 U	5.6	48.3	5 U	1.5	12.2	5 U
1		DH-68	DH-68-22	Soil	SW7471A	50	52	feet			4/1/2008 12:30								
1		DH-69	DH-69-01	Soil	SW6010B	0	2	feet			3/31/2008 13:30	12200		629	2300	5 U	149	21.6	34.8
1		DH-69	DH-69-01	Soil	SW6020	0	2	feet			3/31/2008 13:30		50.4						
1		DH-69	DH-69-01	Soil	SW7471A	0	2	feet			3/31/2008 13:30								
1		DH-69	DH-69-02	Soil	SW6010B	2	4	feet			3/31/2008 13:45			459			81.1		
1		DH-69	DH-69-03	Soil	SW6010B	4	6	feet			3/31/2008 14:00			316			40.2		
1		DH-69	DH-69-04	Soil	SW6010B	6	8	feet			3/31/2008 14:30			304			35.8		
1		DH-69	DH-69-05	Soil	SW6010B	8	10	feet			3/31/2008 14:45			301			30.2		
1		DH-69	DH-69-06	Soil	SW6010B	10	15	feet			3/31/2008 15:00			338			37.1		
1		DH-69	DH-69-08	Soil	SW6010B	15	17	feet			3/31/2008 15:45			294			30.5		
1		DH-69	DH-69-09	Soil	SW6010B	20	22	feet			4/1/2008 9:30			484			40.4		
1		DH-69	DH-69-10	Soil	SW6010B	25	27	feet			4/1/2008 9:45			222			28.4		
1		DH-69	DH-69-11	Soil	SW6010B	30	32	feet			4/1/2008 10:00			438			30.4		
1		DH-69	DH-69-12	Soil	SW6010B	35	37	feet			4/1/2008 11:00			9.8			2.2		
1		DH-69	DH-69-12A	Soil	SW6010B	35	37	feet			4/1/2008 11:15			5.6			2.3		
1		DH-69	DH-69-13	Soil	SW6010B	40	42	feet			4/1/2008 11:30	10700	5 U	10.8	65.6	5 U	3.1	18.4	5 U
1		DH-69	DH-69-13	Soil	SW7471A	40	42	feet			4/1/2008 11:30								
1		DH-70	DH-70-01	Soil	SW6010B	0	2	feet			3/26/2008 8:15	18600	5 U	146	894	5 U	19.6	17.2	11.5
1		DH-70	DH-70-01	Soil	SW7471A	0	2	feet			3/26/2008 8:15								
1		DH-70	DH-70-02	Soil	SW6010B	2	5	feet			3/26/2008 8:30			465			33.1		
1		DH-70	DH-70-03	Soil	SW6010B	5	7	feet			3/26/2008 8:45			426			33.9		
1		DH-70	DH-70-04	Soil	SW6010B	10	12	feet			3/26/2008 9:25			478			43		
1		DH-70	DH-70-05	Soil	SW6010B	14	15	feet			3/26/2008 9:40			507			45.1		
1		DH-70	DH-70-05A	Soil	SW6010B	14	15	feet			3/26/2008 9:50			468			41.3		
1		DH-70	DH-70-06	Soil	SW6010B	15	17	feet			3/26/2008 9:50			308			15.2		
1		DH-70	DH-70-07	Soil	SW6010B	20	22	feet			3/26/2008 10:15			53.7			3.4		
1		DH-70	DH-70-08	Soil	SW6010B	22	25	feet			3/26/2008 10:45			12.5			1.4		
1		DH-70	DH-70-09	Soil	SW6010B	25	30	feet			3/26/2008 12:00	5590	5 U	14.7	47.9	5 U	2	10	5 U
1		DH-70	DH-70-09	Soil	SW7471A	25	30	feet			3/26/2008 12:00								

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		DH-71	DH-71-01	Soil	SW6010B	1	3	feet			3/27/2008 13:30	15900		319	583	5 U	480	24.5	24.6
1		DH-71	DH-71-01	Soil	SW6020	1	3	feet			3/27/2008 13:30		23.2						
1		DH-71	DH-71-01	Soil	SW7471A	1	3	feet			3/27/2008 13:30								
1		DH-71	DH-71-02	Soil	SW6010B	5	7	feet			3/27/2008 13:40			19.4			6.3		
1		DH-71	DH-71-03	Soil	SW6010B	8	10	feet			3/27/2008 13:50			28.7			2.8		
1		DH-71	DH-71-05	Soil	SW6010B	12	14	feet			3/27/2008 14:10			41.9			4.1		
1		DH-71	DH-71-09	Soil	SW6010B	15	17.5	feet			3/27/2008 14:30			57.6			2.9		
1		DH-71	DH-71-12	Soil	SW6010B	20	22	feet			3/27/2008 15:00			62.5			3.6		
1		DH-71	DH-71-12A	Soil	SW6010B	20	22	feet			3/27/2008 15:10			58.5			3.6		
1		DH-71	DH-71-14	Soil	SW6010B	25	26.5	feet			3/27/2008 15:30			47			5.5		
1		DH-71	DH-71-17	Soil	SW6010B	30	32	feet			3/27/2008 16:00			69.7			8.3		
1		DH-71	DH-71-18	Soil	SW6010B	33.5	34.5	feet			3/27/2008 16:30	25900	5 U	5.6	25.3	5 U	1 U	5 U	5 U
1		DH-71	DH-71-18	Soil	SW7471A	33.5	34.5	feet			3/27/2008 16:30								
1		MO1	MO1-A1	Soil	SW6010B	0	0.33	feet			9/26/2007 14:30			1500			310		
1		MO1	MO1-B1	Soil	SW6010B	0.33	1	feet			9/26/2007 14:30			120			28		
1		MO1	MO1-C1	Soil	SW6010B	1	2	feet			9/26/2007 14:30			57			23		
1		MO1	MO1-D1	Soil	SW6010B	2	4	feet			9/26/2007 14:30			71			15		
1		MO1	MO1-E1	Soil	SW6010B	4	6	feet			9/26/2007 14:30			81			29		
1		MO1	MO1-F1	Soil	SW6010B	6	8	feet			9/26/2007 14:30			56			19		
1		MO1	MO1-G1	Soil	SW6010B	8	10	feet			9/26/2007 14:30			22			5		
1		MO1	MO1-H1	Soil	SW6010B	10	12	feet			9/26/2007 14:30			17			4		
1		MO1	MO1-I1	Soil	SW6010B	12	15	feet			9/26/2007 14:30			19			3		
1		MOF1	MOF1-A	Soil	SW6010B	0	0	feet			10/23/2008 10:05	5610	590	3850	255	5 U	14600	20	19
1		MOF1	MOF1-A	Soil	SW7471A	0	0	feet			10/23/2008 10:05								
1		MOF1	MOF1-B	Soil	SW6010B	0	0	feet			10/23/2008 10:10			3230			13100		
1		MOF1	MOF1-C	Soil	SW6010B	0	0	feet			10/23/2008 10:12			409			5120		
1		MOF1	MOF1-D	Soil	SW6010B	0	0	feet			10/23/2008 10:15			84			5830		
1		MOF1	MOF1-E	Soil	SW6010B	0	0	feet			10/23/2008 10:52			120			2850		
1		MOF1	MOF1-F	Soil	SW6010B	0	0	feet			10/23/2008 10:55			51			348		
1		MOF1	MOF1-G	Soil	SW6010B	0	0	feet			10/23/2008 11:05			113			1560		
1		MOF1	MOF1-H	Soil	SW6010B	0	0	feet			10/23/2008 11:19			56			484		
1		MOF1	MOF1-I	Soil	SW6010B	0	0	feet			10/23/2008 11:33	10600		37	90	5 U	341	16	6
1		MOF1	MOF1-I	Soil	SW6020	0	0	feet			10/23/2008 11:33		5 U						
1		MOF1	MOF1-I	Soil	SW7471A	0	0	feet			10/23/2008 11:33								
1		MOF2	MOF2-A	Soil	SW6010B	0	0	feet			10/23/2008 11:50	6170	467	4090	619	5 U	21400	30	23
1		MOF2	MOF2-A	Soil	SW7471A	0	0	feet			10/23/2008 11:50								
1		MOF2	MOF2-B	Soil	SW6010B	0	0	feet			10/23/2008 13:20			11500			75300		
1		MOF2	MOF2-C	Soil	SW6010B	0	0	feet			10/23/2008 13:22			1110			8420		
1		MOF2	MOF2-D	Soil	SW6010B	0	0	feet			10/23/2008 13:25			1100			8310		
1		MOF2	MOF2-E	Soil	SW6010B	0	0	feet			10/23/2008 13:28			15			49		
1		MOF2	MOF2-F	Soil	SW6010B	0	0	feet			10/23/2008 13:30			33			63		
1		MOF2	MOF2-G	Soil	SW6010B	0	0	feet			10/23/2008 13:35			13			190		
1		MOF2	MOF2-H	Soil	SW6010B	0	0	feet			10/23/2008 13:40			42			22		
1		MOF2	MOF2-I	Soil	SW6010B	0	0	feet			10/23/2008 13:45	7290		126	66	5 U	374	16	6
1		MOF2	MOF2-I	Soil	SW6020	0	0	feet			10/23/2008 13:45		17						
1		MOF2	MOF2-I	Soil	SW7471A	0	0	feet			10/23/2008 13:45								
1		MOF3	MOF3-A	Soil	SW6010B	0	0	feet			10/23/2008 13:55	6990		1500	182	5 U	7350	16	16
1		MOF3	MOF3-A	Soil	SW6020	0	0	feet			10/23/2008 13:55		138						
1		MOF3	MOF3-A	Soil	SW7471A	0	0	feet			10/23/2008 13:55								
1		MOF3	MOF3-A2	Soil	SW6010B	0	0	feet			10/23/2008 13:57	6120		1280	193	5 U	6070	12	13
1		MOF3	MOF3-A2	Soil	SW6020	0	0	feet			10/23/2008 13:57		125						
1		MOF3	MOF3-A2	Soil	SW7471A	0	0	feet			10/23/2008 13:57								
1		MOF3	MOF3-B	Soil	SW6010B	0	0	feet			10/23/2008 14:00			7550			24200		
1		MOF3	MOF3-C	Soil	SW6010B	0	0	feet			10/23/2008 14:02			2890			9350		
1		MOF3	MOF3-D	Soil	SW6010B	0	0	feet			10/23/2008 14:05			74			135		
1		MOF3	MOF3-E	Soil	SW6010B	0	0	feet			10/23/2008 14:07			17			12		
1		MOF3	MOF3-F	Soil	SW6010B	0	0	feet			10/23/2008 14:10			33			15		
1		MOF3	MOF3-G	Soil	SW6010B	0	0	feet			10/23/2008 14:15			25			34		
1		MOF3	MOF3-H	Soil	SW6010B	0	0	feet			10/23/2008 14:20			63			223		
1		MOF3	MOF3-I	Soil	SW6010B	0	0	feet			10/23/2008 14:25	5900		7	36	5 U	9	17	5 U
1		MOF3	MOF3-I	Soil	SW6020	0	0	feet			10/23/2008 14:25		5 U						
1		MOF3	MOF3-I	Soil	SW7471A	0	0	feet			10/23/2008 14:25								
1		OS-5	IMSP-9911-111	Soil	EDXRF	0	12	feet			11/17/1999 0:00			1564			3136		
1		OS-6	IMSP-9911-113	Soil	EDXRF	0	14	feet			11/17/1999 0:00			1252			1146		
1		RFISB-1	RFISB-1-1	Soil	Unknown	0	2	feet			7/25/2001 9:30			11			10 U		
1		RFISB-1	RFISB-1-2	Soil	Unknown	2	4	feet			7/25/2001 9:35			10 U			10 U		
1		RFISB-1	RFISB-1-3	Soil	Unknown	4	6	feet			7/25/2001 9:40			20			10 U		
1		RFISB-1	RFISB-1-4	Soil	Unknown	6	8	feet			7/25/2001 9:45			17			10 U		
1		RFISB-1	RFISB-1-5	Soil	Unknown	8	10	feet			7/25/2001 9:50			10 U			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		RFISB-1	RFISB-1-6	Soil	Unknown	10	12	feet			7/25/2001 9:55			12			10 U		
1		RFISB-1	RFISB-1-7	Soil	Unknown	15	17	feet			7/25/2001 10:00			12			10 U		
1		RFISB-1	RFISB-1-8	Soil	Unknown	20	22	feet			7/25/2001 10:05			231			44		
1		RFISB-1	RFISB-1-8D	Soil	Unknown	20	22	feet			7/25/2001 10:05			204			37		
1		RFISB-2	RFISB-2-1	Soil	Unknown	0	2	feet			7/25/2001 11:00			10 U			10 U		
1		RFISB-2	RFISB-2-2	Soil	Unknown	2	4	feet			7/25/2001 11:05			15			10 U		
1		RFISB-2	RFISB-2-3	Soil	Unknown	4	6	feet			7/25/2001 11:10			14			10 U		
1		RFISB-2	RFISB-2-4	Soil	Unknown	6	8	feet			7/25/2001 11:15			19			10 U		
1		RFISB-2	RFISB-2-5	Soil	Unknown	8	10	feet			7/25/2001 11:20			16			10 U		
1		RFISB-2	RFISB-2-6	Soil	Unknown	10	12	feet			7/25/2001 11:25			36			10 U		
1		RFISB-2	RFISB-2-7	Soil	Unknown	15	17	feet			7/25/2001 11:30			28			10 U		
1		RFISB-2	RFISB-2-8	Soil	Unknown	20	22	feet			7/25/2001 11:35			65			13		
1		RFISB-3	RFISB-3-1	Soil	Unknown	0	2	feet			6/1/2001 11:00			190			18		
1		RFISB-3	RFISB-3-2	Soil	Unknown	2	4	feet			6/1/2001 12:00			139			11		
1		RFISB-3	RFISB-3-3	Soil	Unknown	4	6	feet			6/1/2001 12:15			44			10 U		
1		RFISB-3	RFISB-3-4	Soil	Unknown	6	8	feet			6/1/2001 12:30			19			10 U		
1		RFISB-3	RFISB-3-6	Soil	Unknown	10	12	feet			6/1/2001 14:00			10 U			10 U		
1		RFISB-3	RFISB-3-8	Soil	Unknown	20	42	feet			6/1/2001 14:30			777			10 U		
1		RFISB-3	RFISB-3-8D	Soil	Unknown	20	42	feet			6/1/2001 14:30			556			10 U		
1		RFISB-3	RFISB-3-9	Soil	Unknown	25	27	feet			6/1/2001 15:00			0.071			10 U		
1		RFISB-3	RFISB-3-10	Soil	Unknown	30	32	feet			6/1/2001 17:00			247			197		
1		RFISB-3	RFISB-3-11	Soil	Unknown	35	37	feet			6/1/2001 10:00			10 U			10 U		
1		RFISB-4	RFISB-4-1	Soil	Unknown	0	2	feet			5/24/2001 9:45			312			10 U		
1		RFISB-4	RFISB-4-2	Soil	Unknown	2	4	feet			5/24/2001 10:00			86			10 U		
1		RFISB-4	RFISB-4-3	Soil	Unknown	4	6	feet			5/24/2001 10:15			392			10 U		
1		RFISB-4	RFISB-4-4	Soil	Unknown	6	8	feet			5/24/2001 11:00			148			10 U		
1		RFISB-4	RFISB-4-5	Soil	Unknown	8	10	feet			5/24/2001 11:15			490			10 U		
1		RFISB-4	RFISB-4-6	Soil	Unknown	10	12	feet			5/24/2001 11:20			614			10 U		
1		RFISB-4	RFISB-4-7	Soil	Unknown	15	17	feet			5/24/2001 11:30			0.089			0.012		
1		RFISB-4	RFISB-4-8	Soil	Unknown	20	22	feet			5/24/2001 14:00			206			10 U		
1		RFISB-4	RFISB-4-9	Soil	Unknown	25	27	feet			5/24/2001 15:30			6			0.001 U		
1		RFISB-4	RFISB-4-11	Soil	Unknown	35	37	feet			5/24/2001 17:00			251			10 U		
1		RFISB-4	RFISB-4-11D	Soil	Unknown	35	37	feet			5/24/2001 17:00			289			10 U		
1		RFISB-4	RFISB-4-12	Soil	Unknown	40	42	feet			5/25/2001 9:30			10 U			10 U		
1		SINT-1	SINT-0610-100	Soil	SW6010B	0	0	feet			10/5/2006 9:50			2840			1100		
1		SINT-2	SINT-0610-101	Soil	SW6010B	0	0	feet			10/5/2006 10:00			1000			473		
1		SINT-3	SINT-0610-102	Soil	SW6010B	0	0	feet			10/5/2006 10:15			3500			485		
1		SINT-4	SINT-0610-103	Soil	SW6010B	0	0	feet			10/5/2006 10:20			3230			910		
1		SINT-5	SINT-0610-104	Soil	SW6010B	0	0	feet			10/5/2006 10:30			530			207		
1		SINT-6	SINT-0610-105	Soil	SW6010B	0	0	feet			10/5/2006 10:40			1070			438		
1		SINT-7	SINT-0610-106	Soil	SW6010B	0	0	feet			10/5/2006 10:50			2060			555		
1		SINT-8	SINT-0610-107	Soil	SW6010B	0	0	feet			10/5/2006 11:20			1230			494		
1		SPDR-1	SPDR-1	Soil	SW6010B	0	0	feet			12/6/2006 10:50			352			95.4		
1		SPDR-10	SPDR-10	Soil	SW6010B	0	0	feet			12/6/2006 12:40			4740			3080		
1		SPDR-11	SPDR-11	Soil	SW6010B	0	0	feet			12/6/2006 12:50			28000			9830		
1		SPDR-12	SPDR-12	Soil	SW6010B	0	0	feet			12/6/2006 13:00			4300			3480		
1		SPDR-13	SPDR-13	Soil	SW6010B	0	0	feet			12/6/2006 13:10			5190			452		
1		SPDR-2	SPDR-2	Soil	SW6010B	0	0	feet			12/6/2006 11:10			2040			407		
1		SPDR-3	SPDR-3	Soil	SW6010B	0	0	feet			12/6/2006 11:20			3200			375		
1		SPDR-4	SPDR-4	Soil	SW6010B	0	0	feet			12/6/2006 11:30			4770			151		
1		SPDR-5	SPDR-5	Soil	SW6010B	0	0	feet			12/6/2006 11:40			1060			51.9		
1		SPDR-6	SPDR-6	Soil	SW6010B	0	0	feet			12/6/2006 11:50			2080			44.5		
1		SPDR-7	SPDR-7	Soil	SW6010B	0	0	feet			12/6/2006 12:10			4300			164		
1		SPDR-8	SPDR-8	Soil	SW6010B	0	0	feet			12/6/2006 12:20			5780			453		
1		SPDR-9	SPDR-9	Soil	SW6010B	0	0	feet			12/6/2006 12:30			2740			1420		
1		SPIT-1	SP01	Soil	EDXRF	17	17	feet			7/24/1995 0:00			723			10 U		
1		SPIT-2	SP02	Soil	EDXRF	17	17	feet			7/24/1995 0:00			1425			10 U		
1		TH1	TH1-A1	Soil	SW6010B	0	0.33	feet			10/1/2007 10:45			70			300		
1		TH1	TH1-B1	Soil	SW6010B	0.33	1	feet			10/1/2007 10:45			5 U			50		
1		TH1	TH1-C1	Soil	SW6010B	1	2	feet			10/1/2007 10:45			65			54		
1		TH1	TH1-D1	Soil	SW6010B	2	4	feet			10/1/2007 10:45			18			9		
1		TH1	TH1-E1	Soil	SW6010B	4	6	feet			10/1/2007 10:45			17			4		
1		TH1	TH1-F1	Soil	SW6010B	6	8	feet			10/1/2007 10:45			6			1		
1		TH1	TH1-G1	Soil	SW6010B	8	10	feet			10/1/2007 10:45			5 U			1		
1		TH1	TH1-H1	Soil	SW6010B	10	12	feet			10/1/2007 10:45			11			2		
1		TH1	TH1-I1	Soil	SW6010B	12	15	feet			10/1/2007 10:45			7			2		
1		TH2	TH2-A1	Soil	SW6010B	0	0.33	feet			10/1/2007 12:00			250			170		
1		TH2	TH2-B1	Soil	SW6010B	0.33	1	feet			10/1/2007 12:00			5 U			1 U		
1		TH2	TH2-C1	Soil	SW6010B	1	2	feet			10/1/2007 12:00			34			8		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		TH2	TH2-D1	Soil	SW6010B	2	4	feet			10/1/2007 12:00			13			2		
1		TH2	TH2-E1	Soil	SW6010B	4	6	feet			10/1/2007 12:00			5 U			1 U		
1		TH2	TH2-F1	Soil	SW6010B	6	8	feet			10/1/2007 12:00			17			2		
1		TH2	TH2-G1	Soil	SW6010B	8	10	feet			10/1/2007 12:00			16			2		
1		TH2	TH2-H1	Soil	SW6010B	10	12	feet			10/1/2007 12:00			10			2		
1		TH2	TH2-I1	Soil	SW6010B	12	15	feet			10/1/2007 12:00			26			2		
1		TH3	TH3-A1	Soil	SW6010B	0	0.33	feet			10/1/2007 13:05			630			620		
1		TH3	TH3-B1	Soil	SW6010B	0.33	1	feet			10/1/2007 13:05			77			52		
1		TH3	TH3-C1	Soil	SW6010B	1	2	feet			10/1/2007 13:05			15			3		
1		TH3	TH3-D1	Soil	SW6010B	2	4	feet			10/1/2007 13:05			9			15		
1		TH3	TH3-E1	Soil	SW6010B	4	6	feet			10/1/2007 13:05			5 U			5		
1		TH3	TH3-F1	Soil	SW6010B	6	8	feet			10/1/2007 13:05			7			12		
1		TH3	TH3-G1	Soil	SW6010B	8	10	feet			10/1/2007 13:05			5 U			3		
1		TH3	TH3-H1	Soil	SW6010B	10	12	feet			10/1/2007 13:05			5 U			10		
1		TH3	TH3-I1	Soil	SW6010B	12	15	feet			10/1/2007 13:05			5 U			1		
1		TH4	TH4-A1	Soil	SW6010B	0	0.33	feet			10/1/2007 13:50			130			380		
1		TH4	TH4-B1	Soil	SW6010B	0.33	1	feet			10/1/2007 13:50			17			46		
1		TH4	TH4-C1	Soil	SW6010B	1	2	feet			10/1/2007 13:50			5 U			12		
1		TH4	TH4-D1	Soil	SW6010B	2	4	feet			10/1/2007 13:50			5 U			1 U		
1		TH4	TH4-E1	Soil	SW6010B	4	6	feet			10/1/2007 13:50			10			1		
1		TH4	TH4-F1	Soil	SW6010B	6	8	feet			10/1/2007 13:50			10			1		
1		TH4	TH4-G1	Soil	SW6010B	8	10	feet			10/1/2007 13:50			8			1		
1		TH4	TH4-H1	Soil	SW6010B	10	12	feet			10/1/2007 13:50			9			2		
1		TH4	TH4-I1	Soil	SW6010B	12	15	feet			10/1/2007 13:50			5 U			1 U		
1		TH5	TH5-A1	Soil	SW6010B	0	0.33	feet			10/1/2007 14:10			120			190		
1		TH5	TH5-B1	Soil	SW6010B	0.33	1	feet			10/1/2007 14:10			32			11		
1		TH5	TH5-C1	Soil	SW6010B	1	2	feet			10/1/2007 14:10			15			12		
1		TH5	TH5-D1	Soil	SW6010B	2	4	feet			10/1/2007 14:10			11			6		
1		TH5	TH5-E1	Soil	SW6010B	4	6	feet			10/1/2007 14:10			13			1		
1		TH5	TH5-F1	Soil	SW6010B	6	8	feet			10/1/2007 14:10			8			1		
1		TH5	TH5-G1	Soil	SW6010B	8	10	feet			10/1/2007 14:10			11			21		
1		TH5	TH5-H1	Soil	SW6010B	10	12	feet			10/1/2007 14:10			8			1		
1		TH5	TH5-I1	Soil	SW6010B	12	15	feet			10/1/2007 14:10			7			2		
1		UOS-SS04	UOS-SS4-5	Soil	Unknown	36	54	feet			4/26/2001 14:25			313			15		
1		LOS-SS01	LOS-SS01-1	Soil	Unknown	0	0.33333	feet			4/5/2001 0:00			82			5 U		
1		LOS-SS01	LOS-SS01-2	Soil	Unknown	0.33333	1	feet			4/5/2001 0:00			148			31		
1		LOS-SS01	LOS-SS01-3	Soil	Unknown	1	2	feet			4/5/2001 0:00			160			42		
1		LOS-SS01	LOS-SS01-4	Soil	Unknown	2	3	feet			4/5/2001 0:00			137			5 U		
1		LOS-SS02	LOS-SS02-1	Soil	Unknown	0	0.33333	feet			4/5/2001 0:00			151			19		
1		LOS-SS02	LOS-SS02-2	Soil	Unknown	0.33333	1	feet			4/5/2001 0:00			77			30		
1		LOS-SS02	LOS-SS02-3	Soil	Unknown	1	2	feet			4/5/2001 0:00			142			5 U		
1		LOS-SS02	LOS-SS02-4	Soil	Unknown	2	3	feet			4/5/2001 0:00			42			5 U		
1		LOS-SS05	SS-5	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			1495			1093		
1		LOS-SS05	LOS-SS05-1	Soil	Unknown	0	0.33333	feet			4/5/2001 0:00			3192			329		
1		LOS-SS05	LOS-SS05-2	Soil	Unknown	0.33333	1	feet			4/5/2001 0:00			1195			2825		
1		LOS-SS05	LOS-SS05-3	Soil	Unknown	1	2	feet			4/5/2001 0:00			916			4686		
1		LOS-SS05	LOS-SS05-4	Soil	Unknown	2	3	feet			4/5/2001 0:00			784			0.05 U		
1		LOS-SS06	SS-6	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			3300			253		
1		LOS-SS06	LOS-SS06-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			0.027			23		
1		LOS-SS06	LOS-SS06-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			541			142		
1		LOS-SS06	LOS-SS06-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			1778			335		
1		LOS-SS06	LOS-SS06-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			2820			437		
1		LOS-SS06A	LOS-SS06A-3	Soil	Unknown	0.33333	0.5	feet			7/20/2001 0:00			17			5 U		
1		LOS-SS06A	LOS-SS06A-4	Soil	Unknown	0.83333	1	feet			7/20/2001 0:00			16			5 U		
1		LOS-SS07	SS-7	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			3400			373		
1		LOS-SS07	LOS-SS07-1	Soil	Unknown	0	0.33333	feet			4/5/2001 0:00			89			410		
1		LOS-SS07	LOS-SS07-2	Soil	Unknown	0.33333	1	feet			4/5/2001 0:00			311			68		
1		LOS-SS07	LOS-SS07-3	Soil	Unknown	1	2	feet			4/5/2001 0:00			422			114		
1		LOS-SS07	LOS-SS07-4	Soil	Unknown	2	3	feet			4/5/2001 0:00			183			33		
1		LOS-SS10	SS-10	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			3900			1613		
1		LOS-SS10	LOS-SS10-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			1476			351		
1		LOS-SS10	LOS-SS10-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			795			839		
1		LOS-SS10	LOS-SS10-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			508			12		
1		LOS-SS10	LOS-SS10-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			421			11		
1		LOS-SS10	LOS-SS10-5	Soil	Unknown	3	5	feet			4/6/2001 0:00			431			532		
1		LOS-SS11	LOS-SS11-1	Soil	Unknown	0	0.33333	feet			3/15/2001 0:00			59			374		
1		LOS-SS11	LOS-SS11-2	Soil	Unknown	0.33333	1	feet			3/15/2001 0:00			2827			405		
1		LOS-SS11	LOS-SS11-3	Soil	Unknown	1	2	feet			3/15/2001 0:00			922			299		
1		LOS-SS11	LOS-SS11-4	Soil	Unknown	2	3	feet			3/15/2001 0:00			0.1 U			0.23		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		LOS-SS11	LOS-SS11-5	Soil	Unknown	3	4	feet			3/15/2001 14:05			291			36		
1		LOS-SS12	LOS-SS12-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			1007			628		
1		LOS-SS12	LOS-SS12-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			1515			1078		
1		LOS-SS12	LOS-SS12-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			573			682		
1		LOS-SS12	LOS-SS12-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			705			222		
1		LOS-SS14	LOS-SS14-1	Soil	Unknown	0	0.33333	feet			3/15/2001 0:00			311			277		
1		LOS-SS14	LOS-SS14-2	Soil	Unknown	0.33333	1	feet			3/15/2001 0:00			1353			441		
1		LOS-SS14	LOS-SS14-3	Soil	Unknown	1	2	feet			3/15/2001 0:00			1100			661		
1		LOS-SS14	LOS-SS14-4	Soil	Unknown	2	3	feet			3/15/2001 0:00			210			40		
1		LOS-SS16	LOS-SS16-1	Soil	Unknown	0	0.33333	feet			3/15/2001 0:00			1816			109		
1		LOS-SS16	LOS-SS16-2	Soil	Unknown	0.33333	1	feet			3/15/2001 0:00			1179			628		
1		LOS-SS16	LOS-SS16-3	Soil	Unknown	1	2	feet			3/15/2001 0:00			719			356		
1		LOS-SS16	LOS-SS16-4	Soil	Unknown	2	3	feet			3/15/2001 0:00			2710			564		
1		LOS-SS16A	LOS-SS16A-1	Soil	Unknown	0	0.16667	feet			5/14/2001 0:00			276			208		
1		LOS-SS16A	LOS-SS16A-2	Soil	Unknown	0.16667	0.33333	feet			5/14/2001 0:00			77			5 U		
1		LOS-SS16A	LOS-SS16A-3	Soil	Unknown	0.33333	0.5	feet			5/14/2001 0:00			17			5 U		
1		LOS-SS16A	LOS-SS16A-4	Soil	Unknown	0.5	0.66667	feet			5/14/2001 9:00			15			10 U		
1		LOS-SS16A	LOS-SS16A-5	Soil	Unknown	0.66667	0.83333	feet			5/14/2001 9:10			12			10 U		
1		LOS-SS16A	LOS-SS16A-6	Soil	Unknown	0.83333	1	feet			5/14/2001 0:00			15			5 U		
1		LOS-SS16A	LOS-SS16A-7	Soil	Unknown	1.25	1.41667	feet			5/14/2001 0:00			11			5 U		
1		LOS-SS16B	LOS-SS16B-1	Soil	Unknown	0	0.16667	feet			7/19/2001 0:00			261			216		
1		LOS-SS16B	LOS-SS16B-2	Soil	Unknown	0.16667	0.33333	feet			7/19/2001 0:00			79			5 U		
1		LOS-SS16B	LOS-SS16B-3	Soil	Unknown	0.33333	0.5	feet			7/19/2001 0:00			22			5 U		
1		LOS-SS16B	LOS-SS16B-4	Soil	Unknown	0.83333	1	feet			7/19/2001 0:00			81			5 U		
1		SS19	SS-19	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			21625			2373		
1		SS22	SS-22	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			3100			2213		
1		RC-SS05A	RC-SS05A-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			1532			283		
1		RC-SS05A	RC-SS05A-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			700			460		
1		RC-SS05A	RC-SS05A-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			962			376		
1		RC-SS05A	RC-SS05A-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			63			320		
1		RC-SS05B	RC-SS05B-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			3522			29		
1		RC-SS05B	RC-SS05B-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			1564			2605		
1		RC-SS05B	RC-SS05B-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			2310			664		
1		RC-SS05B	RC-SS05B-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			253			244		
1		RC-SS05C	RC-SS05C-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			5468			370		
1		RC-SS05C	RC-SS05C-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			8753			0.1		
1		RC-SS05C	RC-SS05C-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			220			715		
1		RC-SS05C	RC-SS05C-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			181			0.3		
1		RC-SS06	RC-SS06-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			8016			6236		
1		RC-SS06	RC-SS06-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			4370			13992		
1		RC-SS06	RC-SS06-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			6436			10110		
1		RC-SS06	RC-SS06-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			4455			13588		
1		RC-SS06	RC-SS06-5	Soil	Unknown	3	4	feet			4/6/2001 10:50			1415			3579		
1		RC-SS06A	RC-SS06A-3	Soil	Unknown	0.33333	0.5	feet			7/20/2001 0:00			191			1631		
1		RC-SS06A	RC-SS06A-4	Soil	Unknown	0.83333	1	feet			7/20/2001 0:00			180			498		
1		RC-SS07A	RC-SS07A-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			684			1394		
1		RC-SS07A	RC-SS07A-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			3868			1034		
1		RC-SS07A	RC-SS07A-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			2560			937		
1		RC-SS07A	RC-SS07A-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			3769			518		
1		RC-SS07A	RC-SS07A-5	Soil	Unknown	3	5	feet			4/9/2001 0:00			808			254		
1		RC-SS07B	RC-SS07B-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			5757			1536		
1		RC-SS07B	RC-SS07B-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			2624			5619		
1		RC-SS07B	RC-SS07B-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			1219			2658		
1		RC-SS07B	RC-SS07B-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			2975			3014		
1		RC-SS07C	RC-SS07C-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			3799			39		
1		RC-SS07C	RC-SS07C-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			935			239		
1		RC-SS07C	RC-SS07C-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			4404			592		
1		RC-SS07C	RC-SS07C-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			163			432		
1		RC-SS07C	RC-SS07C-5	Soil	Unknown	3	5	feet			4/9/2001 0:00			40			1430		
1		RC-SS07C	RC-SS07C-6	Soil	Unknown	5	6.5	feet			4/9/2001 0:00			43			23		
1		RC-SS07D	RC-SS07D-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			4984			1646		
1		RC-SS07D	RC-SS07D-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			6144			348		
1		RC-SS07D	RC-SS07D-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			3782			590		
1		RC-SS07D	RC-SS07D-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			1100			348		
1		RC-SS07E	RC-SS07E-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			4148			12026		
1		RC-SS07E	RC-SS07E-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			5240			1155		
1		RC-SS07E	RC-SS07E-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			3883			678		
1		RC-SS07E	RC-SS07E-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			713			977		
1		RC-SS08	RC-SS08-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			3735			11553		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		RC-SS08	RC-SS08-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			3065			5546		
1		RC-SS08	RC-SS08-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			940			1135		
1		RC-SS08	RC-SS08-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			1687			3259		
1		RC-SS08	RC-SS08-5	Soil	Unknown	3	5	feet			4/9/2001 0:00			311			540		
1		RC-SS09A	RC-SS09A-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			710			1724		
1		RC-SS09A	RC-SS09A-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			5370			3830		
1		RC-SS09A	RC-SS09A-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			27			126		
1		RC-SS09A	RC-SS09A-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			390			493		
1		RC-SS09B	RC-SS09B-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			3209			1796		
1		RC-SS09B	RC-SS09B-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			2467			1578		
1		RC-SS09B	RC-SS09B-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			539			2838		
1		RC-SS09B	RC-SS09B-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			38			57		
1		RC-SS09C	RC-SS09C-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			2726			39		
1		RC-SS09C	RC-SS09C-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			4679			2749		
1		RC-SS09C	RC-SS09C-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			859			1469		
1		RC-SS09C	RC-SS09C-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			506			520		
1		RC-SS09D	RC-SS09D-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			727			5911		
1		RC-SS09D	RC-SS09D-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			2888			1836		
1		RC-SS09D	RC-SS09D-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			419			1337		
1		RC-SS09D	RC-SS09D-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			756			552		
1		RC-SS09D	RC-SS09D-5	Soil	Unknown	3	5	feet			4/9/2001 0:00			744			948		
1		RC-SS10	RC-SS10-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			1153			5441		
1		RC-SS10	RC-SS10-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			2861			3118		
1		RC-SS10	RC-SS10-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			199			991		
1		RC-SS10	RC-SS10-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			113			131		
1		RC-SS12	SS-12	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			35500			5325		
1		RC-SS12	RC-SS12-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			0.011			45		
1		RC-SS12	RC-SS12-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			123			65		
1		RC-SS12	RC-SS12-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			542			198		
1		RC-SS12	RC-SS12-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			122			256		
1		RC-SS13	RC-SS13-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			1213			13		
1		RC-SS13	RC-SS13-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			1063			900		
1		RC-SS13	RC-SS13-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			985			577		
1		RC-SS13	RC-SS13-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			57			45		
1		RC-SS13	RC-SS13-5	Soil	Unknown	3	5	feet			4/10/2001 0:00			78			68		
1		RC-SS14	SS-14	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			1098			212		
1		RC-SS14A	RC-SS14A-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			1690			955		
1		RC-SS14A	RC-SS14A-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			959			595		
1		RC-SS14A	RC-SS14A-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			1330			1011		
1		RC-SS14A	RC-SS14A-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			524			475		
1		RC-SS14A	RC-SS14A-5	Soil	Unknown	3	5	feet			4/10/2001 0:00			347			51		
1		RC-SS14B	RC-SS14B-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			4671			1271		
1		RC-SS14B	RC-SS14B-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			408			507		
1		RC-SS14B	RC-SS14B-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			760			523		
1		RC-SS14B	RC-SS14B-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			854			539		
1		RC-SS14B	RC-SS14B-5	Soil	Unknown	3	5	feet			4/10/2001 0:00			194			51		
1		RC-SS14C	RC-SS14C-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			532			2861		
1		RC-SS14C	RC-SS14C-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			739			1772		
1		RC-SS14C	RC-SS14C-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			567			1140		
1		RC-SS14C	RC-SS14C-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			1052			3317		
1		RC-SS14C	RC-SS14C-5	Soil	Unknown	3	5	feet			4/10/2001 0:00			519			276		
1		RC-SS14D	RC-SS14D-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			4066			12547		
1		RC-SS14D	RC-SS14D-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			72			1563		
1		RC-SS14D	RC-SS14D-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			712			1094		
1		RC-SS14D	RC-SS14D-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			583			1082		
1		RC-SS14D	RC-SS14D-5	Soil	Unknown	3	5	feet			4/10/2001 0:00			265			75		
1		RC-SS16	RC-SS16-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			0.1 U			320		
1		RC-SS16	RC-SS16-2	Soil	Unknown	0.33333	1	feet			4/10/2001 0:00			2364			428		
1		RC-SS16	RC-SS16-3	Soil	Unknown	1	2	feet			4/10/2001 0:00			4505			705		
1		RC-SS16	RC-SS16-4	Soil	Unknown	2	3	feet			4/10/2001 0:00			469			890		
1		RC-SS17	SS-17	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			795			212		
1		RC-SS17	RC-SS17-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			4009			1123		
1		RC-SS17	RC-SS17-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			0.1 U			8.2		
1		RC-SS17	RC-SS17-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			0.1 U			0.21		
1		RC-SS17	RC-SS17-4	Soil	Unknown	2	3	feet			4/18/2001 0:00			45			14		
1		RC-SS17	RC-SS17-5	Soil	Unknown	3	4.5	feet			4/18/2001 14:25			35			15		
1		RC-SS17	RC-SS17-6	Soil	Unknown	4.5	6	feet			4/18/2001 14:30			102			72		
1		RC-SS17	RC-SS17-7	Soil	Unknown	6	7.5	feet			4/18/2001 0:00			17			38		
1		RC-SS18	SS-18	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			13450			23400		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		RC-SS18	RC-SS18-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			0.1 U			888		
1		RC-SS18	RC-SS18-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			2392			333		
1		RC-SS18	RC-SS18-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			472			294		
1		RC-SS18	RC-SS18-4	Soil	Unknown	2	3	feet			4/18/2001 0:00			311			67		
1		RC-SS18	RC-SS18-5	Soil	Unknown	3	5	feet			4/18/2001 0:00			35			5 U		
1		RC-SS19	RC-SS19-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			3225			0.34		
1		RC-SS19	RC-SS19-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			444			167		
1		RC-SS19	RC-SS19-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			327			0.05 U		
1		RC-SS19	RC-SS19-4	Soil	Unknown	2	2.66667	feet			4/18/2001 0:00			226			43		
1		RC-SS20	SS-20	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			5450			1733		
1		RC-SS20	RC-SS20-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			3034			1319		
1		RC-SS20	RC-SS20-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			2217			772		
1		RC-SS20	RC-SS20-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			1399			750		
1		RC-SS20	RC-SS20-4	Soil	Unknown	2	3	feet			4/18/2001 0:00			1089			404		
1		RC-SS21	RC-SS21-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			1737			652		
1		RC-SS21	RC-SS21-2	Soil	Unknown	1.33333	2	feet			4/18/2001 0:00			189			56		
1		RC-SS22	RC-SS22-1	Soil	Unknown	0	0.33333	feet			4/17/2001 0:00			666			1462		
1		RC-SS22	RC-SS22-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			660			1777		
1		RC-SS22	RC-SS22-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			0.032			0.021		
1		RC-SS22	RC-SS22-4	Soil	Unknown	2	3	feet			4/18/2001 0:00			88			51		
1		RC-SS22	RC-SS22-5	Soil	Unknown	3	5	feet			4/18/2001 0:00			33			11		
1		RC-SS22	RC-SS22-6	Soil	Unknown	5	6	feet			4/18/2001 0:00			89			40		
1		RC-SS23	RC-SS23-1	Soil	Unknown	0	0.33333	feet			4/26/2001 0:00			1299			195		
1		RC-SS23	RC-SS23-2	Soil	Unknown	0.33333	1	feet			4/26/2001 0:00			555			64		
1		RC-SS23	RC-SS23-3	Soil	Unknown	1	2	feet			4/26/2001 0:00			693			97		
1		RC-SS23	RC-SS23-4	Soil	Unknown	2	3	feet			4/26/2001 0:00			81			5 U		
1		RC-SS24	RC-SS24-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			0.1 U			824		
1		RC-SS24	RC-SS24-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			48			10		
1		RC-SS24	RC-SS24-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			222			5 U		
1		RC-SS24	RC-SS24-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			206			26		
1		RC-SS24	RC-SS24-5	Soil	Unknown	3	3	feet			4/16/2001 10:30			36			10 U		
1		RC-SS25	RC-SS25-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			1602			213		
1		RC-SS25	RC-SS25-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			0.1 U			88		
1		RC-SS25	RC-SS25-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			31			0.05 U		
1		RC-SS25	RC-SS25-4	Soil	Unknown	2	3	feet			4/18/2001 0:00			45			13		
1		RC-SS26	RC-SS26-1	Soil	Unknown	0	0.33333	feet			4/18/2001 0:00			3712			395		
1		RC-SS26	RC-SS26-2	Soil	Unknown	0.33333	1	feet			4/18/2001 0:00			417			107		
1		RC-SS26	RC-SS26-3	Soil	Unknown	1	2	feet			4/18/2001 0:00			120			31		
1		RC-SS26	RC-SS26-4	Soil	Unknown	2	3	feet			4/18/2001 0:00			33			5 U		
1		RC-SS26	RC-SS26-5	Soil	Unknown	3	5	feet			4/18/2001 0:00			20			5 U		
1		RC-SS27	RC-SS27-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			3226			1528		
1		RC-SS27	RC-SS27-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			5648			966		
1		RC-SS27	RC-SS27-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			1641			987		
1		RC-SS27	RC-SS27-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			2114			318		
1		RC-SS27	RC-SS27-5	Soil	Unknown	3	5	feet			4/9/2001 0:00			451			129		
1		RC-SS27	RC-SS27-6	Soil	Unknown	5	7	feet			4/9/2001 0:00			1980			741		
1		RC-SS27A	RC-SS27A-4	Soil	Unknown	0.83333	1	feet			7/20/2001 0:00			16			5 U		
1		RC-SS28	RC-SS28-1	Soil	Unknown	0	0.33333	feet			4/9/2001 0:00			0.1 U			2252		
1		RC-SS28	RC-SS28-2	Soil	Unknown	0.33333	1	feet			4/9/2001 0:00			1313			2476		
1		RC-SS28	RC-SS28-3	Soil	Unknown	1	2	feet			4/9/2001 0:00			0.1 U			2.6		
1		RC-SS28	RC-SS28-4	Soil	Unknown	2	3	feet			4/9/2001 0:00			474			663		
1		RC-SS28	RC-SS28-5	Soil	Unknown	3	5	feet			4/9/2001 0:00			589			497		
1		RC-SS28	RC-SS28-6	Soil	Unknown	5	6.25	feet			4/9/2001 0:00			127			132		
1		RC-SS29	RC-SS29-1	Soil	Unknown	0	0.33333	feet			4/10/2001 0:00			1119			761		
1		RC-SS29	RC-SS29-2	Soil	Unknown	0.33333	2	feet			4/10/2001 9:05			2150			1031		
1		RC-SS29	RC-SS29-3	Soil	Unknown	2	3	feet			4/10/2001 0:00			1469			552		
1		RC-SS29	RC-SS29-4	Soil	Unknown	3	5	feet			4/10/2001 0:00			450			140		
1		RC-SS29	RC-SS29-5	Soil	Unknown	5	6.5	feet			4/10/2001 0:00			1072			420		
1		RC-SS2A	RC-SS2A-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			1159			280		
1		RC-SS2A	RC-SS2A-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			1169			211		
1		RC-SS2A	RC-SS2A-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			412			98		
1		RC-SS2A	RC-SS2A-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			526			528		
1		UOP-SS08	UOP-SS08-1	Soil	Unknown	0	0.33333	feet			3/8/2001 0:00			540			32		
1		UOP-SS08	UOP-SS08-2	Soil	Unknown	0.33333	1	feet			3/8/2001 0:00			74			26		
1		UOP-SS08	UOP-SS08-3	Soil	Unknown	1	2	feet			3/8/2001 0:00			115			28		
1		UOP-SS08	UOP-SS08-4	Soil	Unknown	2	3	feet			3/8/2001 0:00			22			5 U		
1		UOP-SS09	UOP-SS09-1	Soil	Unknown	0	0.33333	feet			3/8/2001 0:00			236			116		
1		UOP-SS09	UOP-SS09-2	Soil	Unknown	0.33333	1	feet			3/8/2001 0:00			90			22		
1		UOP-SS09	UOP-SS09-3.1	Soil	Unknown	1	1.5	feet			3/8/2001 0:00			114			23		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		UOP-SS09	UOP-SS09-3.2	Soil	Unknown	1.5	2	feet			3/8/2001 0:00			229			30		
1		UOP-SS09	UOP-SS09-4	Soil	Unknown	2	3	feet			3/8/2001 0:00			17			5 U		
1		UOP-SS15	SS-15	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			385			172		
1		UOP-SS15	UOP-SS15-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			48			10		
1		UOP-SS15	UOP-SS15-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			28			5 U		
1		UOP-SS15	UOP-SS15-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			47			5 U		
1		UOP-SS15	UOP-SS15-4	Soil	Unknown	2	2.66667	feet			3/22/2001 0:00			75			5 U		
1		UOP-SS17	UOP-SS17-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			145			5 U		
1		UOP-SS17	UOP-SS17-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			41			5 U		
1		UOP-SS17	UOP-SS17-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			47			5 U		
1		UOP-SS17	UOP-SS17-4	Soil	Unknown	2	3	feet			3/22/2001 0:00			34			5 U		
1		SS21	SS21-1	Soil	Unknown	0	0.33333	feet			3/21/2001 0:00			420			79		
1		SS21	SS21-2	Soil	Unknown	0.33333	1	feet			3/21/2001 0:00			249			23		
1		SS21	SS21-3	Soil	Unknown	1	2	feet			3/21/2001 0:00			10			5 U		
1		SS21	SS21-4	Soil	Unknown	2	3	feet			3/21/2001 0:00			10 U			5 U		
1		SS23	SS-23	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			121			212		
1		UOS-SS03	SS-3	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			1078			413		
1		UOS-SS03	UOS-SS03-1	Soil	Unknown	0	0.33333	feet			4/27/2001 0:00			1636			9319		
1		UOS-SS03	UOS-SS03-2	Soil	Unknown	0.33333	1	feet			4/27/2001 0:00			6958			4012		
1		UOS-SS03	UOS-SS03-3	Soil	Unknown	1	2	feet			4/27/2001 0:00			1908			1009		
1		UOS-SS03	UOS-SS03-4	Soil	Unknown	2	3	feet			4/27/2001 0:00			1022			1847		
1		UOS-SS04	SS-4	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			5650			14725		
1		UOS-SS04	UOS-SS4-1	Soil	Unknown	0	0.33333	feet			4/26/2001 0:00			735			39		
1		UOS-SS04	UOS-SS4-2	Soil	Unknown	0.33333	1	feet			4/26/2001 0:00			305			87		
1		UOS-SS04	UOS-SS4-3	Soil	Unknown	1	2	feet			4/26/2001 0:00			219			24		
1		UOS-SS04	UOS-SS4-4	Soil	Unknown	2	3	feet			4/26/2001 0:00			320			5 U		
1		UOS-SS05	UOS-SS05-1	Soil	Unknown	0	0.33333	feet			4/17/2001 0:00			1868			40		
1		UOS-SS05	UOS-SS05-2	Soil	Unknown	0.33333	1	feet			4/17/2001 0:00			2394			346		
1		UOS-SS05	UOS-SS05-3	Soil	Unknown	1	2	feet			4/17/2001 0:00			1504			455		
1		UOS-SS05	UOS-SS05-4	Soil	Unknown	2	3	feet			4/17/2001 0:00			931			497		
1		UOS-SS05	UOS-SS05-5	Soil	Unknown	3	5	feet			4/17/2001 0:00			1608			1367		
1		UOS-SS05	UOS-SS05-6	Soil	Unknown	5	6	feet			4/17/2001 0:00			475			148		
1		UPS-SS01	UPS-SS01-1	Soil	Unknown	0	0.33333	feet			3/20/2001 0:00			33			3069		
1		UPS-SS01	UPS-SS01-2	Soil	Unknown	0.33333	1	feet			3/20/2001 0:00			1068			1.5		
1		UPS-SS01	UPS-SS01-3	Soil	Unknown	1	2	feet			3/20/2001 0:00			3100			213		
1		UPS-SS01	UPS-SS01-4	Soil	Unknown	2	3	feet			3/20/2001 0:00			130			107		
1		UPS-SS02	UPS-SS02-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			2297			433		
1		UPS-SS02	UPS-SS02-2	Soil	Unknown	0.33333	1	feet			3/16/2001 0:00			140			79		
1		UPS-SS02	UPS-SS02-3	Soil	Unknown	1	2	feet			3/16/2001 0:00			236			179		
1		UPS-SS02	UPS-SS02-4	Soil	Unknown	2	3	feet			3/16/2001 0:00			101			5 U		
1		UPS-SS03	UPS-SS03-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			518			64		
1		UPS-SS03	UPS-SS03-2	Soil	Unknown	0.33333	1	feet			3/16/2001 0:00			16			24		
1		UPS-SS03	UPS-SS03-3	Soil	Unknown	1	1.83333	feet			3/16/2001 0:00			146			168		
1		UPS-SS03	UPS-SS03-3.1	Soil	Unknown	1.83333	2	feet			3/16/2001 0:00			16			5 U		
1		UPS-SS03	UPS-SS03-4	Soil	Unknown	2	3	feet			3/16/2001 0:00			391			71		
1		UPS-SS03	UPS-SS03-4.1	Soil	Unknown	2	3	feet			3/16/2001 0:00						19		
1		UPS-SS04	UPS-SS04-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			986			603		
1		UPS-SS04	UPS-SS04-2	Soil	Unknown	0.33333	1	feet			3/16/2001 0:00			1027			370		
1		UPS-SS04	UPS-SS04-3	Soil	Unknown	1	2	feet			3/16/2001 0:00			1979			230		
1		UPS-SS05	UPS-SS05-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			203			320		
1		UPS-SS05	UPS-SS05-2	Soil	Unknown	0.33333	0.66667	feet			3/16/2001 0:00			275			343		
1		UPS-SS05	UPS-SS05-3	Soil	Unknown	1	2	feet			3/16/2001 0:00			525			90		
1		UPS-SS06	UPS-SS06-4	Soil	Unknown	2.33333	2.91667	feet			3/20/2001 0:00			27			17		
1		UPS-SS07	UPS-SS07-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			0.11			945		
1		UPS-SS07	UPS-SS07-2	Soil	Unknown	0.33333	1	feet			3/16/2001 0:00			478			483		
1		UPS-SS07	UPS-SS07-3	Soil	Unknown	1	2	feet			3/16/2001 0:00			252			38		
1		UPS-SS07	UPS-SS07-4	Soil	Unknown	2	3	feet			3/16/2001 0:00			212			15		
1		UPS-SS08	UPS-SS08-1	Soil	Unknown	0	0.33333	feet			3/15/2001 0:00			60			0.05 U		
1		UPS-SS08	UPS-SS08-2	Soil	Unknown	0.33333	1	feet			3/15/2001 0:00			83			48		
1		UPS-SS08	UPS-SS08-3	Soil	Unknown	1	2	feet			3/15/2001 0:00			80			33		
1		UPS-SS08	UPS-SS08-4	Soil	Unknown	2	3	feet			3/15/2001 0:00			48			28		
1		UPS-SS09	UPS-SS09-1	Soil	Unknown	0	0.33333	feet			3/20/2001 0:00			334			31		
1		UPS-SS09	UPS-SS09-2	Soil	Unknown	0.33333	1	feet			3/20/2001 0:00			190			35		
1		UPS-SS09	UPS-SS09-3	Soil	Unknown	1	2	feet			3/20/2001 0:00			17			5 U		
1		UPS-SS09	UPS-SS09-4	Soil	Unknown	2	3	feet			3/20/2001 0:00			10 U			5 U		
1		UPS-SS10	UPS-SS10-1	Soil	Unknown	0	0.33333	feet			3/20/2001 0:00			1191			105		
1		UPS-SS10	UPS-SS10-2	Soil	Unknown	0.33333	1	feet			3/20/2001 0:00			92			5 U		
1		UPS-SS10	UPS-SS10-3	Soil	Unknown	1	2	feet			3/20/2001 0:00			11			5 U		
1		UPS-SS10	UPS-SS10-4	Soil	Unknown	2	3	feet			3/20/2001 0:00			11			5 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
1		UPS-SS11	UPS-SS11-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			1748			116		
1		UPS-SS11	UPS-SS11-2	Soil	Unknown	0.33333	0.83333	feet			3/16/2001 0:00			288			68		
1		UPS-SS11	UPS-SS11-2.1	Soil	Unknown	0.83333	1	feet			3/16/2001 0:00			410			75		
1		UPS-SS11	UPS-SS11-3	Soil	Unknown	1	1.33333	feet			3/16/2001 0:00			102			14		
1		UPS-SS11	UPS-SS11-3.1	Soil	Unknown	1.33333	2	feet			3/16/2001 0:00			164			16		
1		UPS-SS11	UPS-SS11-4	Soil	Unknown	2	3	feet			3/16/2001 0:00			137			5 U		
1		UPS-SS12	UPS-SS12-1	Soil	Unknown	0	0.33333	feet			3/16/2001 0:00			5955			192		
1		UPS-SS12	UPS-SS12-2	Soil	Unknown	0.33333	1	feet			3/16/2001 0:00			862			124		
1		UPS-SS12	UPS-SS12-3	Soil	Unknown	1	2	feet			3/16/2001 0:00			625			75		
1		UPS-SS12	UPS-SS12-4	Soil	Unknown	2	3	feet			3/16/2001 0:00			465			79		
1		UPS-SS13	UPS-SS13-1	Soil	Unknown	0	0.33333	feet			3/20/2001 0:00			21			843		
1		UPS-SS13	UPS-SS13-2	Soil	Unknown	0.33333	1	feet			3/20/2001 0:00			1924			501		
1		UPS-SS13	UPS-SS13-3	Soil	Unknown	1	2	feet			3/20/2001 0:00			1894			0.05 U		
1		UPS-SS13	UPS-SS13-4	Soil	Unknown	2	3	feet			3/20/2001 0:00			415			50		
1		UPS-SS14	UPS-SS14-1	Soil	Unknown	0	0.33333	feet			3/20/2001 0:00			18			1160		
1		UPS-SS14	UPS-SS14-2	Soil	Unknown	0.33333	1	feet			3/20/2001 0:00			2148			182		
1		SS21	SS-21	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			17075			1693		
1		SS28	SS-28	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			8625			2525		
1		SS29	SS-29	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			9525			2575		
1		SS30	SS-30	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			1633			373		
1		SS31	SS-31	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			2625			813		
3		PPC-RZ-1		Soil		0	0	feet	TOTAL	mg/kg	7/28/2010 15:20	6610	5.6	71.8	113	10 U	9.8	13	9
3		UOP-SS20		Soil		0	0.5	feet	TOTAL	mg/kg	8/10/2010 7:05	6820	28	199	100 U	10 U	73.8	10	6
3		UOP-SS20		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/10/2010 7:20	12400	16.7	180	147	10 U	34.9	17	9
3		UOP-SS20		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/10/2010 7:35	11600	3	116	133	10 U	20.1	15	8
3		UOP-SS19	UOP-SS19-1	Soil	Unknown	0	0.33333	feet			3/21/2001 0:00			387			80		
3		UOP-SS19	UOP-SS19-2	Soil	Unknown	0.33333	1	feet			3/21/2001 0:00			97			79		
3		UOP-SS19	UOP-SS19-3	Soil	Unknown	1	2	feet			3/21/2001 0:00			43			5 U		
3		UOP-SS19	UOP-SS19-4	Soil	Unknown	2	3	feet			3/21/2001 0:00			62			5 U		
3		UOP-SS20	UOP-SS20-1	Soil	Unknown	0	0.33333	feet			3/21/2001 0:00			0.1 U			28		
3		UOP-SS20	UOP-SS20-2	Soil	Unknown	0.33333	1	feet			3/21/2001 0:00			228			55		
3		UOP-SS20	UOP-SS20-3	Soil	Unknown	1	2	feet			3/21/2001 0:00			23			25		
3		UOP-SS20	UOP-SS20-4	Soil	Unknown	2	3	feet			3/21/2001 0:00			10 U			5 U		
5		LOS-SS15		Soil		0	0.5	feet	TOTAL	mg/kg	8/12/2010 8:00	8600	34	907	216	10 U	41.9	14	9
5		LOS-SS15		Soil		0	0.5	feet	TOTAL	mg/kg	8/6/2010 8:10	7750	29.3	730	175	10 U	34.5	11	8
5		LOS-SS15		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/6/2010 8:20	8820	0.4	25	133	10 U	4.2	8	4
5		LOS-SS15		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/6/2010 8:35	12300	0.1 U	18	163	10 U	0.6	20	6
5		LOS-SS3		Soil		0	0.5	feet	TOTAL	mg/kg	8/4/2010 11:25	12400	17.4	261	161	10 U	114	16	7
5		LOS-SS3		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/4/2010 11:40	13100	1.3	27	135	10 U	5.9	17	5
5		LOS-SS3		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/4/2010 11:55	12800	0.5	18	183	10 U	1.8	17	6
5		LOS-SS8		Soil		0	0.5	feet	TOTAL	mg/kg	8/4/2010 12:45	12000	6.4	56	146	10 U	59.7	14	6
5		LOS-SS8		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/4/2010 12:55	13200	5.2	70	163	10 U	42.8	15	6
5		LOS-SS8		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/4/2010 13:05	12200	0.3	13	132	10 U	2.6	13	5
5		LOS-SS9		Soil		0	0.5	feet	TOTAL	mg/kg	8/6/2010 7:05	10000	173	869	128	10 U	191	12	10
5		LOS-SS9		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/6/2010 7:15	9850	8.5	61	120	10 U	15.4	12	5
5		LOS-SS9		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/6/2010 7:30	10800	0.9	23	137	10 U	2.4	18	5
5		PPC-RZ-3		Soil		0	0	feet	TOTAL	mg/kg	7/30/2010 14:30	7020	1.8	42	100 U	10 U	7.2	13	6
5		PPC-RZ-4		Soil		0	0	feet	TOTAL	mg/kg	7/30/2010 13:10	7890	8	78	126	10 U	13.9	11	9
5		RFI2SB-11		Soil		0	0.5	feet	TOTAL	mg/kg	8/19/2010 10:45	7800	7.4	98	125	10 U	39.2	13	6
5		RFI2SB-11		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/19/2010 10:50	10800	4.4	41	146	10 U	28.4	16	6
5		RFI2SB-11		Soil		2.5	5	feet	TOTAL	mg/kg	8/19/2010 16:00	9380	0.1 U	21	136	10 U	0.1 U	17	6
5		RFI2SB-11		Soil		2.5	5	feet	TOTAL	mg/kg	8/19/2010 10:55	9950	0.1 U	17	131	10 U	0.2	19	5
5		RFI2SB-11		Soil		5	7	feet	UNKNOWN	mg/kg	8/19/2010 11:00	5120	5 U	8	44	5 U	1 U	13	5 U
5		RFI2SB-11		Soil		10	12	feet	UNKNOWN	mg/kg	8/19/2010 11:10	9170	5 U	8	88	5 U	1 U	13	5
5		RFI2SB-11		Soil		15	17	feet	UNKNOWN	mg/kg	8/19/2010 11:20	11300	5 U	10	87	5 U	1 U	19	9
5		RFI2SB-11		Soil		20	22	feet	UNKNOWN	mg/kg	8/19/2010 11:30	11000	5 U	7	61	5 U	1 U	19	7
5		RFI2SB-11		Soil		25	26.5	feet	UNKNOWN	mg/kg	8/19/2010 11:40	5480	5 U	6	23	5 U	1 U	10	5 U
5		RFI2SB-11		Soil		30	32	feet	UNKNOWN	mg/kg	8/19/2010 12:10	3410	5 U	10	23	5 U	1 U	6	5 U
5		RFI2SB-11		Soil		35	36.5	feet	UNKNOWN	mg/kg	8/19/2010 16:30	18200	5 U	5 U	21	9	1 U	5 U	5 U
5		RFI2SB-11		Soil		35	36.5	feet	UNKNOWN	mg/kg	8/19/2010 12:15	18200	5 U	5 U	20	9	1 U	5 U	5 U
5		RFI2SB-11		Soil		40	41.5	feet	UNKNOWN	mg/kg	8/19/2010 12:35	20500	5 U	5 U	27	9	1 U	5 U	5 U
5		RFI2SB-11		Soil		45	46.5	feet	UNKNOWN	mg/kg	8/19/2010 13:00	12500	5 U	5 U	29	5 U	1 U	5 U	5 U
5		RFI2SB-11		Soil		50	51.5	feet	UNKNOWN	mg/kg	8/19/2010 13:40	11000	5 U	5 U	47	5 U	1 U	5 U	5 U
5		RFI2SB-11		Soil		55	56.5	feet	UNKNOWN	mg/kg	8/19/2010 14:05	7400	5 U	5 U	34	5 U	1 U	5 U	5 U
5		RFI2SB-11		Soil		60	61.5	feet	UNKNOWN	mg/kg	8/19/2010 14:30	6040	5 U	5 U	17	5 U	1 U	5 U	5 U
5		RFI2SB-22		Soil		0	0.5	feet	TOTAL	mg/kg	9/7/2010 14:25	18800	8.9	135	103	10 U	101	7	6
5		RFI2SB-22		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/7/2010 14:30	11200	26	280	100 U	10 U	82.2	17	11
5		RFI2SB-22		Soil		2.5	5	feet	TOTAL	mg/kg	9/7/2010 14:45	4950	13.3	78	100 U	10 U	31.5	8	5
5		RFI2SB-22		Soil		5	7	feet	UNKNOWN	mg/kg	9/7/2010 15:05	5930	5	66	56	5 U	23	6	5 U

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	*990,000*	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	**Remediated?**	**Station Name**	**Field Sample ID**	**Sample Matrix**	**Analytical Method**	**Sample Top**	**Sample Bottom**	**Depth Units**	**FilteredAnalysis**	**Reporting Units**	**Sample Date**	**Aluminum (Al)**	**Antimony (Sb)**	**Arsenic (As)**	**Barium (Ba)**	**Beryllium (Be)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Cobalt (Co)**
5		RFI2SB-22		Soil		5	7	feet	UNKNOWN	mg/kg	9/7/2010 15:10	4410	5	83	56	5 U	22	5 U	5 U
5		RFI2SB-22		Soil		10	10	feet	UNKNOWN	mg/kg	9/7/2010 15:15	2550	5 U	22	30	5 U	2	5 U	5 U
5		RFI2SB-22		Soil		15	12	feet	UNKNOWN	mg/kg	9/7/2010 15:25	10200	7	121	90	5 U	13	11	7
5		RFI2SB-22		Soil		20	17	feet	UNKNOWN	mg/kg	9/7/2010 15:40	1980	5 U	5 U	20	5 U	1 U	6	5 U
5		RFI2SB-22		Soil		25	22	feet	UNKNOWN	mg/kg	9/7/2010 15:55	3760	5 U	9	30	5 U	1 U	13	5 U
5		RFI2SB-22		Soil		30	27	feet	UNKNOWN	mg/kg	9/7/2010 16:10	11700	5 U	5 U	24	5 U	1 U	5 U	5 U
5		RFI2SB-3		Soil		0	0.5	feet	TOTAL	mg/kg	9/8/2010 7:40	13000	21.4	230	148	10 U	74.8	18	8
5		RFI2SB-3		Soil		0.5	2.5	feet	TOTAL	mg/kg	9/8/2010 7:45	8010	259	1520	258	10 U	343	21	25
5		RFI2SB-3		Soil		2.5	5	feet	TOTAL	mg/kg	9/8/2010 8:00	7890	153	1490	214	10 U	388	20	23
5		RFI2SB-3		Soil		5	32	feet	UNKNOWN	mg/kg	9/8/2010 8:10	8900	154	2850	211	5 U	515	18	18
5		RFI2SB-3		Soil		10	12	feet	UNKNOWN	mg/kg	9/8/2010 8:20	3300	31	471	44	5 U	42	5 U	9
5		RFI2SB-3		Soil		15	17	feet	UNKNOWN	mg/kg	9/8/2010 8:30	1790	5 U	51	22	5 U	5	5 U	5 U
5		RFI2SB-3		Soil		20	22	feet	UNKNOWN	mg/kg	9/8/2010 8:40	11500	5	15	132	5 U	1 U	14	9
5		RFI2SB-3		Soil		25	27	feet	UNKNOWN	mg/kg	9/8/2010 8:50	5350	5 U	8	33	5 U	1 U	17	5 U
5		RFI2SB-3		Soil		30	32	feet	UNKNOWN	mg/kg	9/8/2010 9:10	5060	7	87	42	5 U	8	11	5
5		RFI2SB-3		Soil		35	37	feet	UNKNOWN	mg/kg	9/8/2010 9:30	2760	5 U	20	16	5 U	1 U	5 U	5 U
5		RFI2SB-3		Soil		40	42	feet	UNKNOWN	mg/kg	9/8/2010 10:25	15200	5	6	67	5 U	1 U	5 U	5 U
5		RFI2SB-3		Soil		45	47	feet	UNKNOWN	mg/kg	9/8/2010 11:15	20000	5 U	5 U	59	5 U	1 U	5 U	5 U
5		UL-BK-1		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 12:45	11800	5.6	80	143	10 U	37.6	17	6
5		UL-BK-2		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 13:05	11300	61	393	138	10 U	380	13	13
5		UL-BK-3		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 13:25	1410	53	272	100 U	10 U	121	5 U	2
5		UL-BK-4		Soil		0	0	feet	TOTAL	mg/kg	8/6/2010 13:50	13100	1	17	129	10 U	3.3	15	5
5		ULM-7-SL		Soil		0	0	feet	TOTAL	mg/kg	8/5/2010 13:15	6290	3.5	53	100 U	10 U	7.9	12	5
5		UOP-SS2		Soil		0	0.5	feet	TOTAL	mg/kg	8/9/2010 7:30	7660	92	829	838	10 U	363	26	46
5		UOP-SS2		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/9/2010 7:45	8990	73	526	212	10 U	225	14	14
5		UOP-SS2		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/9/2010 8:00	12000	2.5	43	248	10 U	11.9	16	6
5		UOP-SS4		Soil		0	0.5	feet	TOTAL	mg/kg	8/9/2010 8:40	12000	4.2	63.2	145	10 U	21.1	13	6
5		UOP-SS4		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/9/2010 8:55	13400	2.6	50	180	10 U	9.3	15	6
5		UOP-SS4		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/9/2010 9:10	13100	0.9	23	152	10 U	4.1	16	5
5		UOS-SS21		Soil		0	0.5	feet	TOTAL	mg/kg	8/4/2010 7:35	11800	5.5	103	148	10 U	12	16	5
5		APSD-10	APSD-10-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			1299			125		
5		APSD-10	APSD-10-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			12990			230		
5		APSD-10	APSD-10-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			891			187		
5		APSD-10	APSD-10-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			1954			288		
5		APSD-10	APSD-10-5	Soil	EDXRF	8	10	feet			10/20/1993 0:00			2525			220		
5		APSD-10	APSD-10-6	Soil	EDXRF	10	12	feet			10/20/1993 0:00			1242			110		
5		APSD-10	APSD-10-7	Soil	EDXRF	12	14	feet			10/20/1993 0:00			1184			69		
5		APSD-10	APSD-10-8	Soil	EDXRF	14	16	feet			10/20/1993 0:00			462			33		
5		APSD-9	APSD-9-1	Soil	EDXRF	0	2	feet			10/20/1993 0:00			543			113		
5		APSD-9	APSD-9-2	Soil	EDXRF	2	4	feet			10/20/1993 0:00			851			80		
5		APSD-9	APSD-9-3	Soil	EDXRF	4	6	feet			10/20/1993 0:00			1631			43		
5		APSD-9	APSD-9-4	Soil	EDXRF	6	8	feet			10/20/1993 0:00			1754			37		
5		APSD-9	APSD-9-5	Soil	EDXRF	8	10	feet			10/20/1993 0:00			2391			42		
5		APSD-9	APSD-9-6	Soil	EDXRF	10	12	feet			10/20/1993 0:00			1461			34		
5		APSD-9	APSD-9-7	Soil	EDXRF	12	14	feet			10/20/1993 0:00			840			23		
5		APSD-9	APSD-9-8	Soil	EDXRF	14	16	feet			10/20/1993 0:00			471			21		
5		DH-48	IMMS-9910-131	Soil	EDXRF	0	2	feet			10/10/1999 0:00			906			434		
5		DH-48	IMMS-9910-132	Soil	EDXRF	2	4	feet			10/10/1999 0:00			33			10 U		
5		DH-48	IMMS-9910-133	Soil	EDXRF	4	6	feet			10/10/1999 0:00			12			10 U		
5		DH-48	IMMS-9910-134	Soil	EDXRF	6	8	feet			10/10/1999 0:00			13			10 U		
5		DH-48	IMMS-9910-135	Soil	EDXRF	8	10	feet			10/10/1999 0:00			15			10 U		
5		DH-48	IMMS-9910-136	Soil	EDXRF	10	12	feet			10/10/1999 0:00			12			10 U		
5		DH-48	IMMS-9910-137	Soil	EDXRF	14	16	feet			10/10/1999 0:00			11			10 U		
5		DH-48	IMMS-9910-139	Soil	EDXRF	19	21	feet			10/10/1999 0:00			11			10 U		
5		DH-48	IMMS-9910-140	Soil	EDXRF	24	26	feet			10/10/1999 0:00			13			10 U		
5		DH-48	IMMS-9910-141	Soil	EDXRF	29	31	feet			10/10/1999 0:00			13			10 U		
5		DH-48	IMMS-9910-142	Soil	EDXRF	33	35	feet			10/11/1999 0:00			10 U			10 U		
5		DH-63	DH-63-1	Soil	Unknown	0	2	feet			5/31/2001 10:00			40			31		
5		DH-63	DH-63-2	Soil	Unknown	2	4	feet			5/31/2001 10:15			58			20		
5		DH-63	DH-63-3	Soil	Unknown	4	6	feet			5/31/2001 10:30			19			10 U		
5		DH-63	DH-63-4	Soil	Unknown	6	8	feet			5/31/2001 10:45			13			10 U		
5		DH-63	DH-63-5	Soil	Unknown	8	10	feet			5/31/2001 11:00			14			10 U		
5		DH-63	DH-63-6	Soil	Unknown	10	12	feet			5/31/2001 11:30			10 U			10 U		
5		DH-63	DH-63-8	Soil	Unknown	20	22	feet			5/31/2001 11:50			13			10 U		
5		DH-63	DH-63-9	Soil	Unknown	25	27	feet			5/31/2001 13:30			15			10 U		
5		DH-63	DH-63-10	Soil	Unknown	30	32	feet			5/31/2001 14:00			10 U			10 U		
5		DH-63	DH-63-12	Soil	Unknown	39	41	feet			5/31/2001 15:45			10 U			10 U		
5		DH-67S	DH-67-01	Soil	EDXRF	0	2	feet			8/10/2002 10:45			117			76		
5		DH-67S	DH-67-02	Soil	EDXRF	2	4	feet			8/10/2002 10:50			17			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5		DH-67S	DH-67-03	Soil	EDXRF	5	7	feet			8/10/2002 11:00			24			10 U		
5		DH-67S	DH-67-04	Soil	EDXRF	10	12	feet			8/10/2002 11:30			10 U			10 U		
5		DH-67S	DH-67-05	Soil	EDXRF	15	17	feet			8/10/2002 11:55			10 U			10 U		
5		DH-67S	DH-67-06	Soil	EDXRF	20	22	feet			8/10/2002 12:15			17			10 U		
5		DH-67S	DH-67-07	Soil	EDXRF	25	27	feet			8/10/2002 13:00			10 U			10 U		
5		DH-67S	DH-67-08	Soil	EDXRF	30	32	feet			8/10/2002 13:30			14			10 U		
5		DH-67S	DH-67-09	Soil	EDXRF	35	37	feet			8/10/2002 14:00			10 U			10 U		
5		DH-67S	DH-67-10	Soil	EDXRF	40	42	feet			8/10/2002 14:30			10 U			10 U		
5		DH-67S	DH-67-11	Soil	EDXRF	45	47	feet			8/10/2002 15:20			10 U			10 U		
5		DH-67S	DH-67-12	Soil	EDXRF	49	51	feet			8/10/2002 16:00			10 U			10 U		
5		OS-1	IMSP-9911-118	Soil	EDXRF	0	9	feet			11/17/1999 0:00			32735			2839		
5		OS-10	IMSP-9911-123	Soil	EDXRF	0	18	feet			11/17/1999 0:00			2702			410		
5		OS-14	IMSP-9911-125	Soil	EDXRF	0	18	feet			11/17/1999 0:00			8813			1309		
5		OS-15	IMSP-9911-124	Soil	EDXRF	0	15	feet			11/17/1999 0:00			6730			4787		
5		OS-17	IMSP-9911-127	Soil	EDXRF	0	12	feet			11/17/1999 0:00			4156			2138		
5		OS-19	IMSP-9911-129	Soil	EDXRF	0	12	feet			11/18/1999 0:00			591			2868		
5		OS-2	IMSP-9911-117	Soil	EDXRF	0	10	feet			11/17/1999 0:00			5144			673		
5		OS-20	IMSP-9911-130	Soil	EDXRF	0	12	feet			11/18/1999 0:00			157			185		
5		OS-3	IMSP-9911-116	Soil	EDXRF	0	10	feet			11/17/1999 0:00			1890			418		
5		OS-4	IMSP-9911-112	Soil	EDXRF	0	10	feet			11/17/1999 0:00			308			100		
5		SRB-1	IMSP-9911-320	Soil	EDXRF	0	4	feet			12/3/1999 0:00			700			121		
5		SRB-1	IMSP-9911-319	Soil	EDXRF	4	6	feet			12/3/1999 0:00			486			97		
5		SRB-1	IMSP-9911-318	Soil	EDXRF	9	11	feet			12/3/1999 0:00			4370			300		
5		SRB-1	IMSP-9911-317	Soil	EDXRF	11	14	feet			12/3/1999 0:00			2131			144		
5		SRB-1	IMSP-9911-316	Soil	EDXRF	14	16	feet			12/3/1999 0:00			2518			1526		
5		SRB-1	IMSP-9911-315	Soil	EDXRF	16	18	feet			12/3/1999 0:00			635			71		
5		SRB-1	IMSP-9911-314	Soil	EDXRF	18	20	feet			12/3/1999 0:00			118			10 U		
5		SRB-10	IMSP-9911-356	Soil	EDXRF	0	2	feet			12/8/1999 0:00			3598			344		
5		SRB-10	IMSP-9911-357	Soil	EDXRF	2	4	feet			12/8/1999 0:00			1161			129		
5		SRB-10	IMSP-9911-358	Soil	EDXRF	4	6	feet			12/8/1999 0:00			184			29		
5		SRB-10	IMSP-9911-359	Soil	EDXRF	6	8	feet			12/9/1999 0:00			160			42		
5		SRB-10	IMSP-9911-360	Soil	EDXRF	8	10	feet			12/9/1999 0:00			186			49		
5		SRB-10	IMSP-9911-361	Soil	EDXRF	10	12	feet			12/9/1999 0:00			210			71		
5		SRB-10	IMSP-9911-363	Soil	EDXRF	12	14	feet			12/9/1999 0:00			506			83		
5		SRB-10	IMSP-9911-364	Soil	EDXRF	14	16	feet			12/9/1999 0:00			304			63		
5		SRB-10	IMSP-9911-365	Soil	EDXRF	16	18	feet			12/9/1999 0:00			369			409		
5		SRB-10	IMSP-9911-366	Soil	EDXRF	18	20	feet			12/9/1999 0:00			321			78		
5		SRB-10	IMSP-9911-367	Soil	EDXRF	20	22	feet			12/9/1999 0:00			768			723		
5		SRB-11	IMSP-9911-260	Soil	EDXRF	0	3	feet			12/2/1999 0:00			221			30		
5		SRB-11	IMSP-9911-259	Soil	EDXRF	3	5	feet			12/2/1999 0:00			419			82		
5		SRB-11	IMSP-9911-258	Soil	EDXRF	5	6	feet			12/2/1999 0:00			62			10 U		
5		SRB-11	IMSP-9911-257	Soil	EDXRF	6	9	feet			12/2/1999 0:00			555			117		
5		SRB-11	IMSP-9911-256	Soil	EDXRF	9	11	feet			12/2/1999 0:00			385			85		
5		SRB-11	IMSP-9911-255	Soil	EDXRF	11	14	feet			12/2/1999 0:00			571			49		
5		SRB-11	IMSP-9911-254	Soil	EDXRF	14	16	feet			12/2/1999 0:00			543			150		
5		SRB-11	IMSP-9911-253	Soil	EDXRF	16	19	feet			12/2/1999 0:00			102			24		
5		SRB-11	IMSP-9911-252	Soil	EDXRF	19	21	feet			12/2/1999 0:00			646			221		
5		SRB-11	IMSP-9911-251	Soil	EDXRF	21	24	feet			12/2/1999 0:00			1199			327		
5		SRB-11	IMSP-9911-249	Soil	EDXRF	25.7	27	feet			12/2/1999 0:00			16			10 U		
5		SRB-11	IMSP-9911-248	Soil	EDXRF	27	27	feet			12/2/1999 0:00			10 U			10 U		
5		SRB-12	IMSP-9911-246	Soil	EDXRF	0	3	feet			12/2/1999 0:00			497			77		
5		SRB-12	IMSP-9911-247	Soil	EDXRF	3	6	feet			12/2/1999 0:00			182			25		
5		SRB-12	IMSP-9911-245	Soil	EDXRF	6	9	feet			12/2/1999 0:00			198			69		
5		SRB-12	IMSP-9911-244	Soil	EDXRF	9	12	feet			12/2/1999 0:00			298			61		
5		SRB-12	IMSP-9911-243	Soil	EDXRF	12	14	feet			12/2/1999 0:00			233			53		
5		SRB-12	IMSP-9911-242	Soil	EDXRF	14	16	feet			12/2/1999 0:00			674			233		
5		SRB-12	IMSP-9911-241	Soil	EDXRF	16	19	feet			12/2/1999 0:00			390			134		
5		SRB-12	IMSP-9911-240	Soil	EDXRF	19	21	feet			12/2/1999 0:00			38			10 U		
5		SRB-12	IMSP-9911-239	Soil	EDXRF	21	24	feet			12/2/1999 0:00			1012			410		
5		SRB-13	IMSP-9911-236	Soil	EDXRF	0	2	feet			12/1/1999 0:00			1111			451		
5		SRB-13	IMSP-9911-235	Soil	EDXRF	2	7.5	feet			12/1/1999 0:00			421			59		
5		SRB-13	IMSP-9911-234	Soil	EDXRF	7	9.5	feet			12/1/1999 0:00			995			93		
5		SRB-13	IMSP-9911-233	Soil	EDXRF	9.5	12	feet			12/1/1999 0:00			744			273		
5		SRB-13	IMSP-9911-232	Soil	EDXRF	12	15	feet			12/1/1999 0:00			154			18		
5		SRB-13	IMSP-9911-231	Soil	EDXRF	15	18	feet			12/1/1999 0:00			68			12		
5		SRB-13	IMSP-9911-230	Soil	EDXRF	18	21	feet			12/1/1999 0:00			1750			479		
5		SRB-13	IMSP-9911-229	Soil	EDXRF	21	24	feet			12/1/1999 0:00			3580			836		
5		SRB-13	IMSP-9911-228	Soil	EDXRF	24	24	feet			12/1/1999 0:00			12			10 U		
5		SRB-14	IMSP-9911-368	Soil	EDXRF	0	2	feet			12/8/1999 0:00			2134			554		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5		SRB-14	IMSP-9911-369	Soil	EDXRF	2	4	feet			12/8/1999 0:00			2654			423		
5		SRB-14	IMSP-9911-370	Soil	EDXRF	2	4	feet			12/9/1999 0:00			2832			450		
5		SRB-14	IMSP-9911-371	Soil	EDXRF	6	8	feet			12/9/1999 0:00			259			60		
5		SRB-14	IMSP-9911-372	Soil	EDXRF	8	10	feet			12/9/1999 0:00			666			120		
5		SRB-14	IMSP-9911-373	Soil	EDXRF	10	12	feet			12/9/1999 0:00			234			77		
5		SRB-14	IMSP-9911-374	Soil	EDXRF	12	14	feet			12/9/1999 0:00			284			55		
5		SRB-14	IMSP-9911-375	Soil	EDXRF	14	16	feet			12/10/1999 0:00			239			58		
5		SRB-14	IMSP-9911-376	Soil	EDXRF	16	18	feet			12/10/1999 0:00			106			20		
5		SRB-14	IMSP-9911-377	Soil	EDXRF	18	20	feet			12/10/1999 0:00			246			49		
5		SRB-14	IMSP-9911-378	Soil	EDXRF	20	22	feet			12/10/1999 0:00			584			310		
5		SRB-14	IMSP-9911-379	Soil	EDXRF	22	24	feet			12/10/1999 0:00			327			55		
5		SRB-14	IMSP-9911-380	Soil	EDXRF	24	26	feet			12/10/1999 0:00			116			19		
5		SRB-14	IMSP-9911-381	Soil	EDXRF	26	28	feet			12/10/1999 0:00			11			10 U		
5		SRB-16	IMSP-9911-210	Soil	EDXRF	0	2	feet			12/1/1999 0:00			302			75		
5		SRB-16	IMSP-9911-211	Soil	EDXRF	2	3	feet			12/1/1999 0:00			470			77		
5		SRB-16	IMSP-9911-212	Soil	EDXRF	3	4	feet			12/1/1999 0:00			82			18		
5		SRB-16	IMSP-9911-213	Soil	EDXRF	4	7	feet			12/1/1999 0:00			609			68		
5		SRB-16	IMSP-9911-214	Soil	EDXRF	7	10	feet			12/1/1999 0:00			796			454		
5		SRB-16	IMSP-9911-215	Soil	EDXRF	10	14	feet			12/1/1999 0:00			110			19		
5		SRB-16	IMSP-9911-217	Soil	EDXRF	18	18	feet			12/1/1999 0:00								
5		SRB-17	IMSP-9911-183	Soil	EDXRF	0	3	feet			11/22/1999 0:00			360			64		
5		SRB-17	IMSP-9911-184	Soil	EDXRF	3	5.5	feet			11/22/1999 0:00			1694			350		
5		SRB-17	IMSP-9911-185	Soil	EDXRF	5.5	9.5	feet			11/22/1999 0:00			350			97		
5		SRB-17	IMSP-9911-186	Soil	EDXRF	9.5	12.5	feet			11/22/1999 0:00			440			44		
5		SRB-17	IMSP-9911-187	Soil	EDXRF	12.5	14.5	feet			11/22/1999 0:00			1970			133		
5		SRB-17	IMSP-9911-188	Soil	EDXRF	14.5	16	feet			11/22/1999 0:00			35			10 U		
5		SRB-17	IMSP-9911-189	Soil	EDXRF	16	18	feet			11/22/1999 0:00			1786			231		
5		SRB-17	IMSP-9911-190	Soil	EDXRF	19.5	20.5	feet			11/22/1999 0:00			10 U			10 U		
5		SRB-17	IMSP-9911-191	Soil	EDXRF	20.5	20.5	feet			11/22/1999 0:00			10 U			10 U		
5		SRB-18	IMSP-9911-192	Soil	EDXRF	0	2.5	feet			11/22/1999 0:00			813			105		
5		SRB-18	IMSP-9911-193	Soil	EDXRF	2.5	5	feet			11/22/1999 0:00			614			74		
5		SRB-18	IMSP-9911-194	Soil	EDXRF	5	8	feet			11/22/1999 0:00			133			59		
5		SRB-18	IMSP-9911-195	Soil	EDXRF	8	11	feet			11/22/1999 0:00			1388			198		
5		SRB-18	IMSP-9911-197	Soil	EDXRF	11	13	feet			11/22/1999 0:00			137			85		
5		SRB-18	IMSP-9911-198	Soil	EDXRF	13	14.5	feet			11/22/1999 0:00			414			185		
5		SRB-18	IMSP-9911-199	Soil	EDXRF	14.5	16	feet			11/22/1999 0:00			13			10 U		
5		SRB-19	IMSP-9911-200	Soil	EDXRF	0	2	feet			11/22/1999 0:00			662			126		
5		SRB-19	IMSP-9911-201	Soil	EDXRF	2	4	feet			11/22/1999 0:00			707			127		
5		SRB-19	IMSP-9911-202	Soil	EDXRF	4	6	feet			11/22/1999 0:00			496			88		
5		SRB-19	IMSP-9911-203	Soil	EDXRF	6	8	feet			11/22/1999 0:00			404			97		
5		SRB-19	IMSP-9911-204	Soil	EDXRF	8	10	feet			11/22/1999 0:00								
5		SRB-19	IMSP-9911-205	Soil	EDXRF	10	12	feet			11/22/1999 0:00			53			10 U		
5		SRB-19	IMSP-9911-206	Soil	EDXRF	12	14	feet			11/22/1999 0:00			13			10 U		
5		SRB-2	IMSP-9911-321	Soil	EDXRF	0	2	feet			12/7/1999 0:00			926			315		
5		SRB-2	IMSP-9911-322	Soil	EDXRF	2	2.5	feet			12/7/1999 0:00			1407			186		
5		SRB-2	IMSP-9911-323	Soil	EDXRF	4	6	feet			12/7/1999 0:00			431			15		
5		SRB-2	IMSP-9911-324	Soil	EDXRF	6	8	feet			12/7/1999 0:00			1117			63		
5		SRB-2	IMSP-9911-326	Soil	EDXRF	8	10	feet			12/7/1999 0:00			848			43		
5		SRB-2	IMSP-9911-327	Soil	EDXRF	10	12	feet			12/7/1999 0:00			339			33		
5		SRB-2	IMSP-9911-328	Soil	EDXRF	12	14	feet			12/7/1999 0:00			924			108		
5		SRB-2	IMSP-9911-329	Soil	EDXRF	14	16	feet			12/7/1999 0:00			1884			56		
5		SRB-2	IMSP-9911-330	Soil	EDXRF	16	18	feet			12/7/1999 0:00			14			10 U		
5		SRB-20	IMSP-9911-207	Soil	EDXRF	0	4	feet			12/1/1999 0:00			430			174		
5		SRB-20	IMSP-9911-208	Soil	EDXRF	4	6	feet			12/1/1999 0:00			1420			477		
5		SRB-20	IMSP-9911-209	Soil	EDXRF	6	7	feet			12/1/1999 0:00			145			83		
5		SRB-21	IMSP-9911-180	Soil	EDXRF	0	3	feet			11/22/1999 0:00			1402			327		
5		SRB-21	IMSP-9911-182	Soil	EDXRF	5	7	feet			11/22/1999 0:00			412			58		
5		SRB-3	IMSP-9911-312	Soil	EDXRF	0	3	feet			12/3/1999 0:00			243			208		
5		SRB-3	IMSP-9911-311	Soil	EDXRF	3	6	feet			12/3/1999 0:00			314			46		
5		SRB-3	IMSP-9911-310	Soil	EDXRF	6	8	feet			12/3/1999 0:00			188			31		
5		SRB-3	IMSP-9911-309	Soil	EDXRF	8	11	feet			12/3/1999 0:00			406			62		
5		SRB-3	IMSP-9911-308	Soil	EDXRF	11	13	feet			12/3/1999 0:00			466			110		
5		SRB-3	IMSP-9911-307	Soil	EDXRF	13	15	feet			12/3/1999 0:00			406			110		
5		SRB-3	IMSP-9911-306	Soil	EDXRF	15	18	feet			12/3/1999 0:00			468			118		
5		SRB-3	IMSP-9911-304	Soil	EDXRF	20	23	feet			12/3/1999 0:00						10 U		
5		SRB-3	IMSP-9911-303	Soil	EDXRF	23	23	feet			12/3/1999 0:00			16			10 U		
5		SRB-4	IMSP-9911-331	Soil	EDXRF	0	2	feet			12/7/1999 0:00			1565			300		
5		SRB-4	IMSP-9911-332	Soil	EDXRF	2	4	feet			12/7/1999 0:00			282			58		
5		SRB-4	IMSP-9911-334	Soil	EDXRF	4	6	feet			12/7/1999 0:00			279			44		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5		SRB-4	IMSP-9911-335	Soil	EDXRF	8	10	feet			12/7/1999 0:00			571			121		
5		SRB-4	IMSP-9911-336	Soil	EDXRF	10	11	feet			12/7/1999 0:00			590			142		
5		SRB-4	IMSP-9911-337	Soil	EDXRF	12	14	feet			12/7/1999 0:00			682			153		
5		SRB-4	IMSP-9911-338	Soil	EDXRF	14	16	feet			12/7/1999 0:00			602			141		
5		SRB-4	IMSP-9911-339	Soil	EDXRF	18	20	feet			12/8/1999 0:00			799			222		
5		SRB-4	IMSP-9911-340	Soil	EDXRF	20	22	feet			12/8/1999 0:00			828			143		
5		SRB-4	IMSP-9911-341	Soil	EDXRF	22	24	feet			12/8/1999 0:00			142			25		
5		SRB-4	IMSP-9911-342	Soil	EDXRF	24	26	feet			12/8/1999 0:00			33			10 U		
5		SRB-5	IMSP-9911-302	Soil	EDXRF	0	2	feet			12/3/1999 0:00			372			63		
5		SRB-5	IMSP-9911-301	Soil	EDXRF	2	5	feet			12/3/1999 0:00			239			57		
5		SRB-5	IMSP-9911-300	Soil	EDXRF	5	7	feet			12/3/1999 0:00			504			140		
5		SRB-5	IMSP-9911-299	Soil	EDXRF	7	10	feet			12/3/1999 0:00			2362			508		
5		SRB-5	IMSP-9911-298	Soil	EDXRF	10	12	feet			12/3/1999 0:00			1831			423		
5		SRB-5	IMSP-9911-297	Soil	EDXRF	12	14	feet			12/3/1999 0:00			2387			437		
5		SRB-5	IMSP-9911-296	Soil	EDXRF	14	17.5	feet			12/3/1999 0:00			873			414		
5		SRB-5	IMSP-9911-295	Soil	EDXRF	17.5	19.5	feet			12/3/1999 0:00			5197			794		
5		SRB-5	IMSP-9911-294	Soil	EDXRF	21	23	feet			12/3/1999 0:00			126			44		
5		SRB-5	IMSP-9911-293	Soil	EDXRF	23	23	feet			12/3/1999 0:00			21			10 U		
5		SRB-6	IMSP-9911-343	Soil	EDXRF	0	2	feet			12/8/1999 0:00			395			279		
5		SRB-6	IMSP-9911-344	Soil	EDXRF	2	4	feet			12/8/1999 0:00			730			210		
5		SRB-6	IMSP-9911-346	Soil	EDXRF	4	6	feet			12/8/1999 0:00			251			91		
5		SRB-6	IMSP-9911-347	Soil	EDXRF	6	8	feet			12/8/1999 0:00			528			140		
5		SRB-6	IMSP-9911-348	Soil	EDXRF	8	10	feet			12/8/1999 0:00			1493			270		
5		SRB-6	IMSP-9911-349	Soil	EDXRF	10	12	feet			12/8/1999 0:00			1629			296		
5		SRB-6	IMSP-9911-350	Soil	EDXRF	12	14	feet			12/8/1999 0:00			1203			396		
5		SRB-6	IMSP-9911-351	Soil	EDXRF	14	16	feet			12/8/1999 0:00			963			387		
5		SRB-6	IMSP-9911-352	Soil	EDXRF	16	18	feet			12/8/1999 0:00			1019			402		
5		SRB-6	IMSP-9911-353	Soil	EDXRF	18	20	feet			12/8/1999 0:00			8578			835		
5		SRB-6	IMSP-9911-354	Soil	EDXRF	20	22	feet			12/8/1999 0:00			709			165		
5		SRB-7	IMSP-9911-292	Soil	EDXRF	0	2	feet			12/2/1999 0:00			2608			1132		
5		SRB-7	IMSP-9911-291	Soil	EDXRF	2	5	feet			12/2/1999 0:00			134			19		
5		SRB-7	IMSP-9911-290	Soil	EDXRF	5	7	feet			12/2/1999 0:00			1515			186		
5		SRB-7	IMSP-9911-289	Soil	EDXRF	7	9	feet			12/2/1999 0:00			354			56		
5		SRB-7	IMSP-9911-288	Soil	EDXRF	9	11	feet			12/2/1999 0:00			953			161		
5		SRB-7	IMSP-9911-287	Soil	EDXRF	11	14	feet			12/2/1999 0:00			328			67		
5		SRB-7	IMSP-9911-286	Soil	EDXRF	14	17	feet			12/2/1999 0:00			1151			170		
5		SRB-7	IMSP-9911-285	Soil	EDXRF	17	19	feet			12/2/1999 0:00			816			135		
5		SRB-7	IMSP-9911-284	Soil	EDXRF	19	21	feet			12/2/1999 0:00			668			183		
5		SRB-7	IMSP-9911-283	Soil	EDXRF	21	24	feet			12/2/1999 0:00			141			179		
5		SRB-7	IMSP-9911-282	Soil	EDXRF	24	24	feet			12/2/1999 0:00			10 U			10 U		
5		SRB-8	IMSP-9911-281	Soil	EDXRF	0	4	feet			12/2/1999 0:00			6662			813		
5		SRB-8	IMSP-9911-280	Soil	EDXRF	4	7	feet			12/2/1999 0:00			396			106		
5		SRB-8	IMSP-9911-279	Soil	EDXRF	7	10	feet			12/2/1999 0:00			260			85		
5		SRB-8	IMSP-9911-278	Soil	EDXRF	10	13	feet			12/2/1999 0:00			1067			97		
5		SRB-8	IMSP-9911-277	Soil	EDXRF	13	15	feet			12/2/1999 0:00			141			28		
5		SRB-8	IMSP-9911-276	Soil	EDXRF	15	18	feet			12/2/1999 0:00			157			40		
5		SRB-8	IMSP-9911-275	Soil	EDXRF	18	20	feet			12/2/1999 0:00			1097			245		
5		SRB-8	IMSP-9911-274	Soil	EDXRF	20	22	feet			12/2/1999 0:00			183			54		
5		SRB-8	IMSP-9911-272	Soil	EDXRF	25	27	feet			12/2/1999 0:00			1073			243		
5		SRB-8	IMSP-9911-271	Soil	EDXRF	27	27	feet			12/2/1999 0:00								
5		SRB-9	IMSP-9911-270	Soil	EDXRF	0	4	feet			12/2/1999 0:00			80			10 U		
5		SRB-9	IMSP-9911-269	Soil	EDXRF	4	7	feet			12/2/1999 0:00			142			33		
5		SRB-9	IMSP-9911-268	Soil	EDXRF	7	10	feet			12/2/1999 0:00			111			55		
5		SRB-9	IMSP-9911-267	Soil	EDXRF	10	13	feet			12/2/1999 0:00			807			78		
5		SRB-9	IMSP-9911-266	Soil	EDXRF	13	15	feet			12/2/1999 0:00			264			103		
5		SRB-9	IMSP-9911-265	Soil	EDXRF	15	18	feet			12/2/1999 0:00			581			162		
5		SRB-9	IMSP-9911-264	Soil	EDXRF	18	21	feet			12/2/1999 0:00			526			125		
5		SRB-9	IMSP-9911-263	Soil	EDXRF	21	13	feet			12/2/1999 0:00			707			80		
5		SRB-9	IMSP-9911-262	Soil	EDXRF	23	25	feet			12/2/1999 0:00			11			10 U		
5		SRB-9	IMSP-9911-261	Soil	EDXRF	25	25	feet			12/2/1999 0:00			10 U			10 U		
5		SRT-1	IMSP-9911-151	Soil	EDXRF	0	2	feet			11/18/1999 0:00			4887			8465		
5		SRT-1	IMSP-9911-152	Soil	EDXRF	2	4	feet			11/18/1999 0:00			1091			1896		
5		SRT-1	IMSP-9911-153	Soil	EDXRF	4	6	feet			11/18/1999 0:00			687			1140		
5		SRT-10	IMSP-9911-160	Soil	EDXRF	0	2	feet			11/18/1999 0:00			2042			214		
5		SRT-10	IMSP-9911-161	Soil	EDXRF	2	4	feet			11/18/1999 0:00			2474			176		
5		SRT-10	IMSP-9911-162	Soil	EDXRF	4	6	feet			11/18/1999 0:00			1175			194		
5		SRT-11	IMSP-9911-157	Soil	EDXRF	0	2	feet			11/18/1999 0:00			944			130		
5		SRT-11	IMSP-9911-158	Soil	EDXRF	2	4	feet			11/18/1999 0:00			809			158		
5		SRT-11	IMSP-9911-159	Soil	EDXRF	4	6	feet			11/18/1999 0:00			447			110		

Screening Level (mg/kg)												Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
												Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
												on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5		SRT-12	IMSP-9911-154	Soil	EDXRF	0	2	feet			11/18/1999 0:00			400			75		
5		SRT-12	IMSP-9911-155	Soil	EDXRF	2	4	feet			11/18/1999 0:00			407			79		
5		SRT-12	IMSP-9911-156	Soil	EDXRF	4	6	feet			11/18/1999 0:00			3365			570		
5		SRT-2	IMSP-9911-148	Soil	EDXRF	0	2	feet			11/18/1999 0:00			749			196		
5		SRT-2	IMSP-9911-149	Soil	EDXRF	2	4	feet			11/18/1999 0:00			2254			146		
5		SRT-2	IMSP-9911-150	Soil	EDXRF	4	6	feet			11/18/1999 0:00			706			163		
5		SRT-3	IMSP-9911-145	Soil	EDXRF	0	2	feet			11/18/1999 0:00			694			143		
5		SRT-3	IMSP-9911-146	Soil	EDXRF	2	4	feet			11/18/1999 0:00			311			114		
5		SRT-3	IMSP-9911-147	Soil	EDXRF	4	6	feet			11/18/1999 0:00			301			145		
5		SRT-4	IMSP-9911-142	Soil	EDXRF	0	2	feet			11/18/1999 0:00			698			118		
5		SRT-4	IMSP-9911-143	Soil	EDXRF	2	4	feet			11/18/1999 0:00			1016			81		
5		SRT-4	IMSP-9911-144	Soil	EDXRF	4	6	feet			11/18/1999 0:00			421			155		
5		SRT-5	IMSP-9911-139	Soil	EDXRF	0	2	feet			11/18/1999 0:00			675			271		
5		SRT-5	IMSP-9911-140	Soil	EDXRF	2	4	feet			11/18/1999 0:00			1852			1428		
5		SRT-5	IMSP-9911-141	Soil	EDXRF	4	6	feet			11/18/1999 0:00			525			360		
5		SRT-6	IMSP-9911-136	Soil	EDXRF	0	2	feet			11/18/1999 0:00			564			237		
5		SRT-6	IMSP-9911-137	Soil	EDXRF	2	4	feet			11/18/1999 0:00			448			154		
5		SRT-6	IMSP-9911-138	Soil	EDXRF	4	6	feet			11/18/1999 0:00			350			177		
5		SRT-7	IMSP-9911-133	Soil	EDXRF	0	2	feet			11/18/1999 0:00			1947			1124		
5		SRT-7	IMSP-9911-134	Soil	EDXRF	2	4	feet			11/18/1999 0:00			698			204		
5		SRT-7	IMSP-9911-135	Soil	EDXRF	4	6	feet			11/18/1999 0:00			627			125		
5		SRT-8	IMSP-9911-166	Soil	EDXRF	0	2	feet			11/18/1999 0:00			964			166		
5		SRT-8	IMSP-9911-167	Soil	EDXRF	2	4	feet			11/18/1999 0:00			980			204		
5		SRT-8	IMSP-9911-168	Soil	EDXRF	4	6	feet			11/18/1999 0:00			456			77		
5		SRT-9	IMSP-9911-163	Soil	EDXRF	0	2	feet			11/18/1999 0:00			422			106		
5		SRT-9	IMSP-9911-164	Soil	EDXRF	2	4	feet			11/18/1999 0:00			88			12		
5		SRT-9	IMSP-9911-165	Soil	EDXRF	4	6	feet			11/18/1999 0:00			4142			761		
5		LOS-SS03	LOS-SS03-1	Soil	Unknown	0	0.33333	feet			3/13/2001 0:00						30		
5		LOS-SS03	LOS-SS03-2	Soil	Unknown	0.33333	1	feet			3/13/2001 0:00			31			5 U		
5		LOS-SS03	LOS-SS03-3	Soil	Unknown	1	2	feet			3/13/2001 0:00			38			5 U		
5		LOS-SS03	LOS-SS03-4	Soil	Unknown	2	3	feet			3/13/2001 0:00			64			17		
5		LOS-SS08	SS-8	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			3800			1013		
5		LOS-SS08	LOS-SS08-1	Soil	Unknown	0	0.33333	feet			3/13/2001 0:00			312			0.05 U		
5		LOS-SS08	LOS-SS08-2	Soil	Unknown	0.33333	1	feet			3/13/2001 0:00			49			13		
5		LOS-SS08	LOS-SS08-3	Soil	Unknown	1	2	feet			3/13/2001 0:00			48			5 U		
5		LOS-SS08	LOS-SS08-4	Soil	Unknown	2	3	feet			3/13/2001 0:00			34			11		
5		LOS-SS09	LOS-SS09-1	Soil	Unknown	0	0.33333	feet			3/15/2001 0:00			2310			170		
5		LOS-SS09	LOS-SS09-2	Soil	Unknown	0.33333	1	feet			3/15/2001 0:00			2365			680		
5		LOS-SS09	LOS-SS09-3	Soil	Unknown	1	2	feet			3/15/2001 0:00			334			620		
5		LOS-SS09	LOS-SS09-4	Soil	Unknown	2	3	feet			3/15/2001 0:00			50			22		
5		LOS-SS13	LOS-SS13-1	Soil	Unknown	0	0.33333	feet			3/13/2001 0:00			367			24		
5		LOS-SS13	LOS-SS13-2	Soil	Unknown	0.33333	1	feet			3/13/2001 0:00			88			35		
5		LOS-SS13	LOS-SS13-3	Soil	Unknown	1	2	feet			3/13/2001 0:00			24			5 U		
5		LOS-SS13	LOS-SS13-4	Soil	Unknown	2	3	feet			3/13/2001 0:00			11			5 U		
5		LOS-SS13	LOS-SS13-4D	Soil	Unknown	2	3	feet			3/13/2001 0:00			15			5 U		
5		LOS-SS15	LOS-SS15-1	Soil	Unknown	0	0.33333	feet			3/13/2001 0:00			340			201		
5		LOS-SS15	LOS-SS15-2	Soil	Unknown	0.33333	1	feet			3/13/2001 0:00			350			144		
5		LOS-SS15	LOS-SS15-3	Soil	Unknown	1	2	feet			3/13/2001 0:00			342			92		
5		LOS-SS15	LOS-SS15-4	Soil	Unknown	2	3	feet			3/13/2001 0:00			10 U			5 U		
5		RCSA-01A	RC-SA01A-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			1173			118		
5		RCSA-01A	RC-SA01A-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			1166			284		
5		RCSA-01A	RC-SA01A-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			2454			522		
5		RCSA-01A	RC-SA01A-4	Soil	Unknown	2	3	feet			4/23/2001 0:00			378			205		
5		RCSA-01A	RC-SA01A-5	Soil	Unknown	3	4.33333	feet			4/23/2001 13:55			41			13		
5		RCSA-01A	RC-SA01A-6	Soil	Unknown	4.33333	5.83333	feet			4/23/2001 14:00			32			10 U		
5		RCSA-01B	RC-SA01B-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			1727			547		
5		RCSA-01B	RC-SA01B-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			1379			361		
5		RCSA-01B	RC-SA01B-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			416			89		
5		RCSA-01B	RC-SA01B-4	Soil	Unknown	2	3	feet			4/23/2001 0:00			67			5 U		
5		RCSA-01B	RC-SA01B-5	Soil	Unknown	3	4.5	feet			4/23/2001 14:50			38			10 U		
5		RCSA-01B	RC-SA01B-6	Soil	Unknown	6	7.5	feet			4/23/2001 0:00			21			5 U		
5		RCSA-01C	RC-SA01C-1	Soil	Unknown	0	0.33333	feet			4/20/2001 0:00			1593			600		
5		RCSA-01C	RC-SA01C-2	Soil	Unknown	0.33333	1	feet			4/20/2001 0:00			1144			285		
5		RCSA-01C	RC-SA01C-3	Soil	Unknown	1	2	feet			4/20/2001 0:00			58			11		
5		RCSA-01C	RC-SA01C-4	Soil	Unknown	2	3	feet			4/20/2001 0:00			27			5 U		
5		RCSA-01C	RC-SA01C-5	Soil	Unknown	3	5	feet			4/20/2001 0:00			12			5 U		
5		RCSA-01D	RC-SA01D-1	Soil	Unknown	0	0.33333	feet			4/20/2001 0:00			656			1065		
5		RCSA-01D	RC-SA01D-2	Soil	Unknown	0.33333	1	feet			4/20/2001 0:00			581			374		
5		RCSA-01D	RC-SA01D-3	Soil	Unknown	1	2	feet			4/20/2001 0:00			201			61		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5		RCSA-01D	RC-SA01D-4	Soil	Unknown	2	3	feet			4/20/2001 0:00			18			5 U		
5		RCSA-01E	RC-SA01E-1	Soil	Unknown	0	0.33333	feet			4/20/2001 0:00			926			354		
5		RCSA-01E	RC-SA01E-2	Soil	Unknown	0.33333	1	feet			4/20/2001 0:00			2777			329		
5		RCSA-01E	RC-SA01E-3	Soil	Unknown	1	2	feet			4/20/2001 0:00			1383			50		
5		RCSA-01E	RC-SA01E-4	Soil	Unknown	2	3	feet			4/20/2001 0:00			152			20		
5		RCSA-01E	RC-SA01E-5	Soil	Unknown	3	5	feet			4/20/2001 0:00			20			5 U		
5		RC-SS01	RC-SS1-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			58			211		
5		RC-SS01	RC-SS1-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			494			77		
5		RC-SS01	RC-SS1-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			411			52		
5		RC-SS01	RC-SS1-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			354			61		
5		RC-SS01	RC-SS1-5	Soil	Unknown	3	5	feet			4/16/2001 0:00			352			122		
5		RC-SS03	RC-SS3-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			215			542		
5		RC-SS03	RC-SS3-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			274			177		
5		RC-SS03	RC-SS3-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			193			152		
5		RC-SS03	RC-SS3-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			45			204		
5		RC-SS04	RC-SS04-1	Soil	Unknown	0	0.33333	feet			4/6/2001 0:00			45			1530		
5		RC-SS04	RC-SS04-2	Soil	Unknown	0.33333	1	feet			4/6/2001 0:00			4732			2102		
5		RC-SS04	RC-SS04-3	Soil	Unknown	1	2	feet			4/6/2001 0:00			200			527		
5		RC-SS04	RC-SS04-4	Soil	Unknown	2	3	feet			4/6/2001 0:00			180			57		
5		RC-SS11	SS-11	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			6525			5800		
5		RC-SS11	RC-SS11-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			5259			249		
5		RC-SS11	RC-SS11-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			122			13		
5		RC-SS11	RC-SS11-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			122			21		
5		RC-SS11	RC-SS11-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			118			17		
5		RC-SS11	RC-SS11-5	Soil	Unknown	3	3.5	feet			4/16/2001 11:40			14			10 U		
5		RC-SS2B	RC-SS2B-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			322			513		
5		RC-SS2B	RC-SS2B-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			942			191		
5		RC-SS2B	RC-SS2B-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			749			126		
5		RC-SS2B	RC-SS2B-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			59			164		
5		RC-SS2C	RC-SS2C-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			736			427		
5		RC-SS2C	RC-SS2C-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			2027			432		
5		RC-SS2C	RC-SS2C-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			436			52		
5		RC-SS2C	RC-SS2C-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			417			518		
5		RC-SS2D	RC-SS2D-1	Soil	Unknown	0	0.33333	feet			4/16/2001 0:00			0.1 U			251		
5		RC-SS2D	RC-SS2D-2	Soil	Unknown	0.33333	1	feet			4/16/2001 0:00			661			171		
5		RC-SS2D	RC-SS2D-3	Soil	Unknown	1	2	feet			4/16/2001 0:00			1325			355		
5		RC-SS2D	RC-SS2D-4	Soil	Unknown	2	3	feet			4/16/2001 0:00			540			275		
5		UOP-SS01	UOP-SS01-1	Soil	Unknown	0	0.33333	feet			3/29/2001 0:00			0.1 U			137		
5		UOP-SS01	UOP-SS01-2	Soil	Unknown	0.33333	1.08333	feet			3/29/2001 0:00			70			35		
5		UOP-SS01	UOP-SS01-3.1	Soil	Unknown	1.33333	2	feet			3/29/2001 0:00			14			5 U		
5		UOP-SS01	UOP-SS01-4	Soil	Unknown	2	3	feet			3/29/2001 0:00			11			5 U		
5		UOP-SS02	UOP-SS02-1	Soil	Unknown	0	0.33333	feet			3/29/2001 0:00			169			227		
5		UOP-SS02	UOP-SS02-2	Soil	Unknown	0.33333	1	feet			3/29/2001 0:00			445			267		
5		UOP-SS02	UOP-SS02-3	Soil	Unknown	1	1.5	feet			3/29/2001 0:00			479			229		
5		UOP-SS02	UOP-SS02-3.1	Soil	Unknown	1.5	2	feet			3/29/2001 0:00			297			112		
5		UOP-SS02	UOP-SS02-4	Soil	Unknown	2	3	feet			3/29/2001 0:00			93			28		
5		UOP-SS03	UOP-SS03-1	Soil	Unknown	0	0.33333	feet			3/29/2001 0:00			91			39		
5		UOP-SS03	UOP-SS03-2	Soil	Unknown	0.33333	1	feet			3/29/2001 0:00			232			59		
5		UOP-SS03	UOP-SS03-3	Soil	Unknown	1	1.5	feet			3/29/2001 0:00			548			52		
5		UOP-SS03	UOP-SS03-3.1	Soil	Unknown	1.5	2	feet			3/29/2001 0:00			34			5 U		
5		UOP-SS03	UOP-SS03-4	Soil	Unknown	2	3	feet			3/29/2001 0:00			23			5 U		
5		UOP-SS04	UOP-SS04-1	Soil	Unknown	0	0.33333	feet			3/29/2001 0:00			25			69		
5		UOP-SS04	UOP-SS04-2	Soil	Unknown	0.33333	1	feet			3/29/2001 0:00			41			11		
5		UOP-SS04	UOP-SS04-3	Soil	Unknown	1	2	feet			3/29/2001 0:00			16			5 U		
5		UOP-SS04	UOP-SS04-4	Soil	Unknown	2	3	feet			3/29/2001 0:00			10 U			5 U		
5		UOP-SS05	UOP-SS05-1	Soil	Unknown	0	0.33333	feet			3/29/2001 0:00			19			38		
5		UOP-SS05	UOP-SS05-2	Soil	Unknown	0.33333	1	feet			3/29/2001 0:00			29			5 U		
5		UOP-SS05	UOP-SS05-3	Soil	Unknown	1	2	feet			3/29/2001 0:00			12			5 U		
5		UOP-SS05	UOP-SS05-4	Soil	Unknown	2	3	feet			3/29/2001 0:00			12			5 U		
5		UOP-SS06	UOP-SS06-1	Soil	Unknown	0	0.33333	feet			3/8/2001 0:00			60			5 U		
5		UOP-SS06	UOP-SS06-2	Soil	Unknown	0.33333	1	feet			3/8/2001 0:00			46			16		
5		UOP-SS06	UOP-SS06-3	Soil	Unknown	1	2	feet			3/8/2001 0:00			33			5 U		
5		UOP-SS06	UOP-SS06-4	Soil	Unknown	2	3	feet			3/8/2001 0:00			10 U			5 U		
5		UOP-SS07	UOP-SS07-1	Soil	Unknown	0	0.33333	feet			3/8/2001 0:00			238			5 U		
5		UOP-SS07	UOP-SS07-2	Soil	Unknown	0.33333	1	feet			3/8/2001 0:00			18			12		
5		UOP-SS07	UOP-SS07-4	Soil	Unknown	2.33333	3	feet			3/8/2001 0:00			22			5 U		
5		UOP-SS10	UOP-SS10-1	Soil	Unknown	0	0.33333	feet			3/8/2001 0:00			0.47			532		
5		UOP-SS10	UOP-SS10-2	Soil	Unknown	0.33333	1	feet			3/8/2001 0:00			169			78		
5		UOP-SS10	UOP-SS10-3	Soil	Unknown	1	2	feet			3/8/2001 0:00			99			35		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5		UOP-SS10	UOP-SS10-4	Soil	Unknown	2	3	feet			3/8/2001 0:00			19			5 U		
5		UOP-SS11	UOP-SS11-1	Soil	Unknown	0	0.33333	feet			3/8/2001 0:00			70			99		
5		UOP-SS11	UOP-SS11-2	Soil	Unknown	0.33333	1	feet			3/8/2001 0:00			92			34		
5		UOP-SS11	UOP-SS11-3	Soil	Unknown	1	2	feet			3/8/2001 0:00			12			5 U		
5		UOP-SS11	UOP-SS11-4	Soil	Unknown	2	3	feet			3/8/2001 0:00			14			5 U		
5		UOS-SS01	SS-1	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			6075			6000		
5		UOS-SS01	UOS-SS01-1	Soil	Unknown	0	0.33333	feet			4/17/2001 0:00			8091			1607		
5		UOS-SS01	UOS-SS01-2	Soil	Unknown	0.33333	1	feet			4/17/2001 0:00			752			473		
5		UOS-SS01	UOS-SS01-3	Soil	Unknown	1	2	feet			4/17/2001 0:00			375			553		
5		UOS-SS01	UOS-SS01-4	Soil	Unknown	2	3	feet			4/17/2001 0:00			13			15		
5		UOS-SS01	UOS-SS01-5	Soil	Unknown	3	5	feet			4/17/2001 0:00			15			13		
5		UOS-SS02	SS-2	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			3475			1813		
5		UOS-SS02	UOS-SS02-1	Soil	Unknown	0	0.33333	feet			4/17/2001 0:00			39			10646		
5		UOS-SS02	UOS-SS02-2	Soil	Unknown	0.33333	1	feet			4/17/2001 0:00			382			1894		
5		UOS-SS02	UOS-SS02-3	Soil	Unknown	1	2	feet			4/17/2001 0:00			1481			1113		
5		UOS-SS02	UOS-SS02-4	Soil	Unknown	2	3	feet			4/17/2001 0:00			122			262		
5		UOS-SS02	UOS-SS02-5	Soil	Unknown	3	5	feet			4/17/2001 0:00			165			497		
off site		EH-103S	EH-103-1	Soil	EDXRF	45	57	feet			7/24/2002 10:30			14			10 U		
off site		EH-103S	EH-103-2	Soil	EDXRF	48	50	feet			7/24/2002 12:00			10 U			10 U		
off site		EH-103S	EH-103-3	Soil	EDXRF	55	60	feet			7/24/2002 15:00			12			10 U		
off site		EH-103S	EH-103-4	Soil	EDXRF	60	65	feet			7/24/2002 15:30			10 U			10 U		
off site		EH-103S	EH-103-5	Soil	EDXRF	65	70	feet			7/24/2002 16:00			10 U			10 U		
off site		EH-103S	EH-103-6	Soil	EDXRF	70	75	feet			7/24/2002 17:00			10 U			10 U		
off site		EH-103S	EH-103-7A	Soil	EDXRF	75	76	feet			7/24/2002 18:20			10 U			10 U		
off site		EH-103S	EH-103-7B	Soil	EDXRF	76	77	feet			7/24/2002 18:25			10 U			10 U		
off site		EH-104S	EH-104-01	Soil	EDXRF	0	1	feet			7/26/2002 9:00			23			10 U		
off site		EH-104S	EH-104-02	Soil	EDXRF	1	3	feet			7/26/2002 9:10			32			10 U		
off site		EH-104S	EH-104-03	Soil	EDXRF	3	5	feet			7/26/2002 9:20			13			10 U		
off site		EH-104S	EH-104-04	Soil	EDXRF	6	8	feet			7/26/2002 9:40			18			10 U		
off site		EH-104S	EH-104-05	Soil	EDXRF	9	11	feet			7/26/2002 10:30			27			10 U		
off site		EH-104S	EH-104-06	Soil	EDXRF	15	17	feet			7/26/2002 10:45			16			10 U		
off site		EH-104S	EH-104-07	Soil	EDXRF	20	22	feet			7/26/2002 11:10			14			10 U		
off site		EH-104S	EH-104-08	Soil	EDXRF	25	27	feet			7/26/2002 11:40			10 U			10 U		
off site		EH-104S	EH-104-09	Soil	EDXRF	30	32	feet			7/26/2002 12:20			10 U			10 U		
off site		EH-104S	EH-104-10	Soil	EDXRF	35	37	feet			7/26/2002 12:45			10 U			10 U		
off site		EH-104S	EH-104-11	Soil	EDXRF	40	42	feet			7/26/2002 14:15			13			10 U		
off site		EH-104S	EH-104-12	Soil	EDXRF	45	47	feet			7/26/2002 15:30			10 U			10 U		
off site		EH-104S	EH-104-13	Soil	EDXRF	50	52	feet			7/26/2002 16:15			10 U			10 U		
off site		EH-106S	EH-106-01	Soil	EDXRF	0	2	feet			9/10/2002 11:00			32			10 U		
off site		EH-106S	EH-106-02	Soil	EDXRF	2	4	feet			9/10/2002 11:15			15			10 U		
off site		EH-106S	EH-106-03	Soil	EDXRF	5	7	feet			9/10/2002 11:30			10 U			10 U		
off site		EH-106S	EH-106-04	Soil	EDXRF	15	20	feet			9/10/2002 12:00			19			10 U		
off site		EH-106S	EH-106-05	Soil	EDXRF	20	22	feet			9/10/2002 12:20			26			10 U		
off site		EH-106S	EH-106-06	Soil	EDXRF	25	27	feet			9/10/2002 12:40			16			10 U		
off site		EH-106S	EH-106-07	Soil	EDXRF	30	35	feet			9/10/2002 14:00			10 U			10 U		
off site		EH-106S	EH-106-08	Soil	EDXRF	35	40	feet			9/10/2002 14:15			21			10 U		
off site		EH-106S	EH-106-09	Soil	EDXRF	40	45	feet			9/10/2002 14:30			18			10 U		
off site		EH-106S	EH-106-10	Soil	EDXRF	45	50	feet			9/10/2002 14:45			52			10 U		
off site		EH-106S	EH-106-11	Soil	EDXRF	48	50	feet			9/10/2002 15:00			10 U			10 U		
off site		EH-107S	EH-107-01	Soil	EDXRF	30	31	feet			7/28/2002 10:00			18			10 U		
off site		EH-107S	EH-107-02	Soil	EDXRF	35	37	feet			7/28/2002 10:45			10 U			10 U		
off site		EH-107S	EH-107-03	Soil	EDXRF	40	45	feet			7/31/2002 10:24			13			10 U		
off site		EH-107S	EH-107-04	Soil	EDXRF	45	50	feet			7/31/2002 10:45			10 U			10 U		
off site		EH-107S	EH-107-05	Soil	EDXRF	50	55	feet			7/31/2002 12:00			10			10 U		
off site		EH-107S	EH-107-06	Soil	EDXRF	55	60	feet			7/31/2002 12:45			10 U			10 U		
off site		EH-107S	EH-107-07	Soil	EDXRF	60	65	feet			7/31/2002 16:00			10 U			10 U		
off site		EH-107S	EH-107-08	Soil	EDXRF	65	70	feet			7/31/2002 16:20			10 U			10 U		
off site		EH-107S	EH-107-09	Soil	EDXRF	70	75	feet			8/8/2002 10:30			10 U			10 U		
off site		EH-107S	EH-107-10	Soil	EDXRF	75	80	feet			8/8/2002 12:30			10 U			10 U		
off site		EH-107S	EH-107-10D	Soil	EDXRF	75	80	feet			8/8/2002 12:35								
off site		EH-107S	EH-107-11	Soil	EDXRF	80	82	feet			8/8/2002 16:00			10 U			10 U		
off site		EH-109S	EH-109-01	Soil	EDXRF	5	7	feet			8/20/2002 10:15			10 U			10 U		
off site		EH-109S	EH-109-02	Soil	EDXRF	10	11	feet			8/20/2002 10:40			10			10 U		
off site		EH-109S	EH-109-04	Soil	EDXRF	15	16	feet			8/20/2002 11:15			12			10 U		
off site		EH-109S	EH-109-05	Soil	EDXRF	20	22	feet			8/20/2002 11:30			15			10 U		
off site		EH-109S	EH-109-06	Soil	EDXRF	30	32	feet			8/20/2002 12:10			13			10 U		
off site		EH-109S	EH-109-07	Soil	EDXRF	35	40	feet			8/20/2002 14:40			24			10 U		
off site		EH-109S	EH-109-08	Soil	EDXRF	40	45	feet			8/20/2002 14:50			63			10 U		
off site		EH-109S	EH-109-09	Soil	EDXRF	45	50	feet			8/20/2002 15:50			61			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
off site		EH-109S	EH-109-10	Soil	EDXRF	50	55	feet			8/20/2002 15:55			76			10 U		
off site		EH-109S	EH-109-11	Soil	EDXRF	55	60	feet			8/20/2002 16:05			71			10 U		
off site		EH-109S	EH-109-12	Soil	EDXRF	60	65	feet			8/20/2002 16:45			46			10 U		
off site		EH-109S	EH-109-13	Soil	EDXRF	65	70	feet			8/20/2002 17:00			27			10 U		
off site		EH-109S	EH-109-14	Soil	EDXRF	69	71	feet			8/20/2002 17:30			10 U			10 U		
off site		EH-110S	EH-110-01	Soil	EDXRF	5	7	feet			8/11/2002 10:35			18			10 U		
off site		EH-110S	EH-110-02	Soil	EDXRF	10	12	feet			8/11/2002 10:45			18			10 U		
off site		EH-110S	EH-110-03	Soil	EDXRF	15	17	feet			8/11/2002 11:00			10 U			10 U		
off site		EH-110S	EH-110-04	Soil	EDXRF	20	22	feet			8/11/2002 11:50			15			10 U		
off site		EH-110S	EH-110-05	Soil	EDXRF	25	30	feet			8/11/2002 12:20			10 U			10 U		
off site		EH-110S	EH-110-06	Soil	EDXRF	30	32	feet			8/11/2002 12:50			10			10 U		
off site		EH-110S	EH-110-07	Soil	EDXRF	35	37	feet			8/11/2002 14:00			10 U			10 U		
off site		EH-110S	EH-110-08	Soil	EDXRF	40	42	feet			8/11/2002 14:20			10 U			10 U		
off site		EH-110S	EH-110-09	Soil	EDXRF	45	47	feet			8/11/2002 14:30			10 U			10 U		
off site		EH-110S	EH-110-10	Soil	EDXRF	50	52	feet			8/11/2002 14:55			10 U			10 U		
off site		EH-110S	EH-110-11	Soil	EDXRF	55	57	feet			8/11/2002 15:15			10 U			10 U		
off site		EH-110S	EH-110-12	Soil	EDXRF	57	59	feet			8/11/2002 15:50			10 U			10 U		
off site		EH-111S	EH-111-01	Soil	EDXRF	0	5	feet			9/13/2002 8:30			10 U			10 U		
off site		EH-111S	EH-111-02	Soil	EDXRF	5	10	feet			9/13/2002 8:45			27			10 U		
off site		EH-111S	EH-111-03	Soil	EDXRF	10	12	feet			9/13/2002 9:00			19			10 U		
off site		EH-111S	EH-111-04	Soil	EDXRF	15	17	feet			9/13/2002 10:00			19			10 U		
off site		EH-111S	EH-111-05	Soil	EDXRF	20	22	feet			9/13/2002 10:20			15			10 U		
off site		EH-111S	EH-111-06	Soil	EDXRF	25	27	feet			9/13/2002 10:40			11			10 U		
off site		EH-111S	EH-111-07	Soil	EDXRF	30	32	feet			9/13/2002 11:05			14			10 U		
off site		EH-111S	EH-111-08	Soil	EDXRF	35	40	feet			9/13/2002 11:55			10 U			10 U		
off site		EH-111S	EH-111-09	Soil	EDXRF	40	45	feet			9/13/2002 12:10			12			10 U		
off site		EH-111S	EH-111-10	Soil	EDXRF	45	50	feet			9/13/2002 12:20			13			10 U		
off site		EH-111S	EH-111-11	Soil	EDXRF	50	52	feet			9/13/2002 12:30			10 U			10 U		
off site		EH-111S	EH-111-12	Soil	EDXRF	52	54	feet			9/13/2002 13:15			26			10 U		
off site		EH-112S	EH-112-01	Soil	EDXRF	0	5	feet			9/11/2002 11:10			13			10 U		
off site		EH-112S	EH-112-02	Soil	EDXRF	5	10	feet			9/11/2002 11:20			10 U			10 U		
off site		EH-112S	EH-112-03	Soil	EDXRF	10	12	feet			9/11/2002 11:30			10 U			10 U		
off site		EH-112S	EH-112-04	Soil	EDXRF	15	17	feet			9/11/2002 11:45			10 U			10 U		
off site		EH-112S	EH-112-05	Soil	EDXRF	20	22	feet			9/11/2002 12:30			16			10 U		
off site		EH-112S	EH-112-06	Soil	EDXRF	25	27	feet			9/11/2002 13:30			20			10 U		
off site		EH-112S	EH-112-07	Soil	EDXRF	30	35	feet			9/11/2002 14:00			10 U			10 U		
off site		EH-112S	EH-112-08	Soil	EDXRF	35	40	feet			9/11/2002 14:20			10 U			10 U		
off site		EH-112S	EH-112-09	Soil	EDXRF	40	44	feet			9/11/2002 14:30			13			10 U		
off site		EH-112S	EH-112-10	Soil	EDXRF	44	46	feet			9/11/2002 14:50			23			10 U		
off site		EH-112S	EH-112-11	Soil	EDXRF	50	52	feet			9/11/2002 16:00			15			10 U		
off site		EH-113S	EH-113-1	Soil	EDXRF	0	5	feet			10/3/2002 9:30			10 U			10 U		
off site		EH-113S	EH-113-2	Soil	EDXRF	5	10	feet			10/3/2002 9:45			15			10 U		
off site		EH-113S	EH-113-3	Soil	EDXRF	10	12	feet			10/3/2002 9:55			11			10 U		
off site		EH-113S	EH-113-4	Soil	EDXRF	15	16	feet			10/3/2002 10:15			28			10 U		
off site		EH-113S	EH-113-5	Soil	EDXRF	20	21	feet			10/3/2002 10:40			18			10 U		
off site		EH-113S	EH-113-6	Soil	EDXRF	25	30	feet			10/3/2002 11:10			10 U			10 U		
off site		EH-113S	EH-113-7	Soil	EDXRF	30	35	feet			10/3/2002 11:35			18			10 U		
off site		EH-113S	EH-113-8	Soil	EDXRF	35	40	feet			10/3/2002 11:55			11			10 U		
off site		EH-113S	EH-113-9	Soil	EDXRF	40	45	feet			10/3/2002 12:10			13			10 U		
off site		EH-113S	EH-113-10	Soil	EDXRF	50	55	feet			10/3/2002 14:55			10 U			10 U		
off site		EH-113S	EH-113-11	Soil	EDXRF	55	60	feet			10/3/2002 15:35			10 U			10 U		
off site		EH-113S	EH-113-12	Soil	EDXRF	59	61	feet			10/3/2002 16:05			10 U			10 U		
off site		EH-113S	EH-113-13	Soil	EDXRF	61	65	feet			10/3/2002 17:10			10 U			10 U		
off site		EH-113S	EH-113-14	Soil	EDXRF	65	70	feet			10/3/2002 17:20			10 U			10 U		
off site		EH-113S	EH-113-15	Soil	EDXRF	70	75	feet			10/8/2002 12:55			10 U			10 U		
off site		EH-113S	EH-113-16	Soil	EDXRF	75	78	feet			10/8/2002 13:15			13			10 U		
off site		EH-113S	EH-113-17	Soil	EDXRF	80	85	feet			10/8/2002 15:00			10 U			10 U		
off site		EH-113S	EH-113-18	Soil	EDXRF	85	90	feet			10/8/2002 15:30			10 U			10 U		
off site		EH-114S	EH-114-1	Soil	EDXRF	0	5	feet			10/9/2002 14:00			10			10 U		
off site		EH-114S	EH-114-2	Soil	EDXRF	5	10	feet			10/9/2002 14:15			35			10 U		
off site		EH-114S	EH-114-3	Soil	EDXRF	10	15	feet			10/9/2002 14:30			15			10 U		
off site		EH-114S	EH-114-4	Soil	EDXRF	15	20	feet			10/9/2002 14:50			10 U			10 U		
off site		EH-114S	EH-114-5	Soil	EDXRF	20	25	feet			10/9/2002 15:40			10 U			10 U		
off site		EH-114S	EH-114-6	Soil	EDXRF	25	30	feet			10/9/2002 15:55			10 U			10 U		
off site		EH-114S	EH-114-7	Soil	EDXRF	30	35	feet			10/9/2002 16:05			12			10 U		
off site		EH-114S	EH-114-8	Soil	EDXRF	35	40	feet			10/9/2002 16:15			13			10 U		
off site		EH-114S	EH-114-9	Soil	EDXRF	39	41	feet			10/10/2002 9:30			10 U			10 U		
off site		EH-114S	EH-114-10	Soil	EDXRF	45	50	feet			10/10/2002 11:00			10 U			10 U		
off site		EH-114S	EH-114-11	Soil	EDXRF	50	53	feet			10/10/2002 11:15			10 U			10 U		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
off site		EH-114S	EH-114-12	Soil	EDXRF	53	55	feet			10/10/2002 11:40			10 U			10 U		
off site		EH-115S	EH-115-1	Soil	EDXRF	0	2	feet			10/21/2002 10:00			18			10 U		
off site		EH-115S	EH-115-2	Soil	EDXRF	2	5	feet			10/21/2002 10:05			25			10 U		
off site		EH-115S	EH-115-3	Soil	EDXRF	5	7	feet			10/21/2002 10:15			11			10 U		
off site		EH-115S	EH-115-4	Soil	EDXRF	7	10	feet			10/21/2002 10:20			10 U			10 U		
off site		EH-115S	EH-115-5	Soil	EDXRF	10	12	feet			10/21/2002 10:30			30			10 U		
off site		EH-115S	EH-115-6	Soil	EDXRF	12	15	feet			10/21/2002 10:35			17			10 U		
off site		EH-115S	EH-115-7	Soil	EDXRF	15	17	feet			10/21/2002 10:40			21			10 U		
off site		EH-115S	EH-115-8	Soil	EDXRF	17	20	feet			10/21/2002 10:45			10 U			10 U		
off site		EH-115S	EH-115-9	Soil	EDXRF	20	22	feet			10/21/2002 10:55			14			10 U		
off site		EH-115S	EH-115-10	Soil	EDXRF	22	25	feet			10/21/2002 11:00			11			10 U		
off site		EH-115S	EH-115-11	Soil	EDXRF	25	27	feet			10/21/2002 11:05			12			10 U		
off site		EH-115S	EH-115-12	Soil	EDXRF	27	30	feet			10/21/2002 11:10			10 U			10 U		
off site		EH-115S	EH-115-13	Soil	EDXRF	30	35	feet			10/21/2002 11:20			33			10 U		
off site		EH-115S	EH-115-14	Soil	EDXRF	35	40	feet			10/21/2002 11:45			10 U			10 U		
off site		EH-115S	EH-115-15	Soil	EDXRF	40	45	feet			10/21/2002 12:00			15			10 U		
off site		EH-115S	EH-115-16	Soil	EDXRF	45	50	feet			10/21/2002 12:15			10 U			10 U		
off site		EH-115S	EH-115-17	Soil	EDXRF	50	52	feet			10/21/2002 12:30			12			10 U		
off site		EH-118	EH-118-01	Soil	SW6010B	0	2	feet			4/26/2008 11:00	15400	5 U	27	99.4	5 U	6.4	18.4	6.7
off site		EH-118	EH-118-01	Soil	SW7471A	0	2	feet			4/26/2008 11:00								
off site		EH-118	EH-118-02	Soil	SW6010B	2	4	feet			4/26/2008 11:30			5 U			3.1		
off site		EH-118	EH-118-03	Soil	SW6010B	4	5	feet			4/26/2008 11:45			5 U			2.9		
off site		EH-118	EH-118-04	Soil	SW6010B	5	6	feet			4/26/2008 12:00			17.7			2.8		
off site		EH-118	EH-118-05	Soil	SW6010B	10	11	feet			4/26/2008 13:00			5 U			3.9		
off site		EH-118	EH-118-06	Soil	SW6010B	10	15	feet			4/26/2008 13:30			7.8			2.5		
off site		EH-118	EH-118-08	Soil	SW6010B	15	20	feet			4/26/2008 14:00			7.9			2.2		
off site		EH-118	EH-118-09	Soil	SW6010B	20	21	feet			4/26/2008 14:30			10.7			3.8		
off site		EH-118	EH-118-11	Soil	SW6010B	25	27	feet			4/29/2008 10:45			5 U			2.3		
off site		EH-118	EH-118-13	Soil	SW6010B	30	32	feet			4/29/2008 11:00			5 U			1.2		
off site		EH-118	EH-118-15	Soil	SW6010B	35	37	feet			4/29/2008 11:20			5 U			1 U		
off site		EH-118	EH-118-17	Soil	SW6010B	40	42	feet			4/29/2008 11:45			5 U			2.7		
off site		EH-118	EH-118-19	Soil	SW6010B	45	47	feet			4/29/2008 12:25			5 U			2.4		
off site		EH-118	EH-118-21	Soil	SW6010B	50	52	feet			4/29/2008 13:20			5 U			1 U		
off site		EH-118	EH-118-23	Soil	SW6010B	55	57	feet			4/29/2008 14:00	18000	5 U	5 U	127	5 U	1 U	5 U	5 U
off site		EH-118	EH-118-23	Soil	SW7471A	55	57	feet			4/29/2008 14:00								
off site		EH-119	EH-119-01	Soil	SW6010B	0	2	feet			4/22/2008 9:00	6980	5 U	15.6	140	5 U	2.3	9	5 U
off site		EH-119	EH-119-01	Soil	SW7471A	0	2	feet			4/22/2008 9:00								
off site		EH-119	EH-119-02	Soil	SW6010B	2	4	feet			4/22/2008 9:15			8.8			2.8		
off site		EH-119	EH-119-03	Soil	SW6010B	4	6	feet			4/22/2008 9:30			9.9			2.7		
off site		EH-119	EH-119-04	Soil	SW6010B	6	8	feet			4/22/2008 9:45			9			3.1		
off site		EH-119	EH-119-05	Soil	SW6010B	8	10	feet			4/22/2008 10:00			5 U			5.1		
off site		EH-119	EH-119-06	Soil	SW6010B	10	12	feet			4/22/2008 10:15			5 U			4.1		
off site		EH-119	EH-119-07	Soil	SW6010B	15	16.5	feet			4/22/2008 10:45			10.6			3.5		
off site		EH-119	EH-119-08	Soil	SW6010B	20	21.5	feet			4/22/2008 11:15			5 U			2.5		
off site		EH-119	EH-119-09	Soil	SW6010B	25	26.5	feet			4/22/2008 12:00			5 U			3.1		
off site		EH-119	EH-119-11	Soil	SW6010B	25	36.5	feet			4/22/2008 12:45			5 U			2.4		
off site		EH-119	EH-119-10	Soil	SW6010B	30	31.5	feet			4/22/2008 12:15			5 U			1.5		
off site		EH-119	EH-119-12	Soil	SW6010B	40	41.5	feet			4/24/2008 10:20			5 U			2.7		
off site		EH-119	EH-119-13	Soil	SW6010B	45	46.5	feet			4/24/2008 10:50			5 U			2.4		
off site		EH-119	EH-119-14	Soil	SW6010B	50	55	feet			4/24/2008 11:05			9.2			2.1		
off site		EH-119	EH-119-15	Soil	SW6010B	56.5	57.5	feet			4/24/2008 11:20			5 U			3.5		
off site		EH-119	EH-119-16	Soil	SW6010B	60	63	feet			4/24/2008 11:35			11.7			2.1		
off site		EH-119	EH-119-17	Soil	SW6010B	65	67	feet			4/24/2008 11:50			9.1			1.1		
off site		EH-119	EH-119-18	Soil	SW6010B	70	71.5	feet			4/24/2008 12:05	27300	5 U	5 U	45.4	5 U	1 U	6.5	5 U
off site		EH-119	EH-119-18	Soil	SW7471A	70	71.5	feet			4/24/2008 12:05								
off site		EH-120	EH-120-01	Soil	SW6010B	0	2	feet			5/1/2008 7:00	12600	5 U	17.8	105	5 U	1.2	14	5.7
off site		EH-120	EH-120-01	Soil	SW7471A	0	2	feet			5/1/2008 7:00								
off site		EH-120	EH-120-11	Soil	SW6010B	2	4	feet			5/1/2008 9:30			5 U			3.8		
off site		EH-120	EH-120-02	Soil	SW6010B	4	6	feet			5/1/2008 7:15			5 U			2.7		
off site		EH-120	EH-120-03	Soil	SW6010B	6	8	feet			5/1/2008 7:30			5 U			3		
off site		EH-120	EH-120-04	Soil	SW6010B	8	10	feet			5/1/2008 7:45			5 U			4.5		
off site		EH-120	EH-120-05	Soil	SW6010B	10	14	feet			5/1/2008 8:00			13.1			4.3		
off site		EH-120	EH-120-07	Soil	SW6010B	15	16	feet			5/1/2008 8:30			5 U			3.3		
off site		EH-120	EH-120-09	Soil	SW6010B	20	21	feet			5/1/2008 9:00			5 U			3.8		
off site		EH-120	EH-120-14	Soil	SW6010B	25	27	feet			5/1/2008 10:15			5 U			4.1		
off site		EH-120	EH-120-17	Soil	SW6010B	30	32	feet			5/1/2008 11:00			5 U			3.1		
off site		EH-120	EH-120-19	Soil	SW6010B	35	37	feet			5/1/2008 11:30			5 U			5.7		
off site		EH-120	EH-120-21	Soil	SW6010B	40	42	feet			5/1/2008 12:00			5 U			2.5		
off site		EH-120	EH-120-23	Soil	SW6010B	45	47	feet			5/1/2008 12:30			5 U			2.5		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
off site		EH-120	EH-120-26	Soil	SW6010B	50	55	feet			5/1/2008 13:15			5 U			1 U		
off site		EH-120	EH-120-27	Soil	SW6010B	55	60	feet			5/1/2008 13:30			5 U			1 U		
off site		EH-120	EH-120-28	Soil	SW6010B	65	67	feet			5/1/2008 13:45	19200	5 U	10.5	66.7	5 U	1 U	17.7	8.1
off site		EH-120	EH-120-28	Soil	SW7471A	65	67	feet			5/1/2008 13:45								
off site		EH-121	EH-121-01	Soil	SW6010B	0	2	feet			4/11/2008 8:30	8550	5 U	26.7	162	5 U	3.2	12.3	5 U
off site		EH-121	EH-121-01	Soil	SW7471A	0	2	feet			4/11/2008 8:30								
off site		EH-121	EH-121-02	Soil	SW6010B	2	4	feet			4/11/2008 8:45			27.8			3.4		
off site		EH-121	EH-121-03	Soil	SW6010B	4	6	feet			4/11/2008 8:55			31.8			3.9		
off site		EH-121	EH-121-04	Soil	SW6010B	6	8	feet			4/11/2008 9:05			25			2.2		
off site		EH-121	EH-121-05	Soil	SW6010B	8	10	feet			4/11/2008 9:15			27.6			4.4		
off site		EH-121	EH-121-06	Soil	SW6010B	10	12	feet			4/11/2008 9:30			27.7			4.4		
off site		EH-121	EH-121-08	Soil	SW6010B	15	17	feet			4/11/2008 10:00			24.8			3.2		
off site		EH-121	EH-121-10	Soil	SW6010B	20	22	feet			4/11/2008 10:20			18.6			4.8		
off site		EH-121	EH-121-12	Soil	SW6010B	25	27	feet			4/11/2008 10:45			19.7			2.6		
off site		EH-121	EH-121-14	Soil	SW6010B	30	32	feet			4/11/2008 11:10			28.2			2.3		
off site		EH-121	EH-121-16	Soil	SW6010B	35	37	feet			4/11/2008 11:45			13.3			1 U		
off site		EH-121	EH-121-18	Soil	SW6010B	40	42	feet			4/21/2008 9:00			12.8			1		
off site		EH-121	EH-121-20	Soil	SW6010B	45	50	feet			4/21/2008 9:30			13.8			1 U		
off site		EH-121	EH-121-21	Soil	SW6010B	52	57	feet			4/21/2008 9:45			32.1			6.5		
off site		EH-121	EH-121-24	Soil	SW6010B	60	61	feet			4/21/2008 10:30			15.7			1.2		
off site		EH-121	EH-121-27	Soil	SW6010B	65	68	feet			4/21/2008 12:30			15.3			1.2		
off site		EH-121	EH-121-29	Soil	SW6010B	70	71.5	feet			4/21/2008 14:15	25500	5 U	6	125	5 U	1.2	5 U	5 U
off site		EH-121	EH-121-29	Soil	SW7471A	70	71.5	feet			4/21/2008 14:15								
off site		EH-122	EH-122-01	Soil	SW6010B	0	2	feet			5/3/2008 7:20	7140	5 U	5	48.8	5 U	1 U	11.7	5 U
off site		EH-122	EH-122-01	Soil	SW7471A	0	2	feet			5/3/2008 7:20								
off site		EH-122	EH-122-02	Soil	SW6010B	2	4	feet			5/3/2008 7:45			11.8			5.2		
off site		EH-122	EH-122-04	Soil	SW6010B	5	6	feet			5/3/2008 8:10			5 U			4.3		
off site		EH-122	EH-122-05	Soil	SW6010B	6	8	feet			5/3/2008 8:30			5.6			3.6		
off site		EH-122	EH-122-07	Soil	SW6010B	8	10	feet			5/3/2008 8:45			9.3			3.5		
off site		EH-122	EH-122-09	Soil	SW6010B	10	12	feet			5/3/2008 8:45			9.1			4.1		
off site		EH-122	EH-122-12	Soil	SW6010B	15	17	feet			5/3/2008 9:05			5 U			4.4		
off site		EH-122	EH-122-15	Soil	SW6010B	20	22	feet			5/3/2008 9:45			5 U			3.6		
off site		EH-122	EH-122-18	Soil	SW6010B	25	27	feet			5/3/2008 9:55			5 U			2.2		
off site		EH-122	EH-122-20	Soil	SW6010B	30	32	feet			5/3/2008 10:00			15.2			3.4		
off site		EH-122	EH-122-23	Soil	SW6010B	35	37	feet			5/3/2008 10:30			5 U			3.4		
off site		EH-122	EH-122-25	Soil	SW6010B	40	42	feet			5/3/2008 10:50			5 U			2.3		
off site		EH-122	EH-122-27	Soil	SW6010B	45	47	feet			5/3/2008 11:10			5 U			2.2		
off site		EH-122	EH-122-29	Soil	SW6010B	50	52	feet			5/3/2008 11:30			5 U			3.3		
off site		EH-122	EH-122-32	Soil	SW6010B	55	57	feet			5/3/2008 12:00			5 U			3.6		
off site		EH-122	EH-122-34	Soil	SW6010B	60	62	feet			5/3/2008 12:20			5 U			3.4		
off site		EH-122	EH-122-36	Soil	SW6010B	65	67	feet			5/3/2008 12:40	29300	5 U	5 U	97.2	5 U	1 U	6.3	5 U
off site		EH-122	EH-122-36	Soil	SW7471A	65	67	feet			5/3/2008 12:40								
off site		EH-66	EH-66-01	Soil	SW6010B	0	2	feet			4/10/2008 8:30	8690	5 U	19.7	134	5 U	3.2	11.9	5 U
off site		EH-66	EH-66-01	Soil	SW7471A	0	2	feet			4/10/2008 8:30								
off site		EH-66	EH-66-02	Soil	SW6010B	2	4	feet			4/10/2008 8:45			19.7			2.9		
off site		EH-66	EH-66-03	Soil	SW6010B	4	6	feet			4/10/2008 8:55			28.8			2.8		
off site		EH-66	EH-66-04	Soil	SW6010B	6	8	feet			4/10/2008 9:05			15.8			1.4		
off site		EH-66	EH-66-05	Soil	SW6010B	8	10	feet			4/10/2008 9:15			21.5			2.5		
off site		EH-66	EH-66-06	Soil	SW6010B	10	12	feet			4/10/2008 9:30			28.7			4		
off site		EH-66	EH-66-08	Soil	SW6010B	15	17	feet			4/10/2008 10:00			24.8			4		
off site		EH-66	EH-66-10	Soil	SW6010B	20	22	feet			4/10/2008 10:20			35.5			4.8		
off site		EH-66	EH-66-12	Soil	SW6010B	25	27	feet			4/10/2008 10:45			19.7			2.5		
off site		EH-66	EH-66-14	Soil	SW6010B	30	32	feet			4/10/2008 11:10			17.9			3		
off site		EH-66	EH-66-16	Soil	SW6010B	35	37	feet			4/10/2008 11:45			11.7			1.5		
off site		EH-66	EH-66-17	Soil	SW6010B	37	40	feet			4/10/2008 12:00	3990	5 U	8	28.7	5 U	1 U	20 U	5 U
off site		EH-66	EH-66-17	Soil	SW7471A	37	40	feet			4/10/2008 12:00								
off site		EH-67	EH-67-01	Soil	SW6010B	0	2	feet			5/4/2008 7:55	8260	5 U	5 U	53.2	5 U	1 U	9.2	5 U
off site		EH-67	EH-67-01	Soil	SW7471A	0	2	feet			5/4/2008 7:55								
off site		EH-67	EH-67-02	Soil	SW6010B	2	4	feet			5/4/2008 8:00			5.2			4.6		
off site		EH-67	EH-67-03	Soil	SW6010B	4	5	feet			5/4/2008 8:10			5 U			7.3		
off site		EH-67	EH-67-05	Soil	SW6010B	6	8	feet			5/4/2008 8:20			5 U			4.1		
off site		EH-67	EH-67-07	Soil	SW6010B	8	10	feet			5/4/2008 8:25			5 U			3.9		
off site		EH-67	EH-67-09	Soil	SW6010B	10	12	feet			5/4/2008 8:30			5 U			3.7		
off site		EH-67	EH-67-11	Soil	SW6010B	15	17	feet			5/4/2008 8:45			5 U			3.7		
off site		EH-67	EH-67-13	Soil	SW6010B	20	22	feet			5/4/2008 9:00			5 U			3.9		
off site		EH-67	EH-67-15	Soil	SW6010B	25	27	feet			5/4/2008 9:20			5 U			2.4		
off site		EH-67	EH-67-18	Soil	SW6010B	30	32	feet			5/4/2008 9:40			5 U			3		
off site		EH-67	EH-67-21	Soil	SW6010B	35	37	feet			5/4/2008 10:00	13900	5 U	6.1	184	5 U	1 U	14.5	5 U
off site		EH-67	EH-67-21	Soil	SW7471A	35	37	feet			5/4/2008 10:00								

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
off site		EH-68	EH-68-01	Soil	SW6010B	0	2	feet			4/7/2008 17:00	10900	5 U	11.7	110	5 U	3.7	14.7	6.9
off site		EH-68	EH-68-01	Soil	SW7471A	0	2	feet			4/7/2008 17:00								
off site		EH-68	EH-68-02	Soil	SW6010B	2	4	feet			4/7/2008 17:00			13.2			4.9		
off site		EH-68	EH-68-03	Soil	SW6010B	4	6	feet			4/7/2008 17:00			5 U			1.6		
off site		EH-68	EH-68-04	Soil	SW6010B	6	8	feet			4/7/2008 17:00			19.1			3.1		
off site		EH-68	EH-68-05	Soil	SW6010B	8	10	feet			4/7/2008 17:00			13.4			2.4		
off site		EH-68	EH-68-06	Soil	SW6010B	10	12	feet			4/8/2008 17:00			6.8			3.2		
off site		EH-68	EH-68-07	Soil	SW6010B	15	16.5	feet			4/8/2008 17:00			6.9			1.8		
off site		EH-68	EH-68-08	Soil	SW6010B	20	21.5	feet			4/8/2008 17:00			5 U			1		
off site		EH-68	EH-68-09	Soil	SW6010B	25	26.5	feet			4/8/2008 17:00	10300	5 U	6.2	57.4	5 U	1 U	19	5 U
off site		EH-68	EH-68-09	Soil	SW7471A	25	26.5	feet			4/8/2008 17:00								
off site		EH-69	EH-69-01	Soil	SW6010B	4	6	feet			4/9/2008 8:00	6280	5 U	5 U	56.6	5 U	1 U	11.1	5 U
off site		EH-69	EH-69-01	Soil	SW7471A	4	6	feet			4/9/2008 8:00								
off site		EH-69	EH-69-02	Soil	SW6010B	8	10	feet			4/9/2008 8:30			5 U			1.5		
off site		EH-69	EH-69-04	Soil	SW6010B	10	12	feet			4/9/2008 9:30			5 U			5.8		
off site		EH-69	EH-69-06	Soil	SW6010B	15	17	feet			4/9/2008 10:30			5 U			3.4		
off site		EH-69	EH-69-08	Soil	SW6010B	20	22	feet			4/9/2008 11:30			5 U			2.2		
off site		EH-69	EH-69-10	Soil	SW6010B	25	26	feet			4/9/2008 13:00			5 U			1.4		
off site		EH-69	EH-69-12	Soil	SW6010B	30	32	feet			4/9/2008 14:00			7.8			3.2		
off site		EH-69	EH-69-14	Soil	SW6010B	35	37	feet			4/9/2008 15:00	6550	5 U	5 U	54.3	5 U	1 U	7	5.2
off site		EH-69	EH-69-14	Soil	SW7471A	35	37	feet			4/9/2008 15:00								
off site		RCSA-02A	RC-SA02A-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			902			528		
off site		RCSA-02A	RC-SA02A-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			489			243		
off site		RCSA-02A	RC-SA02A-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			126			17		
off site		RCSA-02A	RC-SA02A-4	Soil	Unknown	2	3.5	feet			4/24/2001 9:15			36			14		
off site		RCSA-02A	RC-SA02A-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			15			5 U		
off site		RCSA-02B	RC-SA02B-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			604			700		
off site		RCSA-02B	RC-SA02B-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			1099			764		
off site		RCSA-02B	RC-SA02B-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			150			53		
off site		RCSA-02B	RC-SA02B-4	Soil	Unknown	2	3.5	feet			4/24/2001 9:50			23			10 U		
off site		RCSA-02B	RC-SA02B-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			21			5 U		
off site		RCSA-02B	RC-SA02B-6	Soil	Unknown	5	6.5	feet			4/24/2001 0:00			16			5 U		
off site		RCSA-02C	RC-SA02C-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			533			381		
off site		RCSA-02C	RC-SA02C-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			667			271		
off site		RCSA-02C	RC-SA02C-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			173			63		
off site		RCSA-02C	RC-SA02C-4	Soil	Unknown	2	3.5	feet			4/24/2001 10:20			21			10 U		
off site		RCSA-02C	RC-SA02C-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			10 U			5 U		
off site		RCSA-02D	RC-SA02D-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			191			173		
off site		RCSA-02D	RC-SA02D-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			831			202		
off site		RCSA-02D	RC-SA02D-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			108			21		
off site		RCSA-02D	RC-SA02D-4	Soil	Unknown	2	3.5	feet			4/24/2001 10:50			17			10 U		
off site		RCSA-02D	RC-SA02D-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			19			5 U		
off site		RCSA-02E	RC-SA02E-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			1634			151		
off site		RCSA-02E	RC-SA02E-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			627			306		
off site		RCSA-02E	RC-SA02E-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			42			5 U		
off site		RCSA-02E	RC-SA02E-4	Soil	Unknown	2	3.5	feet			4/24/2001 11:15			19			10 U		
off site		RCSA-02E	RC-SA02E-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			54			5 U		
off site		RCSA-02E	RC-SA02E-6	Soil	Unknown	5	6.5	feet			4/24/2001 0:00			17			5 U		
off site		RCSA-02F	RC-SA02F-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			3255			40		
off site		RCSA-02F	RC-SA02F-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			68			24		
off site		RCSA-02F	RC-SA02F-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			61			5 U		
off site		RCSA-02F	RC-SA02F-4	Soil	Unknown	2	3.5	feet			4/24/2001 12:00			20			10 U		
off site		RCSA-02F	RC-SA02F-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			28			5 U		
off site		RCSA-02F	RC-SA02F-6	Soil	Unknown	5	6.5	feet			4/24/2001 0:00			11			5 U		
off site		RCSA-02F	RC-SA02F-7	Soil	Unknown	6.5	7.5	feet			4/24/2001 0:00			49			5 U		
off site		RCSA-03	RCSA-3-1	Soil	Unknown	0	0.33333	feet			4/26/2001 0:00			956			2875		
off site		RCSA-03	RCSA-3-2	Soil	Unknown	0.33333	1	feet			4/26/2001 0:00			3521			2323		
off site		RCSA-03	RCSA-3-3	Soil	Unknown	1	2	feet			4/26/2001 0:00			1340			910		
off site		RCSA-03	RCSA-3-5	Soil	Unknown	3.5	5	feet			4/26/2001 0:00			35			51		
off site		RCSA-03	RCSA-3-6	Soil	Unknown	5	6.5	feet			4/26/2001 0:00			11			13		
off site		RCSA-04	RC-SA04-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			2464			665		
off site		RCSA-04	RC-SA04-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			1811			583		
off site		RCSA-04	RC-SA04-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			229			114		
off site		RCSA-04	RC-SA04-4	Soil	Unknown	2	3.5	feet			4/24/2001 15:45			70			75		
off site		RCSA-04	RC-SA04-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			221			17		
off site		RCSA-04	RC-SA04-6	Soil	Unknown	5	6.5	feet			4/24/2001 0:00			30			32		
off site		RCSA-04	RC-SA04-7	Soil	Unknown	6.5	7.5	feet			4/24/2001 0:00			728			31		
off site		RCSA-05A	RC-SA05A-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			3511			488		
off site		RCSA-05A	RC-SA05A-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			2020			694		

Screening Level (mg/kg)												Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
												Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
												on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
off site		RCSA-05A	RC-SA05A-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			470			630		
off site		RCSA-05A	RC-SA05A-4	Soil	Unknown	2	3.5	feet			4/24/2001 14:45			598			147		
off site		RCSA-05A	RC-SA05A-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			19			5 U		
off site		RCSA-05A	RC-SA05A-6	Soil	Unknown	6.5	7.5	feet			4/24/2001 0:00			63			5 U		
off site		RCSA-05B	RC-SA05B-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			3407			672		
off site		RCSA-05B	RC-SA05B-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			1887			607		
off site		RCSA-05B	RC-SA05B-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			1312			889		
off site		RCSA-05B	RC-SA05B-4	Soil	Unknown	2	3	feet			4/23/2001 0:00			63			28		
off site		RCSA-05B	RC-SA05B-5	Soil	Unknown	3	4.5	feet			4/23/2001 11:25			17			10 U		
off site		RCSA-05B	RC-SA05B-6	Soil	Unknown	4.5	6	feet			4/23/2001 11:30			46			16		
off site		RCSA-05B	RC-SA05B-7	Soil	Unknown	6	7.5	feet			4/23/2001 0:00			23			262		
off site		RCSA-05C	RC-SA05C-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			2358			1185		
off site		RCSA-05C	RC-SA05C-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			3167			1106		
off site		RCSA-05C	RC-SA05C-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			1338			1848		
off site		RCSA-05C	RC-SA05C-4	Soil	Unknown	2	3	feet			4/23/2001 0:00			68			24		
off site		RCSA-05C	RC-SA05C-5	Soil	Unknown	3	4.5	feet			4/23/2001 12:05			28			16		
off site		RCSA-05C	RC-SA05C-6	Soil	Unknown	4.5	6	feet			4/23/2001 12:10			288			148		
off site		RCSA-05C	RC-SA05C-7	Soil	Unknown	6.5	8	feet			4/23/2001 0:00			52			162		
off site		RCSA-05D	RC-SA05D-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			2067			1048		
off site		RCSA-05D	RC-SA05D-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			3163			1230		
off site		RCSA-05D	RC-SA05D-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			1051			697		
off site		RCSA-05D	RC-SA05D-4	Soil	Unknown	2	3.5	feet			4/23/2001 12:45			73			31		
off site		RCSA-05D	RC-SA05D-5	Soil	Unknown	3.5	5	feet			4/23/2001 0:00			93			28		
off site		RCSA-05D	RC-SA05D-6	Soil	Unknown	5	6.5	feet			4/23/2001 0:00			12			5 U		
off site		RCSA-05D	RC-SA05D-7	Soil	Unknown	6.5	8	feet			4/23/2001 0:00			12			14		
off site		RCSA-05E	RC-SA05E-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			2880			767		
off site		RCSA-05E	RC-SA05E-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			112			210		
off site		RCSA-05E	RC-SA05E-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			62			16		
off site		RCSA-05E	RC-SA05E-4	Soil	Unknown	2	3.5	feet			4/23/2001 13:35			183			129		
off site		RCSA-05E	RC-SA05E-5	Soil	Unknown	3.5	5	feet			4/23/2001 0:00			37			34		
off site		RCSA-05E	RC-SA05E-6	Soil	Unknown	5	6.5	feet			4/23/2001 0:00			17			22		
off site		RCSA-05F	RC-SA05F-1	Soil	Unknown	0	0.33333	feet			4/23/2001 0:00			2593			751		
off site		RCSA-05F	RC-SA05F-2	Soil	Unknown	0.33333	1	feet			4/23/2001 0:00			2031			885		
off site		RCSA-05F	RC-SA05F-3	Soil	Unknown	1	2	feet			4/23/2001 0:00			163			300		
off site		RCSA-05F	RC-SA05F-4	Soil	Unknown	2	3	feet			4/23/2001 0:00			96			205		
off site		RCSA-06	RC-SA06-1	Soil	Unknown	0	0.33333	feet			4/24/2001 0:00			3889			527		
off site		RCSA-06	RC-SA06-2	Soil	Unknown	0.33333	1	feet			4/24/2001 0:00			2710			485		
off site		RCSA-06	RC-SA06-3	Soil	Unknown	1	2	feet			4/24/2001 0:00			395			392		
off site		RCSA-06	RC-SA06-4	Soil	Unknown	2	3.5	feet			4/24/2001 14:00			43			10 U		
off site		RCSA-06	RC-SA06-5	Soil	Unknown	3.5	5	feet			4/24/2001 0:00			109			25		
off site		RCSA-06	RC-SA06-6	Soil	Unknown	5	6.5	feet			4/24/2001 0:00			49			19		
off site		RCSA-06	RC-SA06-7	Soil	Unknown	6.5	7.5	feet			4/24/2001 0:00			17			189		
off site		RCSA-07	RC-SA07-1	Soil	Unknown	0	0.33333	feet			4/25/2001 0:00			3234			683		
off site		RCSA-07	RC-SA07-2	Soil	Unknown	0.33333	1	feet			4/25/2001 0:00			89			99		
off site		RCSA-07	RC-SA07-3	Soil	Unknown	1	2	feet			4/25/2001 0:00			1201			808		
off site		RCSA-07	RC-SA07-4	Soil	Unknown	2	3.5	feet			4/25/2001 9:15			719			592		
off site		RCSA-07	RC-SA07-5	Soil	Unknown	3.5	5	feet			4/25/2001 0:00			317			130		
off site		RCSA-07	RC-SA07-6	Soil	Unknown	5	6.5	feet			4/25/2001 0:00			89			49		
off site		RCSA-07	RC-SA07-7	Soil	Unknown	6.5	8	feet			4/25/2001 0:00			798			16		
off site		RCSA-07	RC-SA07-8	Soil	Unknown	11.5	13	feet			4/25/2001 0:00			188			5 U		
off site		RCSA-08A	RC-SA08A-1	Soil	Unknown	0	0.33333	feet			4/25/2001 0:00			1411			809		
off site		RCSA-08A	RC-SA08A-2	Soil	Unknown	0.33333	1	feet			4/25/2001 0:00			3659			518		
off site		RCSA-08A	RC-SA08A-3	Soil	Unknown	1	2	feet			4/25/2001 0:00			944			486		
off site		RCSA-08A	RC-SA08A-4	Soil	Unknown	2	3.5	feet			4/25/2001 11:45			702			343		
off site		RCSA-08A	RC-SA08A-5	Soil	Unknown	5	6.5	feet			4/25/2001 0:00			2553			511		
off site		RCSA-08A	RC-SA08A-6	Soil	Unknown	6.5	8	feet			4/25/2001 0:00			386			261		
off site		RCSA-08B	RC-SA08B-1	Soil	Unknown	0	0.33333	feet			4/25/2001 0:00			1049			649		
off site		RCSA-08B	RC-SA08B-2	Soil	Unknown	0.33333	1	feet			4/25/2001 0:00			89			1014		
off site		RCSA-08B	RC-SA08B-3	Soil	Unknown	1	2	feet			4/25/2001 0:00			8848			351		
off site		RCSA-08B	RC-SA08B-4	Soil	Unknown	2	3.5	feet			4/25/2001 12:45			484			318		
off site		RCSA-08B	RC-SA08B-5	Soil	Unknown	3.5	5	feet			4/25/2001 0:00			238			241		
off site		RCSA-08B	RC-SA08B-6	Soil	Unknown	5	6.5	feet			4/25/2001 0:00			202			357		
off site		RCSA-08B	RC-SA08B-7	Soil	Unknown	6.5	8	feet			4/25/2001 0:00			36			480		
off site		RCSA-08B	RC-SA08B-8	Soil	Unknown	8	9.33333	feet			4/25/2001 0:00			1255			251		
off site		RCSA-08B	RC-SA08B-9	Soil	Unknown	9.33333	10.8333	feet			4/25/2001 0:00			173			11		
off site		RCSA-08B	RC-SA08B-10	Soil	Unknown	12.5	14	feet			4/25/2001 0:00			16			5 U		
off site		RCSA-08C	RC-SA08C-1	Soil	Unknown	0	0.33333	feet			4/25/2001 0:00			763			195		
off site		RCSA-08C	RC-SA08C-2	Soil	Unknown	0.33333	1	feet			4/25/2001 0:00			1107			213		
off site		RCSA-08C	RC-SA08C-3	Soil	Unknown	1	2	feet			4/25/2001 0:00			1000			305		

Screening Level (mg/kg)											Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23
											Industrial Soil	990,000	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*
											on site PRGs	NA	NA	176.0	NA	NA	NA	NA	NA
CMS Area	Remediated?	Station Name	Field Sample ID	Sample Matrix	Analytical Method	Sample Top	Sample Bottom	Depth Units	FilteredAnalysis	Reporting Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
off site		RCSA-08C	RC-SA08C-4	Soil	Unknown	2	3.5	feet			4/25/2001 14:15			1905			93		
off site		RCSA-08C	RC-SA08C-5	Soil	Unknown	3.5	5	feet			4/25/2001 0:00			1525			126		
off site		RCSA-08C	RC-SA08C-6	Soil	Unknown	5	6.5	feet			4/25/2001 0:00			408			43		
off site		RCSA-08C	RC-SA08C-7	Soil	Unknown	6.5	8	feet			4/25/2001 0:00			32			12		
off site		RCSA-08D	RC-SA08D-1	Soil	Unknown	0	0.33333	feet			4/25/2001 0:00			5516			264		
off site		RCSA-08D	RC-SA08D-2	Soil	Unknown	0.33333	1	feet			4/25/2001 0:00			468			219		
off site		RCSA-08D	RC-SA08D-3	Soil	Unknown	1	2	feet			4/25/2001 0:00			78			66		
off site		RCSA-08D	RC-SA08D-4	Soil	Unknown	2	3	feet			4/25/2001 0:00			37			20		
off site		RCSA-08E	RC-SA08E-1	Soil	Unknown	0	0.33333	feet			4/25/2001 0:00			6171			238		
off site		RCSA-08E	RC-SA08E-2	Soil	Unknown	0.33333	1	feet			4/25/2001 0:00			71			27		
off site		RCSA-08E	RC-SA08E-3	Soil	Unknown	1	2	feet			4/25/2001 0:00			101			36		
off site		RCSA-08E	RC-SA08E-4	Soil	Unknown	2	3	feet			4/25/2001 0:00			141			56		
off site		RCSA-08E	RC-SA08E-5	Soil	Unknown	3	4.5	feet			4/25/2001 16:10			17			10 U		
off site		UOP-SS12	UOP-SS12-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			81			71		
off site		UOP-SS12	UOP-SS12-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			31			5 U		
off site		UOP-SS12	UOP-SS12-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			19			5 U		
off site		UOP-SS12	UOP-SS12-4	Soil	Unknown	2	3	feet			3/22/2001 0:00			12			5 U		
off site		UOP-SS13	UOP-SS13-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			34			28		
off site		UOP-SS13	UOP-SS13-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			15			5 U		
off site		UOP-SS13	UOP-SS13-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			11			5 U		
off site		UOP-SS13	UOP-SS13-4	Soil	Unknown	2	3	feet			3/22/2001 0:00			23			5 U		
off site		UOP-SS14	UOP-SS14-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			25			16		
off site		UOP-SS14	UOP-SS14-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			112			30		
off site		UOP-SS14	UOP-SS14-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			20			5 U		
off site		UOP-SS14	UOP-SS14-4	Soil	Unknown	2	3	feet			3/22/2001 0:00			14			5 U		
off site		UOP-SS16	SS-16	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00			121			92		
off site		UOP-SS16	UOP-SS16-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			29			5 U		
off site		UOP-SS16	UOP-SS16-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			25			5 U		
off site		UOP-SS16	UOP-SS16-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			25			5 U		
off site		UOP-SS16	UOP-SS16-4	Soil	Unknown	2	3	feet			3/22/2001 0:00			13			5 U		
off site		UOP-SS18	UOP-SS18-1	Soil	Unknown	0	0.33333	feet			3/22/2001 0:00			101			5 U		
off site		UOP-SS18	UOP-SS18-2	Soil	Unknown	0.33333	1	feet			3/22/2001 0:00			19			5 U		
off site		UOP-SS18	UOP-SS18-3	Soil	Unknown	1	2	feet			3/22/2001 0:00			12			5 U		
off site		UOP-SS18	UOP-SS18-4	Soil	Unknown	2	3	feet			3/22/2001 0:00			14			5 U		
off site		EH-70-SL		Soil		0	0.5	feet	TOTAL	mg/kg	8/17/2010 11:30	14800	2.3	39.1	140	10 U	12.1	15	6
off site		EH-70-SL		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/17/2010 11:35	10200	1.8	20.4	165	10 U	7.6	10	6
off site		EH-70-SL		Soil		0.5	2.5	feet	TOTAL	mg/kg	8/17/2010 11:37	10200	2.1	24	137	10 U	8	12	9
off site		EH-70-SL		Soil		2.5	5	feet	TOTAL	mg/kg	8/17/2010 11:40	17000	0.4	11.1	176	10 U	1.1	16	9
off site		EH-70-SL		Soil		5	7	feet	UNKNOWN	mg/kg	8/17/2010 11:45	3410	5 U	6	21	5 U	1 U	12	5 U
off site		EH-70-SL		Soil		10	12	feet	UNKNOWN	mg/kg	8/17/2010 12:20	10300	5 U	15	52	5 U	1 U	12	7
off site		EH-70-SL		Soil		15	17	feet	UNKNOWN	mg/kg	8/17/2010 12:55	14100	5 U	12	103	5 U	1 U	21	8
off site		EH-70-SL		Soil		20	22	feet	UNKNOWN	mg/kg	8/17/2010 13:30	8070	5 U	7	48	5 U	1 U	11	5 U
off site		EH-70-SL		Soil		25	27	feet	UNKNOWN	mg/kg	8/17/2010 13:45	8120	5 U	7	67	5 U	1 U	12	5
off site		EH-70-SL		Soil		30	32	feet	UNKNOWN	mg/kg	8/17/2010 14:05	14400	5 U	9	61	5 U	1 U	12	7
off site		EH-70-SL		Soil		35	37	feet	UNKNOWN	mg/kg	8/17/2010 14:15	6180	5 U	7	40	5 U	1 U	14	5 U
off site		EH-70-SL		Soil		40	42	feet	UNKNOWN	mg/kg	8/17/2010 14:25	7910	5 U	5	32	5 U	1 U	5 U	5 U
off site		EH-70-SL		Soil		45	47	feet	UNKNOWN	mg/kg	8/17/2010 14:30	8920	5 U	5	32	5 U	1 U	9	5 U
off site		REF-NPS-1		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 13:45	7680	5.7	38	134	10 U	23.5	10	4
off site		REF-NPS-2		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 14:00	7850	3.7	40	136	10 U	17.4	10	4
off site		REF-NPS-3		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 14:15	13400	1.9	35	100 U	10 U	8.5	19	6
off site		REF-NPS-4		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 14:30	12800	1.9	35	100 U	10 U	10.9	21	9
off site		REF-NPS-5		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 14:45	13400	2.1	34	100 U	10 U	5.6	25	7
off site		REF-RZ-5		Soil		0	0	feet	TOTAL	mg/kg	7/30/2010 12:45	7350	56	232	912	10 U	57.7	21	16
off site		REF-US-1		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 15:45	7890	0.9	38	105	10 U	2.3	10	7
off site		REF-US-2		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 16:15	14200	1.7	107	164	10 U	4	17	10
off site		REF-US-3		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 16:30	9870	1	56	105	10 U	2.9	16	7
off site		REF-US-4		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 17:45	9670	3.5	85	117	10 U	14.2	15	8
off site		REF-US-4		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 17:30	8830	3.7	92	110	10 U	14.6	13	8
off site		REF-US-5		Soil		0	0	feet	TOTAL	mg/kg	7/29/2010 18:00	7920	2.9	68	100 U	10 U	10.5	16	8
off site		UOP-SS12		Soil		0	0.5	feet	TOTAL	mg/kg	8/9/2010 11:00	9800	33	173	196	10 U	96.5	19	9
off site		UOP-SS12		Soil		0.5	2.5	feet	UNKNOWN	mg/kg	8/9/2010 11:15	13400	0.9	16	100 U	10 U	1.4	19	6
off site		UOP-SS12		Soil		2.5	5	feet	UNKNOWN	mg/kg	8/9/2010 11:20	5870	1.6	18	100 U	10 U	3.6	11	7
off site		WPS-1		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 11:45	9140	0.1 U	7.3	175	10 U	0.5	16	7
off site		WPS-2		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 11:10	6470	0.1 U	3.8	100 U	10 U	0.1 U	7	4
off site		WPS-3		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 10:50	6230	0.1 U	3.5	100 U	10 U	0.1 U	6	4
off site		WPS-3		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 10:45	5560	0.1 U	2.9	100 U	10 U	0.2	6	3
off site		WPS-4		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 12:15	7770	0.1 U	2.2	100 U	10 U	0.1 U	8	6
off site		WPS-5		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 11:30	8720	0.1 U	3.4	121	10 U	0.1 U	8	6
off site		WPS-5		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 11:20	7950	0.1 U	2.8	102	10 U	0.1 U	8	5

Screening Level (mg/kg)											Residential Soil	77,000		31		0.39		15,000		160		70		0.29		23	
											Industrial Soil	990,000		*410*		*1.6*		*190,000*		*2,000*		*800*		*5.6*		*300*	
											on site PRGs	NA		NA		176.0		NA		NA		NA		NA		NA	
CMS Area	**Remediated?**	**Station Name**	**Field Sample ID**	**Sample Matrix**	**Analytical Method**	**Sample Top**	**Sample Bottom**	**Depth Units**	**FilteredAnalysis**	**Reporting Units**	**Sample Date**	**Aluminum (Al)**		**Antimony (Sb)**		**Arsenic (As)**		**Barium (Ba)**		**Beryllium (Be)**		**Cadmium (Cd)**		**Chromium (Cr)**		**Cobalt (Co)**	
off site		WPS-6		Soil		0	0	feet	TOTAL	mg/kg	8/11/2010 12:40	8730		0.1	U	2.9		111		10	U	0.1	U	7		7	
off site		DH-54	IMMS-9910-289	Soil	EDXRF	0	2	feet			12/1/1999 0:00					59						12					
off site		DH-54	IMMS-9910-290	Soil	EDXRF	2	4	feet			12/1/1999 0:00					46						10	U				
off site		DH-54	IMMS-9910-291	Soil	EDXRF	4	6	feet			12/1/1999 0:00					25						10	U				
off site		DH-54	IMMS-9910-292	Soil	EDXRF	6	8	feet			12/2/1999 0:00					14						10	U				
off site		DH-54	IMMS-9910-293	Soil	EDXRF	8	10	feet			12/2/1999 0:00					11						10	U				
off site		DH-54	IMMS-9910-294	Soil	EDXRF	10	12	feet			12/2/1999 0:00					10	U					10	U				
off site		DH-54	IMMS-9910-295	Soil	EDXRF	15	17	feet			12/2/1999 0:00					17						10	U				
off site		DH-54	IMMS-9910-296	Soil	EDXRF	20	22	feet			12/2/1999 0:00					14						10	U				
off site		DH-54	IMMS-9910-297	Soil	EDXRF	25	27	feet			12/2/1999 0:00					11						10	U				
5		SRB-15	IMSP-9911-218	Soil	EDXRF	0	3	feet			12/1/1999 0:00					1116						205					
5		SRB-15	IMSP-9911-219	Soil	EDXRF	3	6.5	feet			12/1/1999 0:00					38						10	U				
5		SRB-15	IMSP-9911-220	Soil	EDXRF	6.5	8	feet			12/1/1999 0:00					1107						266					
5		SRB-15	IMSP-9911-221	Soil	EDXRF	8	11	feet			12/1/1999 0:00					183						26					
5		SRB-15	IMSP-9911-222	Soil	EDXRF	11	14	feet			12/1/1999 0:00					3884						1134					
5		SRB-15	IMSP-9911-223	Soil	EDXRF	14	16	feet			12/1/1999 0:00					185						57					
5		SRB-15	IMSP-9911-224	Soil	EDXRF	16	19	feet			12/1/1999 0:00					69						13					
5		SRB-15	IMSP-9911-225	Soil	EDXRF	19	21.5	feet			12/1/1999 0:00					3574						754					
5		SRB-15	IMSP-9911-226	Soil	EDXRF	21.5	23	feet			12/1/1999 0:00					50						10	U				
5		SRB-15	IMSP-9911-227	Soil	EDXRF	23	23	feet			12/1/1999 0:00					10	U					10	U				
1		ULL-5	IMSP-9911-103	Soil	EDXRF	0	15	feet			11/16/1999 0:00					3146						1089					
1		SS24	SS-24	Soil	Unknown	0	0.08333	feet			1/1/2001 0:00					2115						613					

Facility

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
DH-72-SL	1680	8	78600	8340	4390	15	18	12.3	87	20	8.9	31	14800
DH-72-SL	4150	24	126000	11900	6590	19	37	19.5	153	39	16.1	38	12700
DH-72-SL	1230	5 U	35000	8110	1560	22	24	4.4	49	6	6.7	30	8090
DH-72-SL	103	6	30900	434	731	0.5 U	11	5 U	5 U	8	2	74	1250
DH-72-SL	185	5 U	30800	17	2820	1	13	5 U	5 U	7	26	112	276
DH-72-SL	27	5 U	13400	49	193	0.5 U	5 U	5 U	5 U	5 U	2	27	93
DH-72-SL	30	5 U	14400	27	150	0.6	5 U	5 U	5 U	5 U	5	43	94
DH-72-SL	34	5 U	13700	12	131	0.5 U	5 U	5 U	5 U	5 U	6	35	714
DH-72-SL	14	5 U	9620	63	210	0.5 U	5 U	5 U	5 U	5 U	1 U	6	226
DH-72-SL	11	5 U	17600	37	434	0.5 U	5 U	5 U	5 U	5	1 U	8	62
DH-72-SL	5 U	5 U	3820	28	259	0.5 U	5 U	5 U	5 U	5 U	1 U	5 U	26
DH-72-SL	5 U	5 U	5020	15	166	0.5 U	5 U	5 U	5 U	5 U	1 U	5 U	30
DH-72-SL	5 U	5 U	3190	9	69	0.5 U	5 U	5 U	5 U	5 U	1 U	7	15
DH-72-SL	6	5 U	7220	16	66	0.5 U	5 U	5 U	5 U	5 U	1 U	6	22
DH-73-SL	2340	11	69200	6960	2450	7.9	16	17.2	40	9	2.2	47	51700
DH-73-SL	1540	19	122000	3980	4660	5	6	4.4	10	16	1.6	48	49100
DH-73-SL	1040	19	76900	2970	3410	1.4	7	2.1	12	7	0.4	49	14000
DH-73-SL	304	5	35200	411	1430	1.2	11	5 U	5 U	5 U	1 U	38	4480
DH-73-SL	169	5 U	22600	335	1080	0.5 U	5	5 U	5 U	5 U	1 U	29	2950
DH-73-SL	13	5 U	5840	12	104	0.5 U	5 U	5 U	5 U	5 U	1 U	13	36
DH-73-SL	27	5 U	20900	27	405	0.5 U	5 U	5 U	5 U	5 U	2	46	74
DH-73-SL	55	5 U	19800	12	516	0.5 U	5 U	5 U	5 U	5 U	1 U	49	40
DH-73-SL	20	5 U	14800	10	145	0.5 U	5 U	5 U	5 U	5 U	1 U	35	41
DH-73-SL	13	5 U	10400	9	63	0.5 U	5 U	5 U	5 U	5 U	1 U	26	29
DH-73-SL	17	5 U	18000	10	69	0.5 U	5 U	5 U	5 U	5 U	1 U	46	40
DH-73-SL	17	5 U	18300	8	47	0.5 U	5 U	5 U	5 U	5 U	1 U	37	33
DH-73-SL	16	5 U	13800	15	24	0.5 U	5 U	5 U	5 U	5 U	1 U	10	40
DH-74-SL	4760	19	168000	9610	9620	1 U	32	97	55	5 U	1 U	67	135000
DH-74-SL	13100	19	165000	13300	7540	1 U	67	133	180	34	8	56	21800
DH-74-SL	15900	19	158000	20300	6810	1 U	69	169	195	46	8	48	121000
DH-74-SL	17100	19	163000	17900	6840	1 U	64	164	213	47	7	51	122000
DH-74-SL	9610	20	162000	11300	8160	1 U	63	209	123	38	9	47	120000
DH-74-SL	3670	29	232000	70	10000	1 U	117	5 U	13	15	1 U	50	17500
DH-74-SL	3070	26	235000	40	9380	1 U	14	5 U	12	15	1 U	55	15000
DH-74-SL	1930	26	244000	187	6540	1 U	5 U	14	5 U	17	4	49	17800
DH-74-SL	1010	25	265000	19	5080	1 U	5 U	9	5 U	20	1 U	65	14500
DH-74-SL	1420	29	254000	36	6200	1 U	5 U	12	5 U	18	1 U	71	11300
DH-74-SL	2430	28	292000	150	10600	1 U	109	5 U	5 U	20	1 U	74	12200
DH-74-SL	969	24	271000	25	5000	1 U	5 U	12	5 U	18	1 U	53	8640
DH-74-SL	953	25	235000	15	5930	1 U	5 U	10	5 U	15	1	60	2080
DH-74-SL	1030	25	226000	38	6320	1 U	5 U	10	5 U	20	4	44	7070
DH-74-SL	1240	32	262000	16	7970	1 U	5 U	13	5 U	20	4	54	17100
DH-74-SL	71	5 U	18400	449	395	1 U	10	17	5 U	5 U	3	39	524
DH-74-SL	21	5 U	11800	37	295	1 U	5 U	5 U	5 U	5 U	2	27	47
DH-74-SL	13	5 U	8100	20	253	1 U	5 U	5 U	5 U	5 U	1 U	18	41
DH-74-SL	111	5 U	32400	37	917	1 U	5 U	5 U	5 U	5 U	1 U	37	1060
DH-74-SL	20	5 U	10100	11	199	1 U	5 U	5 U	5 U	5 U	1 U	21	46
DH-75-SL	1900	14	162000	7780	4570	0.5 U	16	29	23	5 U	1 U	32	149000
DH-75-SL	3310	16	168000	5730	6510	0.5 U	23	84	44	5 U	1 U	42	144000
DH-75-SL	3190	14	182000	3360	4760	0.5 U	23	41	46	27	1 U	29	81600
DH-75-SL	3260	10	166000	13500	3430	0.5 U	28	46	65	5 U	6	26	126000
DH-75-SL	3100	12	150000	9070	4250	0.5 U	29	41	25	5 U	1 U	23	122000
DH-75-SL	4860	13	161000	6990	3870	0.5 U	30	130	50	5 U	7	24	134000
DH-75-SL	5270	27	147000	5410	9690	0.5 U	17	72	40	32	1 U	45	130000
DH-75-SL	4650	28	177000	8350	12100	0.5 U	18	44	30	32	1 U	42	118000
DH-75-SL	6080	28	191000	4820	14200	0.5 U	121	194	46	36	1 U	46	117000
DH-75-SL	4120	40	229000	387	10200	0.5 U	124	10	16	19	1 U	48	24300
DH-75-SL	4540	34	222000	75	11500	0.5 U	23	5 U	13	16	1 U	29	14500
DH-75-SL	5030	30	221000	73	11700	0.5 U	24	5 U	16	15	1 U	27	14000
DH-75-SL	1250	28	221000	99	5660	0.5 U	6	11	5 U	19	3	48	9930
DH-75-SL	1920	34	245000	20	6370	0.5 U	5 U	12	5 U	19	2	47	12700
DH-75-SL	1450	30	262000	18	5290	0.5 U	5	10	5 U	19	1 U	58	10300
DH-75-SL	1230	32	261000	26	6810	0.5 U	5 U	11	5 U	19	2	55	14700
DH-75-SL	1640	39	266000	17	8070	0.5 U	5	13	5 U	19	3	54	10200
DH-75-SL	1180	31	263000	394	4820	0.5 U	5 U	11	5 U	22	1 U	47	28800
DH-75-SL	724	31	251000	23	4100	0.5 U	5 U	10	5 U	19	1 U	63	5490

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
DH-75-SL	719	36	255000	83	8780	0.5 U	36	5 U	5 U	20	1 U	52	17200
DH-75-SL	1260	39	248000	23	7600	0.5 U	5 U	13	5 U	19	3	43	8540
DH-75-SL	29	5 U	18100	11	409	0.5 U	9	5 U	5 U	5 U	3	43	76
DH-75-SL	9	5 U	8000	7	252	0.5 U	5 U	5 U	5 U	5 U	1 U	23	40
DH-75-SL	20	5 U	9210	8	234	0.5 U	5 U	5 U	5 U	5 U	1 U	22	38
DH-75-SL	25	5 U	21200	9	332	0.5 U	5	5 U	5 U	5 U	2	51	56
DH-75-SL	17	5 U	18200	6	312	0.5 U	5 U	5 U	5 U	5 U	1	41	35
DH-75-SL	23	5 U	18000	7	267	0.5 U	5 U	5 U	5 U	5 U	1 U	44	36
DH-75-SL	24	5 U	12900	7	238	0.5 U	5 U	5 U	5 U	5 U	1 U	37	22
DH-75-SL	23	5 U	13700	9	160	0.5 U	5 U	5 U	5 U	5 U	1 U	37	35
DH-75-SL	19	5 U	13900	9	108	0.5 U	5 U	5 U	5 U	5 U	1 U	33	42
DH-76-SL	5470	29	191000	7890	8360	0.12	64	150	58	40	9	83	141000
DH-76-SL	5370	31	182000	7770	7470	0.081	63	255	69	37	7	73	114000
DH-76-SL	6300	22	164000	7190	6940	0.095	72	251	99	34	8	68	104000
DH-76-SL	5520	26	164000	7540	6820	0.5 U	50	267	77	31	5	67	117000
DH-76-SL	23100	26	177000	17200	8630	0.5 U	53	325	228	5 U	7	60	122000
DH-76-SL	3210	26	170000	6870	11100	0.5 U	5 U	88	27	34	8	38	129000
DH-76-SL	5250	27	189000	8620	8450	0.5 U	21	81	46	27	6	50	104000
DH-76-SL	20800	27	206000	14400	7160	0.5 U	24	120	147	51	5	73	112000
DH-76-SL	12600	24	180000	9630	6700	0.5 U	24	92	97	34	5	61	98300
DH-76-SL	5550	30	194000	9460	6990	0.5 U	7	133	46	37	6	71	116000
DH-76-SL	4320	30	191000	6750	9300	0.5 U	5 U	90	30	35	7	66	103000
DH-76-SL	3460	27	181000	11400	8170	0.5 U	22	50	43	16	13	59	83200
DH-76-SL	3970	23	157000	8130	7670	0.5 U	6	135	33	20	7	88	100000
DH-76-SL	5320	19	175000	7710	8100	0.5 U	20	25	29	24	8	55	112000
DH-76-SL	5080	26	168000	7870	7500	0.5 U	19	28	28	24	8	53	112000
DH-76-SL	8050	19	188000	17500	4900	0.5 U	53	57	97	27	1 U	39	114000
DH-76-SL	54300	25	193000	24900	4690	0.5 U	330	160	298	5 U	1 U	49	70000
DH-76-SL	4170	20	191000	13900	6300	0.5 U	21	33	27	26	5	34	108000
DH-76-SL	5150	22	169000	10100	6190	0.5 U	32	23	40	20	6	38	95100
DH-76-SL	5840	30	219000	13400	13700	0.5 U	38	26	33	24	1 U	55	84500
DH-76-SL	1510	27	192000	12400	13500	0.5 U	88	16	11	18	1 U	114	64800
DH-76-SL	1760	37	221000	16200	10400	0.5 U	5 U	15	11	21	6	66	63600
DH-76-SL	394	9	119000	3440	6680	0.5 U	5 U	10	5 U	8	8	32	27100
DH-76-SL	58	5 U	25000	32	264	0.5 U	12	5 U	5 U	5 U	3	55	129
DH-76-SL	32	5 U	24500	17	303	0.5 U	6	5 U	5 U	5 U	2	59	69
DH-76-SL	51	5 U	23700	14	424	0.5 U	6	5 U	5 U	5 U	1 U	56	57
DH-76-SL	21	5 U	13400	13	469	0.5 U	5 U	5 U	5 U	5 U	1 U	27	36
DH-76-SL	20	5 U	17400	12	109	0.5 U	5 U	5 U	5 U	5 U	1 U	31	47
DH-76-SL	23	5 U	16100	14	76	0.5 U	5 U	5 U	5 U	5 U	1 U	43	43
DH-76-SL	21	5 U	15000	12	52	0.5 U	5 U	5 U	5 U	5 U	1 U	43	30
LL-BK-1	193	5 U	14100	497	331	2	11	2.9	11	5 U	1.2	38	287
LL-BK-2	2410	5 U	27500	8130	1040	28	36	23	90	5 U	29	27	5270
LL-BK-3	184	5 U	17000	448	278	1.7	8	3.2	6	5 U	1.8	47	311
LL-BK-4	35	5 U	17000	57	304	0.29	11	0.5 U	2 U	5 U	0.5	48	71
LL-BK-4	32	5 U	18600	69	308	0.43	10	0.6	2 U	5 U	0.5	55	72
PPC-RZ-2	244		17300	804	441	1.2	6	0.9	10		0.8	46	646
RC-SS25	331	5 U	17400	885	311	0.72	6	2.1	9	-5 U	1.5	46	723
RC-SS25	30	5 U	14000	61	222	0.05 U	5	0.5 U	2 U	-5 U	0.1 U	39	170
RC-SS25	18	5 U	21300	22	348	0.05 U	8	0.5 U	2 U	5 U	0.1 U	66	54
RC-SS25	16	5 U	21300	24	313	0.05 U	8	0.5 U	2 U	5 U	0.1 U	67	52
RC-SS5	13900	22	88500	41800	5850	500	126	569	451	-5 U	307	27	25400
RC-SS5	566	5 U	20500	2550	544	23	18	75	30	-5 U	124	41	9330
RC-SS5	174	5 U	16800	783	843	11	29	13	8	-5 U	7	34	4540
RC-SS7	11600	6	55100	46900	1960	120	113	754	365	151	45	28	22000
RC-SS7	8100	7	28400	17000	2010	33	53	98	122	5 U	8	39	14500
RC-SS7	471	5 U	16900	2780	725	21	26	96	31	5 U	4	31	4500
RFI2SB-1	634	5 U	18100	2890	1050	10	7	4.1	18	5 U	2.1	22	3020
RFI2SB-1	426	5 U	17900	3100	987	11	5	1.8	13	5 U	1.4	24	3310
RFI2SB-1	160	5 U	17600	631	458	0.19	8	0.8	4	5 U	1	37	1310
RFI2SB-1	113	5 U	18400	424	453	5.3	9	5 U	5 U	5 U	10	40	1030
RFI2SB-1	111	5 U	15000	649	458	21	7	5 U	5 U	5 U	7	28	1190
RFI2SB-1	790	37	125000	9740	7190	0.65	5 U	5	14	6	15	23	37100
RFI2SB-1	10	5 U	10300	8	147	0.5 U	5 U	5 U	5 U	5 U	8	26	35
RFI2SB-1	10	5 U	8840	9	137	0.5 U	5 U	5 U	5 U	5 U	3	25	35
RFI2SB-1	22	5 U	8750	9	125	0.5 U	5 U	5 U	5 U	5 U	2	19	35
RFI2SB-1	14	5 U	8860	8	251	0.5 U	5 U	5 U	5 U	5 U	2	26	25
RFI2SB-10	1530	35	182000	739	7080	2.6	9	3.3	7	5 U	1.1	37	14500
RFI2SB-10	21	5 U	11100	29	354	0.05 U	8	1.2	2 U	5 U	0.4	26	435

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
RFI2SB-10	16	5 U	14300	17	314	0.05 U	13	1.1	2 U	5 U	0.4	50	50
RFI2SB-10	17	5 U	14000	12	272	0.5 U	11	5 U	5 U	5 U	4	39	38
RFI2SB-10	13	5 U	11000	13	332	0.5 U	8	5 U	5 U	5 U	4	30	32
RFI2SB-10	23	6	28100	11	491	0.5 U	11	5 U	5 U	11	1 U	68	121
RFI2SB-10	66	7	31100	19	705	0.5 U	9	5 U	5 U	10	1 U	80	52
RFI2SB-10	43	6	24800	10	577	0.5 U	7	5 U	5 U	10	9	64	46
RFI2SB-10	39	5 U	7360	83	476	0.5 U	5 U	5 U	5 U	5 U	1 U	23	34
RFI2SB-10	32	5 U	7240	54	394	0.5 U	5 U	5 U	5 U	5 U	1 U	20	35
RFI2SB-12	3350	5 U	14200	9930	184	0.29	49	27.1	138	9	0.5	26	69700
RFI2SB-12	25	5 U	17600	310	242	0.28	6	0.7	2 U	5 U	0.4	30	2440
RFI2SB-12	16	5 U	13700	131	277	0.05 U	5 U	0.5 U	2 U	5 U	0.3	24	975
RFI2SB-12	28	5 U	21000	28	51	0.5 U	5 U	5 U	5 U	5 U	1 U	32	49
RFI2SB-12	19	5 U	18500	15	420	0.5 U	5 U	5 U	5 U	5 U	1 U	46	38
RFI2SB-12	34	5 U	14400	9	245	0.5 U	5 U	5 U	5 U	5 U	1 U	35	31
RFI2SB-12	17	5 U	14300	9	291	0.5 U	5 U	5 U	5 U	5 U	1	36	34
RFI2SB-12	26	5 U	9470	7	106	0.5 U	5 U	5 U	5 U	5 U	1 U	21	26
RFI2SB-12	32	5 U	9580	25	142	0.5 U	5 U	5 U	5 U	5 U	1 U	22	29
RFI2SB-12	25	5 U	18900	8	311	0.5 U	5 U	5 U	5 U	5 U	2	53	35
RFI2SB-12	34	5 U	21200	11	328	0.5 U	5 U	5 U	5 U	5 U	1 U	57	37
RFI2SB-12	15	5 U	9990	20	135	0.5 U	5 U	5 U	7	5 U	1 U	21	50
RFI2SB-12	14	5 U	12100	13	45	0.5 U	5 U	5 U	5 U	5 U	1 U	35	29
RFI2SB-12	8	5 U	8810	12	28	0.5 U	5 U	5 U	5 U	5 U	1 U	6	24
RFI2SB-12	6	5 U	3530	19	35	0.5 U	5 U	5 U	5 U	5 U	1 U	5 U	17
RFI2SB-13	31	5 U	15800	73	342	0.05 U	5 U	0.5 U	2 U	5 U	1.2	40	1580
RFI2SB-13	1670	13	127000	1630	5290	2.3	5 U	2.8	5	7	4	47	17100
RFI2SB-13	1710	17	151000	765	5370	0.83	6	2.7	21	13	5	42	12800
RFI2SB-13	13	5 U	12300	14	245	0.05 U	6	0.5 U	2 U	5 U	0.3	32	53
RFI2SB-13	13	5 U	14600	15	348	1 U	6	5 U	5 U	5 U	1 U	35	80
RFI2SB-13	16	5 U	18500	5	443	1 U	6	5 U	5 U	5 U	1 U	54	39
RFI2SB-13	26	5 U	15200	23	480	1 U	5	5 U	5 U	5 U	1 U	35	55
RFI2SB-13	40	5 U	16400	8	535	1 U	5 U	5 U	5 U	5 U	1 U	48	27
RFI2SB-13	26	5 U	11300	8	416	1 U	5 U	5 U	5 U	5 U	1 U	26	29
RFI2SB-13	38	5 U	16700	14	353	1 U	5 U	5 U	5 U	5 U	1 U	42	37
RFI2SB-13	36	5 U	18100	15	483	1 U	5	5 U	5 U	5 U	2	41	43
RFI2SB-13	18	5 U	13900	9	91	1 U	5 U	5 U	5 U	5 U	1 U	30	34
RFI2SB-13	18	5 U	16500	9	91	1 U	5 U	5 U	5 U	5 U	1 U	42	38
RFI2SB-13	13	5 U	14500	9	59	1 U	5 U	5 U	5 U	5 U	1 U	42	28
RFI2SB-13	14	5 U	17100	31	346	1 U	5 U	5 U	5 U	5 U	1 U	54	162
RFI2SB-14	1440	8	34200	6310	1050	26	26	17.2	37	6	2.7	30	32300
RFI2SB-14	405	5 U	40500	3060	1220	2.1	7	1	7	5 U	0.8	30	15500
RFI2SB-14	1060	17	95500	3520	3950	2	8	1.9	8	7	1.5	42	32500
RFI2SB-14	203	5 U	19500	2640	621	7.1	10	5 U	8	5 U	3	30	2480
RFI2SB-14	31	5 U	15100	229	629	0.6	5 U	5 U	5 U	5 U	1 U	31	375
RFI2SB-14	42	5 U	16700	210	686	0.5 U	5 U	5 U	5 U	5 U	1 U	34	317
RFI2SB-14	42	5 U	19400	15	524	0.5 U	8	5 U	5 U	5 U	1 U	46	41
RFI2SB-14	29	5 U	20300	11	380	0.5 U	5 U	5 U	5 U	5 U	1 U	49	38
RFI2SB-14	33	5 U	14200	11	326	0.5 U	5 U	5 U	5 U	5 U	1 U	32	37
RFI2SB-14	28	5 U	20300	11	335	0.5 U	5 U	5 U	5 U	5 U	1 U	55	40
RFI2SB-14	27	5 U	18400	16	325	0.5 U	5 U	5 U	5 U	5 U	1 U	42	50
RFI2SB-14	25	5 U	22300	14	128	0.5 U	5 U	5 U	5 U	5 U	1 U	44	54
RFI2SB-14	22	5 U	27900	17	38	0.5 U	5 U	5 U	5 U	5 U	1 U	15	80
RFI2SB-15	2730	5 U	63800	25600	988	13	63	662	149	5 U	11	17	160000
RFI2SB-15	1190	12	99400	12200	5680	1.7	8	74	30	16	11	52	79600
RFI2SB-15	1560	16	143000	21700	7920	0.05 U	5 U	11	27	15	8	97	62700
RFI2SB-15	1670	28	148000	21600	11100	1 U	5 U	5 U	58	12	1 U	99	60800
RFI2SB-15	1350	32	145000	18100	11100	1 U	5 U	5 U	41	12	1 U	107	57200
RFI2SB-15	1930	17	113000	18000	8140	1 U	5 U	5 U	63	13	1 U	115	60400
RFI2SB-15	72	5 U	20500	616	683	1 U	7	5 U	5 U	5 U	1	34	1480
RFI2SB-15	14	5 U	13000	23	173	1 U	5	5 U	5 U	5 U	1	41	71
RFI2SB-15	12	5 U	12100	22	157	1 U	5 U	5 U	5 U	5 U	1 U	31	66
RFI2SB-15	34	5 U	18300	13	256	1 U	23	5 U	5 U	5 U	1 U	40	64
RFI2SB-15	31	5 U	15900	10	441	1 U	5 U	5 U	5 U	5 U	3	43	42
RFI2SB-15	20	5 U	14200	9	142	1 U	5 U	5 U	5 U	5 U	1	30	41
RFI2SB-15	14	5 U	17200	8	119	1 U	8	5 U	5 U	5 U	11	30	40
RFI2SB-15	33	5 U	21100	20	185	1 U	5 U	5 U	5 U	5 U	2	51	35
RFI2SB-15	81	8	78800	54	210	1 U	5 U	5 U	5 U	5 U	2	200	64
RFI2SB-15	31	5 U	17500	16	74	1 U	5 U	5 U	5 U	5 U	1	22	49
RFI2SB-16	172	5 U	11100	3670	301	5.2	5	0.9	13	5 U	0.8	22	950
RFI2SB-16	13	5 U	9900	31	224	0.05 U	6	0.5 U	2 U	5 U	0.4	20	56

	3,100			**55,000**		**400**		**1,800**		**23**		**1,500**		**390**		**390**				**0.78**		**390**		**23,000**	
	41,000			***720,000***		***800***		***23,000***		***310***		***20,000***		***5,100***		***5,100***				***10.0***		***5,200***		***310,000***	
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**	
RFI2SB-16	18	5	U	9990		199		302		0.21		6		0.5	U	2	U	5	U	0.4		22		211	
RFI2SB-16	10	5	U	9360		19		211		0.05	U	5		0.5	U	2	U	5	U	0.4		22		44	
RFI2SB-16	16	5	U	16700		18		400		0.5	U	11		5	U	5	U	5	U	3		33		55	
RFI2SB-16	48	6		32000		17		806		0.5	U	11		5	U	5	U	5	U	5		61		61	
RFI2SB-16	39	5	U	15900		15		484		0.5	U	6		5	U	5	U	5	U	5		40		43	
RFI2SB-16	40	5	U	14800		31		413		0.5	U	6		5	U	5	U	5	U	4		37		34	
RFI2SB-16	39	5	U	24600		16		626		0.5	U	10		5	U	5	U	5	U	10		53		113	
RFI2SB-16	33	5	U	17500		10		155		0.5	U	5	U	5	U	5	U	5	U	2		44		502	
RFI2SB-16	39	5	U	19800		16		186		0.5	U	5		5	U	5	U	5	U	4		50		404	
RFI2SB-16	21	5	U	12300		10		122		0.5	U	5	U	5	U	5	U	5	U	5		31		164	
RFI2SB-16	45	5	U	29500		25		273		0.5	U	5	U	5	U	5	U	5	U	2		63		228	
RFI2SB-16	7	5	U	4560		17		38		0.5	U	5	U	5	U	5	U	5	U	1	U	5	U	25	
RFI2SB-17	25	5	U	14200		58		364		0.14		5	U	0.5	U	2	U	5	U	0.2		38		226	
RFI2SB-17	392	10		53500		2710		1870		5		6		1.9		6		5	U	0.3		49		20400	
RFI2SB-17	77	6		33300		357		652		0.11		11		0.5	U	2	U	5	U	0.2		88		297	
RFI2SB-17	39	5	U	25500		99		481		0.5	U	6		5	U	5	U	5	U	5		49		91	
RFI2SB-17	38	5	U	24900		13		442		0.5	U	39		5	U	5	U	5	U	9		59		48	
RFI2SB-17	37	5	U	21300		13		491		0.5	U	33		5	U	5	U	5	U	8		46		46	
RFI2SB-17	42	5	U	15600		15		359		0.5	U	5	U	5	U	5	U	5	U	3		37		35	
RFI2SB-17	37	5	U	27800		18		339		0.5	U	8		5	U	5	U	5	U	5		84		35	
RFI2SB-17	27	5	U	23600		13		153		0.5	U	5	U	5	U	5	U	5	U	3		74		25	
RFI2SB-17	21	5	U	13900		11		222		0.5	U	5	U	5	U	5	U	5	U	4		31		34	
RFI2SB-17	37	5	U	14400		14		201		0.5	U	5	U	5	U	5	U	5	U	4		34		37	
RFI2SB-17	16	5	U	25000		20		125		0.5	U	5	U	5	U	5	U	5	U	1		18		33	
RFI2SB-17	9	5	U	16500		42		92		0.5	U	5	U	5	U	5	U	5	U	1	U	11		25	
RFI2SB-17	12	5	U	12500		30		41		0.5	U	5	U	5	U	5	U	5	U	1	U	12		38	
RFI2SB-18	48	5	U	16800		377		515		4.7		8		1.8		3		5	U	4		33		707	
RFI2SB-18	2490	26		186000		8200		6680		91		16		30		43		16		172		53		13900	
RFI2SB-18	2500	26		170000		10700		7680		220		11		93		57		6		359		42		13000	
RFI2SB-18	4200	9		104000		28100		3870		380		12		126		225		5		343		28		8430	
RFI2SB-18	280	5	U	17400		2190		334		62		5	U	76		16		5	U	335		45		1390	
RFI2SB-18	304	5	U	27500		1260		434		13		5	U	94		10		5	U	130		35		1060	
RFI2SB-18	67	5	U	13600		35		108		0.5	U	5		11		5	U	5	U	32		41		1040	
RFI2SB-18	17	5	U	8520		42		339		0.5	U	5	U	5	U	5	U	5	U	1	U	7		113	
RFI2SB-2	21	5	U	14100		60		302		0.24		11		1.1		2	U	5	U	0.3		40		57	
RFI2SB-2	324	5	U	16300		2190		392		65		9		4.1		15		5	U	5.9		22		2150	
RFI2SB-2	718	5	U	24600		20600		613		86		9		4.3		66		5	U	5		47		4690	
RFI2SB-2	164	5	U	17900		989		1600		1.2		8		5	U	10		5	U	6		44		638	
RFI2SB-2	136	5	U	10200		262		721		0.7		5	U	5	U	5	U	5	U	6		23		814	
RFI2SB-2	41	5	U	6730		230		434		0.5	U	5	U	5	U	5	U	5	U	5		15		414	
RFI2SB-2	54	5	U	14900		137		413		0.5	U	8		5	U	5	U	5	U	10		37		362	
RFI2SB-2	12	5	U	9920		41		150		0.5	U	5	U	5	U	5	U	5	U	3		27		50	
RFI2SB-2	11	5	U	9500		17		118		0.5	U	5	U	5	U	5	U	5	U	3		20		37	
RFI2SB-2	7	5	U	3890		12		156		0.5	U	5	U	5	U	5	U	5	U	1		5	U	17	
RFI2SB-20	861	15		94600		352		4200		0.05	U	10		2.3		5		5	U	1.3		44		6670	
RFI2SB-20	1770	28		191000		85		9270		0.05	U	5		0.9		2	U	12		0.1	U	38		19100	
RFI2SB-20	2000	38		210000		51		9390		0.05	U	5		1.1		2	U	12		0.1	U	39		19400	
RFI2SB-20	1940	34		234000		36		9190		1	U	5	U	7		5	U	8		7		49		15700	
RFI2SB-20	44	5	U	19100		10		933		1	U	6		5	U	5	U	5	U	6		50		42	
RFI2SB-20	64	5	U	25100		18		951		1	U	8		5	U	5	U	5	U	3		49		55	
RFI2SB-20	51	5	U	23500		15		794		1	U	7		5	U	5	U	5	U	4		48		47	
RFI2SB-20	47	5	U	23200		17		710		1	U	6		5	U	5	U	5	U	4		57		48	
RFI2SB-20	33	5	U	19000		11		273		1	U	5	U	5	U	5	U	5	U	2		42		31	
RFI2SB-20	40	5	U	16300		13		193		1	U	5	U	5	U	5	U	5	U	1	U	33		44	
RFI2SB-20	26	5	U	26100		11		282		1	U	5	U	5	U	5	U	5	U	5		51		48	
RFI2SB-20	57	5	U	22000		17		398		1	U	5	U	17		5	U	5	U	5		54		1920	
RFI2SB-20	25	5	U	32100		21		42		1	U	5	U	5	U	5	U	5	U	1	U	13		51	
RFI2SB-21	51	5	U	17300		184		403		0.11		5	U	0.5	U	2	U	5	U	0.3		43		592	
RFI2SB-21	18	5	U	14300		29		410		0.05	U	12		0.5	U	2	U	5	U	0.4		31		96	
RFI2SB-21	12	5	U	16100		27		288		0.05	U	6		0.5	U	2	U	5	U	0.2		54		35	
RFI2SB-21	13	5	U	15300		14		190		0.5	U	6		5	U	5	U	5	U	4		44		30	
RFI2SB-21	47	5	U	29200		16		503		0.5	U	10		5	U	5	U	5	U	8		98		52	
RFI2SB-21	45	5	U	26400		19		466		0.5	U	8		5	U	5	U	5	U	7		66		60	
RFI2SB-21	39	5	U	14900		13		191		0.5	U	5	U	5	U	5	U	5	U	3		41		31	
RFI2SB-21	47	5	U	19300		17		447		0.5	U	7		5	U	5	U	5	U	10		48		52	
RFI2SB-21	43	5	U	11800		16		183		0.5	U	7		5	U	5	U	5	U	4		33		1210	
RFI2SB-21	19	5	U	13700		10		84		0.5	U	5	U	5	U	5	U	5	U	4		43		171	
RFI2SB-21	35	5	U	20300		13		183		0.5	U	5		5	U	5	U	5	U	4		50		429	
RFI2SB-21	17	5	U	12400		10		157		0.5	U	5	U	5	U	5	U	5	U	3		26		267	

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
RFI2SB-21	17	5 U	13900	16	173	0.5 U	5 U	5 U	5 U	5 U	2	24	264
RFI2SB-21	36	5 U	14100	144	1140	0.5 U	5 U	5 U	5 U	5 U	2	26	59
RFI2SB-4	253	5 U	22400	3490	880	20	8	4.2	15	5 U	10	37	3290
RFI2SB-4	7190	7	61400	8170	1590	2.5	16	0.9	170	5 U	0.4	63	6750
RFI2SB-4	77	5 U	5420	426	421	0.7	5 U	0.5 U	2 U	5 U	9	15	249
RFI2SB-4	33	5 U	4490	301	124	0.5 U	5 U	5 U	5 U	5 U	3	11	89
RFI2SB-4	97	5 U	3730	431	138	6.7	5 U	5 U	5 U	5 U	11	17	470
RFI2SB-4	26	5 U	15700	39	231	4.4	9	5 U	5 U	5 U	2	29	672
RFI2SB-4	5 U	5 U	4590	5 U	49	0.5 U	5 U	5 U	5 U	5 U	1 U	21	13
RFI2SB-4	11	5 U	9650	13	122	0.5 U	5 U	5 U	5 U	5 U	1 U	19	39
RFI2SB-4	10	5 U	13300	41	691	0.5 U	5 U	5 U	5 U	5 U	1	13	71
RFI2SB-5	3390	109	170000	12500	11000	1.5	20	20 U	38	25	1.7	39	78400
RFI2SB-5	357	6	41900	2430	2160	2.1	10	2.2	6	5 U	10.5	52	11600
RFI2SB-5	25	5 U	8290	11	233	2.5	5 U	1.5	2 U	5 U	4	33	303
RFI2SB-5	28	5 U	30200	12	90	1.7	5 U	5 U	5 U	5 U	7	107	78
RFI2SB-5	29	5 U	15600	9	242	3.7	5 U	5 U	5 U	5 U	2	35	150
RFI2SB-5	35	5 U	17400	14	162	1.1	5 U	5 U	5 U	5 U	3	51	1180
RFI2SB-5	22	5 U	13400	8	174	0.5 U	5 U	5 U	5 U	5 U	1	40	531
RFI2SB-5	11	5 U	5990	37	120	0.5 U	5 U	5 U	5 U	5 U	1 U	9	46
RFI2SB-6	2790	52	261000	290	11900	1.4	27	7.1	14	5 U	11.4	63	15900
RFI2SB-6	7410	50	246000	224	14200	0.54	20	6.6	11	6	10.4	69	14600
RFI2SB-6	2820	15	70300	18800	4290	75	60	106	160	5 U	122	43	14200
RFI2SB-6	41	5 U	17500	293	202	21	14	5 U	5 U	-5 U	190	47	2990
RFI2SB-6	59	5 U	27000	192	1100	3	8	5 U	5 U	-5 U	16	75	740
RFI2SB-6	63	5 U	22100	225	312	1 U	8	5 U	5 U	-5 U	6	51	615
RFI2SB-6	46	5 U	21800	16	445	1 U	6	5 U	5 U	-5 U	1 U	48	164
RFI2SB-6	14	5 U	11900	78	675	1 U	5 U	5 U	5 U	-5 U	5	38	54
RFI2SB-7	4790	7	29100	33800	1430	13	63	63.9	135	5 U	70.1	26	14000
RFI2SB-7	1470	5	27400	11100	1600	1.9	23	6.6	49	5 U	3.6	42	4150
RFI2SB-7	63	5 U	27400	115	533	2.3	11	2.1	2 U	5 U	0.3	62	727
RFI2SB-7	64	29	21600	135	587	0.75	11	1.5	7	5 U	0.3	51	573
RFI2SB-7	38	5 U	20700	20	951	0.5 U	9	15	5 U	5 U	8	48	466
RFI2SB-7	36	5 U	14500	12	1160	0.5 U	6	5 U	5 U	5 U	5	39	242
RFI2SB-7	48	5 U	17800	15	289	0.5 U	15	5 U	5 U	5 U	6	39	390
RFI2SB-7	39	5 U	16200	12	133	8.6	6	5 U	5 U	5 U	4	48	967
RFI2SB-7	25	5 U	12700	12	156	0.5 U	5 U	5 U	5 U	5 U	5	26	716
RFI2SB-7	6	5 U	6370	52	348	0.5 U	5 U	5 U	5 U	5 U	3	9	40
RFI2SB-8	3610	36	228000	367	13200	0.5 U	21	5 U	16	8	2	61	13600
RFI2SB-8	6220	26	149000	18500	7970	34	89	48	245	5 U	17	46	14900
RFI2SB-8	25	5 U	12400	26	277	0.5 U	8	5 U	5 U	-5 U	1 U	23	142
RFI2SB-8	11	5 U	11900	21	256	0.5 U	8	5 U	5 U	-5 U	1 U	23	47
RFI2SB-8	13	5 U	18800	14	264	0.5 U	6	5 U	5 U	5 U	1 U	55	33
RFI2SB-8	34	6	35600	13	780	0.5 U	11	5 U	5 U	-5 U	1 U	69	67
RFI2SB-8	58	5 U	29800	16	1080	0.5 U	10	5 U	5 U	5 U	1 U	66	49
RFI2SB-8	33	5 U	16700	11	825	0.5 U	5 U	5 U	5 U	5 U	1 U	43	41
RFI2SB-8	50	5 U	21100	12	139	0.5 U	7	5 U	5 U	-5 U	1 U	53	157
RFI2SB-8	21	5 U	11300	6	84	0.5 U	5 U	5 U	5 U	-5 U	1 U	28	296
RFI2SB-8	31	5 U	16700	9	150	0.5 U	6	5 U	5 U	-5 U	1 U	44	415
RFI2SB-8	15	5 U	15800	57	403	0.5 U	5 U	5 U	5 U	-5 U	2	9	43
RFI2SB-9	11100	44	185000	8870	10900	9.9	159	151	373	44	6.4	53	57700
RFI2SB-9	4500	13	65500	21800	2020	28	53	281	280	16	24	24	10400
RFI2SB-9	2130	6	32400	14000	1160	20	38	116	136	5 U	9.4	24	6580
RFI2SB-9	16	5 U	11500	34	228	0.05 U	8	0.8	2 U	5 U	0.5	25	702
RFI2SB-9	67	5 U	12400	94	330	0.5 U	6	5 U	5 U	-5 U	1 U	29	960
RFI2SB-9	12	5 U	20400	14	403	0.5 U	5 U	5 U	5 U	-5 U	3	58	47
RFI2SB-9	29	5 U	18900	21	338	0.5 U	6	5 U	5 U	-5 U	1 U	41	70
RFI2SB-9	41	5 U	23900	13	870	0.5 U	7	5 U	5 U	-5 U	3	60	54
RFI2SB-9	59	5 U	17800	17	752	0.5 U	7	5 U	5 U	5 U	5	47	40
RFI2SB-9	46	5 U	17500	14	555	0.5 U	5	5 U	5 U	5 U	2	47	140
RFI2SB-9	45	5 U	15300	10	278	0.5 U	5 U	5 U	5 U	5 U	1	45	112
RFI2SB-9	28	5 U	15000	20	209	0.5 U	5 U	5 U	5 U	5 U	1	16	193
UOP-SS17	403	5 U	22700	691	830	0.95	6	1.2	4	5 U	0.5	50	3560
UOP-SS17	142	5	19100	504	774	0.31	5 U	0.5 U	2	5 U	0.1 U	37	2320
UOP-SS17	109	5 U	11700	440	327	0.97	5 U	0.5 U	2 U	5 U	0.1 U	30	637
UOP-SS9	243	5 U	4760	1580	272	2	5 U	1.6	15	5 U	1	11	345
UOP-SS9	187	5 U	14400	1910	329	4.6	11	2.2	10	5 U	1.2	31	511
UOP-SS9	109	5 U	13800	646	308	7.2	10	1.2	3	5 U	0.8	29	314
UOP-SS9	23	5 U	15000	42	272	0.054	14	0.5 U	2 U	5 U	0.4	54	52
UOS-SS22	790	5 U	20100	4320	436	8.7	24	13	42	5 U	8	41	1250

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
UOS-SS22	616	5 U	18900	3610	493	10	19	9	39	5 U	50 U	39	1160
UOS-SS8	19	5 U	14100	41	207	0.19	9	0.9	2 U	5 U	0.8	41	85
UOS-SS8	3660	6	40700	16700	1650	45	52	100	192	23	14	33	12800
UOS-SS8	1730	5 U	19300	7580	905	14	19	64	77	7	8	27	3610
UPS-SS11	595	8	39900	4300	1710	5.2	15	4.9	22	5 U	1.6	45	17100
UPS-SS11	510	8	63300	4130	2810	6.2	9	1.8	11	5 U	0.6	41	19300
UPS-SS11	1480	35	140000	9330	9790	4.1	5 U	2.3	18	9	11	47	53800
UPS-SS12	3500	10	52900	14800	3910	14	39	20	133	7	6	29	27900
UPS-SS12	4040	6	57400	13900	2490	23	45	27	112	25	5	34	54200
UPS-SS9	1140	5 U	15300	2290	443	1.5	8	6.4	18	5 U	2	50	7550
UPS-SS9	649	5 U	14200	2920	302	3.5	8	3.4	19	-5 U	1.7	40	7140
UPS-SS9	127	5 U	13400	294	191	0.21	5	0.6	2 U	5 U	0.4	44	745
ACP1			26300	5650	1110								4290
ACP1		910					86	13	59		8	23	
ACP1						280							
ACP1		110		494				35					332
ACP1		820		7330				42					8370
ACP1		43		175				31					112
ACP1		126		626				31					532
ACP1		34		95				18					97
ACP1		58		170				19					167
ACP1		55		71				30					130
ACP1			15800	90									167
ACP1		48			625		7	5 U	5 U		5 U	36	
ACP1						2.4							
ACP2			61700	7630	2230								6070
ACP2		1020					9	12	58		6	29	
ACP2						550							
ACP2		125		16				34					678
ACP2		14		19				31					196
ACP2		15		35				28					44
ACP2		17		28				48					42
ACP2		25		23				29					52
ACP2		25		18				27					50
ACP2		23		16				30					57
ACP2		33	20700	33									47
ACP2					360		8	5 U	5 U		5 U	58	
ACP2						0.05 U							
ACP2			27800										57
ACP2		43		24	400		9	5 U	5 U		5 U	75	
ACP2						0.36							
AP-1		2400		17800									6640
AP-1													
AP-10		988		6880									3260
AP-11		1780		21300									2460
AP-12		4670		65000									10900
AP-13		1760		27200									4680
AP-14		3410		61800									8670
AP-15		841		11400									2460
AP-16		1540		20000									3000
AP-17		2000		23000									3450
AP-18		622		11100									2070
AP-19		1470		19200									2060
AP-2		11400		66000									12900
AP-3		2360		27800									4700
AP-4		1640		17500									4840
AP-5		5840		70800									9160
AP-6		2890		48600									6570
AP-7		606		11700									1860
AP-8		2140		23300									11800
AP-9		720		5580									6940
APSD-11				11895									6300
APSD-11				17064									6625
APSD-11				439									887
APSD-11				1736									1789
APSD-11				961									1200
APSD-11				430									900
APSD-11				258									666
APSD-12				11315									4206

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
APSD-12						9060																		3060
APSD-12						1213																		1758
APSD-12						406																		803
APSD-12						542																		1051
APSD-12						366																		908
APSD-13						256																		251
APSD-13						149																		221
APSD-13						197																		277
APSD-13						90																		190
APSD-13						81																		210
APSD-13						77																		211
APSD-13						197																		271
APSD-13						295																		334
APSD-13						298																		419
APSD-13						8053																		804
APSD-13						47																		540
APSD-13						51																		904
APSD-14						197730																		2895
APSD-14						16794																		1285
APSD-14						7103																		2399
APSD-14						12959																		2143
APSD-14						16430																		1729
APSD-14						538																		3286
APSD-7						34521																		7771
APSD-7						4433																		2160
APSD-7						2921																		2941
APSD-7						2150																		1281
APSD-7						1714																		1089
APSD-8						10071																		4353
APSD-8						748																		854
APSD-8						1405																		1019
APSD-8						615																		590
APSD-8						223																		490
APSD-8						187																		440
BFB1			70		14800	1180		312				12		5	U	5	U					34		3770
BFB1																				15				
BFB1										9.8														
BFB1			21			26								42										55
BFB1			13			10								20										42
BFB1			13			10								16										46
BFB1			12			14								12										43
BFB1			10			15								27										33
BFB1			12			14								18										43
BFB1			25			30								20										65
BFB1			52		40100	24		369				9		5	U	5	U					115		43
BFB1																				5	U			
BFB1										0.05	U													
BFB2			773		18400	3500		429				20		7		17						41		3460
BFB2																				26				
BFB2										58														
BFB2			25			16								41										50
BFB2			22			21								33										143
BFB2			16			14								27										45
BFB2			15			12								27										47
BFB2			15			11								25										44
BFB2			13			17								30										40
BFB2			12			8								23										42
BFB2			12			10								22										43
BFB2			19		23300	25		323				7		5	U	5	U					59		38
BFB2																				5	U			
BFB2										0.11														
BFB3			33		16500	367		308				12				5	U					34		860
BFB3														12						7				
BFB3										5.8														
BFB3			17			15								44										45
BFB3			16			10								46										43
BFB3			19			16								39										51
BFB3			17			7								49										47
BFB3			12			9								22										39

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		55,000	400	1,800	23	1,500	390	390		0.78	390	23,000
	41,000		*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
BFB3		14		21				22					45
BFB3		18		23				31					67
BFB3		17		23				20					47
BFB3			16500										
BFB3		14		15	188		5 U	5 U	5 U		5 U	50	33
BFB3						0.062							
BFB4		1650	13700	35200					103		272		21000
BFB4					532		16	164				16	
BFB4						8.4							
BFB4		647		13900				106					9630
BFB4		2440		42300				123					23100
BFB4		228		1430				43					1050
BFB4		175		1710				36					1030
BFB4		133		2890				73					2230
BFB4		21		79				35					92
BFB4		15		58				33					68
BFB4			16700										
BFB4		20		24	350		7	5 U	5 U		5 U	48	41
BFB4						0.05 U							
BFB5		1390	18300	36500					63		35		22200
BFB5					528		24	30				30	
BFB5						44							
BFB5		395		5100				49					3380
BFB5		4380		6290				40					4190
BFB5		974		9690				50					5740
BFB5		18		34				33					47
BFB5		35		197				41					218
BFB5		36		182				38					309
BFB5		23		22				32					56
BFB5		14		12				12					35
BFB5		32	19800	179									159
BFB5					318		7	5 U	5 U		5 U	51	
BFB5						0.31							
BLF1		2610	16600	25600					148		154		22200
BLF1					376		32	80				27	
BLF1						60							
BLF1		315		3030				59					1460
BLF1		86		684				26					427
BLF1		67		492				21					351
BLF1		92		917				27					517
BLF1		137		1410				28					862
BLF1		33		98				22					79
BLF1		55		286				15					193
BLF1		80	24100	33	1140								53
BLF1							10	5 U	5 U		5 U	49	
BLF1						0.05 U							
BLF2			19200	2300									2080
BLF2		400			415		12	7	23		82	41	
BLF2						17							
BLF2		73		95				24					3100
BLF2		74		86				28					3160
BLF2		116		225				28					3590
BLF2		32		26				15					1020
BLF2		37		41				21					1440
BLF2		68		31				35					2610
BLF2		33		14				24					861
BLF2		73		19				30					2530
BLF2			14400	17									553
BLF2		52			159		6	5 U	5 U		21	36	
BLF2						1.8							
BLF3			12600	3630			14						2360
BLF3		690			347			11	30		34	33	
BLF3						28							
BLF3		397		4900				30					4190
BLF3		244		1750				17					3120
BLF3		69		374				30					1060
BLF3			8590				11						215
BLF3		44		97	72			7	5 U		5 U	22	
BLF3						0.35							

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		55,000	400	1,800	23	1,500	390	390		0.78	390	23,000
	41,000		*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
BLF4			18300	2760			8						1240
BLF4		472			596			5 U	70		19	28	
BLF4						11							
BLF4		112		958				9					90
BLF4		62		145				5 U					36
BLF4		22	1070	20			5 U						68
BLF4					31			5 U	15		5 U	5	
BLF4						3.7							
BLF5			15000	24			11						59
BLF5		27			338			5 U	5 U		5 U	28	
BLF5						0.05 U							
BLF5			17900	1650			10						1360
BLF5		246			509			5 U	8		5 U	40	
BLF5						8.2							
BLF5		36		5 U				19					52
BLF5		16		5 U				8					21
BLF5		12		5 U				6					41
BLF5		12		5 U				13					20
BLF5		14		5 U				10					25
BLF5		15		597				14					188
BLF6			31300	2780	1060		19						2620
BLF6		606						9	19		16	54	
BLF6						15							
BLF6		87		290				29					371
BLF6		267		54				20					787
BLF6		69		102				17					695
BLF6			7790										429
BLF6		39		29	328		5 U	5 U	5 U		5 U	16	
BLF6						5.9							
BLF7		11100	45600	17600	3680				150		39		6690
BLF7							50	28				31	
BLF7						14							
BLF7		175		1120				35					974
BLF7		1840		53400				133					15700
BLF7		1720		51700				120					14500
BLF7		99		820				50					480
BLF7		84		204				39					228
BLF7		70		258				35					176
BLF7		172		306				57					321
BLF7		86		55				28					749
BLF7		34	10300	19	509								188
BLF7							5 U	5 U	5 U		5 U	25	
BLF7						2.9							
DH-30		4970		11574	3985								26012
DH-30		111		19549	458								1082
DH-30		190		127	318								1175
DH-30		89		127	694								1281
DH-30		76		93	2093								774
DH-30		138		31	579								1675
DH-31		20593		30880	216								1352
DH-31		2907		6587	599								251
DH-31		9520		26715	462								599
DH-31		125		70	1092								70
DH-31		102		34	1226								69
DH-31		76		26	856								72
DH-31		0.02		0.0073	738	0.001 U	0.005 U	0.005 U	0.005 U			0.026	0.016
DH-31		67		26	597								115
DH-32		2043		4387	789								749
DH-32		41		68	363								61
DH-32		29		25	403								49
DH-32		46		31	1899								71
DH-32		32		19	590								58
DH-32		29		17	508								41
DH-32		52		31	985								53
DH-32		83		25	1273								69
DH-32		118		33	1678								1715
DH-33		311		719	727								389
DH-33		61		74	471								55
DH-33		50		33	654								51

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
DH-33		51				71		655																79
DH-33		86				28		758																59
DH-33		48				27		412																43
DH-33		70				35		1005																85
DH-33		51				19		623																57
DH-33		58				23		561																1042
DH-34		2808				8500		972																2703
DH-34		772				2115		649																686
DH-34		86				67		1205																90
DH-34		50				31		427																40
DH-34		65				30		677																64
DH-34		83				30		973																61
DH-34		77				13		527																54
DH-34		59				28		618																58
DH-34		111				31		696																111
DH-35		8679				12879		1863																8672
DH-35		6166				8529		1500																7505
DH-35		207				444		562																648
DH-35		138				182		1354																113
DH-35		84				38		950																87
DH-35		114				56		1225																109
DH-35		92				41		1552																63
DH-35		66				42		875																83
DH-35		70				26		517																77
DH-36		873				4300		1739																28454
DH-36		54				80		643																450
DH-36		83				43		2208																192
DH-36		76				23		1486																70
DH-36		66				21		1446																116
DH-36		75				23		841																73
DH-36		62				18		519																71
DH-36		54				26		396																51
DH-36		57				17		767																64
DH-37		4887				4405		387																511
DH-37		1239				1029		448																254
DH-37		121				89		664																81
DH-37		66				67		922																78
DH-37		60				41		737																78
DH-37		58				22		483																1120
DH-38		12142				13598		1346																4437
DH-38		167				200		600																875
DH-38		55				33		622																444
DH-38		79				65		724																252
DH-38		84				42		1209																342
DH-38		62				33		329																50
DH-38		59				32		952																116
DH-38		86				22		1045																542
DH-38		137				42		465																2941
DH-38		78				26		441																828
DH-39		3487				1801		2940																10803
DH-39		2007				146		5190																16578
DH-39		32				33		1438																1134
DH-39		33				15		335																62
DH-39		29				10	U	611																56
DH-39		38				24		473																57
DH-39		66				25		579																53
DH-39		55				65		656																86
DH-39		35				78		953																109
DH-39		44				65		263																91
DH-40		2977				14152		1106																5849
DH-40		254				475		764																1034
DH-40		51				72		1024																204
DH-40		41				94		742																91
DH-40		54				32		576																52
DH-40		84				67		804																175
DH-40		62				27		1254																118
DH-40		75				56		844																121
DH-41		241				1293		764																1014
DH-41		453				3103		945																2226

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		55,000	400	1,800	23	1,500	390	390		0.78	390	23,000
	41,000		*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
DH-41		1420		5074	597								2365
DH-41		127		1809	227								352
DH-41		68		9821	510								392
DH-41		57		76	248								80
DH-41		53		57	236								62
DH-41		79		33	366								146
DH-42		1380		22723	524								3919
DH-42		2370		35856	446								5018
DH-42		2223		29967	919								7236
DH-42		1079		13562	483								3494
DH-42		192		842	577								677
DH-42		72		278	436								277
DH-42		76		89	912								214
DH-42		76		292	247								168
DH-42		56		37	450								137
DH-42		53		65	462								559
DH-43		201		330	579								148
DH-43		280		593	576								280
DH-43		28		18	432								55
DH-43		28		25	297								41
DH-43		41		21	502								51
DH-43		61		28	557								53
DH-43		66		38	747								82
DH-43		57		22	437								188
DH-43		74		28	430								345
DH-43		50		30	323								402
DH-44		211		868	102								233
DH-44		1936		11659	618								4076
DH-44		31		34	465								52
DH-44		37		95	539								64
DH-44		42		60	593								80
DH-44		51		94	1047								122
DH-44		101		103	793								103
DH-44		81		84	1587								426
DH-44		82		81	446								870
DH-44		33		88	853								154
DH-45		4139		9224	629								5629
DH-45		1062		3381	504								3674
DH-45		3005		7468	798								5287
DH-45		399		1282	839								928
DH-45		281		765	457								549
DH-45		71		186	444								2790
DH-46		660		2734	518								952
DH-46		643		1794	533								527
DH-46		329		1235	473								270
DH-46		282		1658	467								391
DH-46		270		1032	492								375
DH-46		315		914	441								296
DH-46		88		47	448								123
DH-47		1090		5153	555								1597
DH-47		1951		10372	3977								15060
DH-47		58		201	595								292
DH-47		78		463	756								763
DH-47		426		3829	4587								13667
DH-49		945		2830	568								7509
DH-49		33		47	339								206
DH-49		15		25	443								52
DH-49		27		20	614								58
DH-49		30		18	519								49
DH-49		26		23	477								55
DH-49		51		21	1209								62
DH-49		99		29	1548								71
DH-49		69		29	1158								67
DH-49		137		40	872								76
DH-49		70		32	760								95
DH-50		129		66	601								109
DH-50		238		183	515								337
DH-50		31		20	410								48
DH-50		26		21	580								42

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
DH-50		36				17		519																52
DH-50		66				25		733																60
DH-50		62				21		595																62
DH-50		55				24		554																45
DH-50		113				33		629																80
DH-50		56				20		1599																50
DH-50		70				28		426																412
DH-51		841				2186		615																8054
DH-51		822				1853		641																6686
DH-51		477				1051		853																2443
DH-51		29				27		471																59
DH-51		82				29		1189																99
DH-51		80				46		1245																117
DH-51		68				23		1011																43
DH-51		52				20		282																39
DH-51		45				20		1132																33
DH-52		639				1304		1332																1957
DH-52		57				117		703																180
DH-52		82				147		432																203
DH-52		42				62		592																115
DH-52		76				147		528																271
DH-52		98				39		980																120
DH-52		134				65		1935																123
DH-53		243				372		909																1211
DH-53		420				529		937																1418
DH-53		68				231		565																543
DH-53		88				210		581																242
DH-53		50				111		554																162
DH-53		58				48		571																95
DH-53		44				41		687																92
DH-53		44				39		900																109
DH-55		7746				4337																		13372
DH-55		3126				15																		14431
DH-55		3922				34																		13720
DH-55		2185				10	U																	11119
DH-55		1650				10	U																	8593
DH-55		1946				15																		8472
DH-55		1677				14																		8646
DH-55		3149				14																		8749
DH-55		1326				17																		8540
DH-55		1498				10	U																	8160
DH-55		1486				19																		9267
DH-55		1660				11																		8540
DH-55		1849				33																		8502
DH-55		1711				28																		9523
DH-55		2351				55																		11654
DH-55		161				396																		2364
DH-55		110				290																		1784
DH-55		48				50																		268
DH-55		82				27																		189
DH-56		1923				88																		12213
DH-56		1848				14																		10862
DH-56		1404				10	U																	10394
DH-56		1333				10	U																	8797
DH-56		1593				10	U																	9016
DH-56		1485				10	U																	12338
DH-56		1663				25																		17586
DH-56		1695				10	U																	8624
DH-56		1384				10	U																	12081
DH-56		1228				48																		13948
DH-56		1366				10	U																	10351
DH-56		1376				11																		11775
DH-56		1153				337																		12766
DH-56		784				4425																		7216
DH-56		41				20																		233
DH-56		69				32																		53
DH-57		331				434																		306
DH-57		1267				21229																		35867
DH-57		869				14446																		36780

	3,100		55,000		400	1,800		23	1,500	390	390		0.78	390	23,000	
	41,000		*720,000*		*800*	*23,000*		*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*	
	NA	NA	NA		520	NA		NA	NA	NA	NA	NA	NA	NA	NA	
Station Name	**Copper (Cu)**	**Gold (Au)**	**Iron (Fe)**		**Lead (Pb)**	**Manganese (Mn)**		**Mercury (Hg)**	**Nickel (Ni)**	**Selenium (Se)**	**Silver (Ag)**	**Tellurium (Te)**	**Thallium (Tl)**	**Vanadium (V)**	**Zinc (Zn)**	
DH-57		780			15278										34247	
DH-57		917			9030										32290	
DH-57		856			11215										31462	
DH-57		787			10825										35084	
DH-57		66			106										220	
DH-57		45			232										620	
DH-58		470			3135										2862	
DH-58		390			1479										1198	
DH-58		52			64										132	
DH-58		77			206										266	
DH-58		77			353										310	
DH-58		26			38										75	
DH-58		45			27										79	
DH-58		51			27										42	
DH-58		33			36										38	
DH-58		52			20										42	
DH-58		62			31										10	U
DH-59		12726			104528										16516	
DH-59		8368			65288										15109	
DH-59		588			222										401	
DH-59		575			309										624	
DH-59		197			172										387	
DH-59		34			93										99	
DH-59		76			148										172	
DH-59		67			262										159	
DH-60		718			2819										1699	
DH-60		37			70										148	
DH-60		314			945										483	
DH-60		119			417										339	
DH-60		27			39										40	
DH-60		56			145										110	
DH-60		50			35										38	
DH-60		30			56										85	
DH-60		18			51										81	
DH-60		31			58										83	
DH-60		27			62										120	
DH-61		132			837										595	
DH-61		1174			9519										10768	
DH-61		26			28										74	
DH-61		35			55										114	
DH-61		29			37										44	
DH-61		44			30										58	
DH-61		53			26										65	
DH-61		30			67										119	
DH-62		24			75										120	
DH-62		33			52										113	
DH-62		21			64										112	
DH-62		25			54										141	
DH-62		27			60										104	
DH-62		31			53										88	
DH-62		33			44										91	
DH-62		37			40										72	
DH-62		55			55										89	
DH-62		48			46										77	
DH-64		43			122										157	
DH-64		88			173										370	
DH-64		32			81										184	
DH-64		37			89										275	
DH-64		28			17										42	
DH-64		40			32										48	
DH-64		31			24										25	
DH-64		55			32										67	
DH-64		42			33										34	
DH-64		33			23										182	
DH-64		53			34										97	
DH-64		33			22										183	
DH-64		42			34										235	
DH-64		41			24										193	
DH-64		62			97										105	

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
DH-65		1259				565																		15064
DH-65		1120				26																		12273
DH-65		1241				33																		11405
DH-65		1115				32																		11999
DH-65		926				10	U																	9653
DH-65		948				10	U																	10437
DH-65		962				10	U																	10321
DH-65		1161				10	U																	13384
DH-65		701				10	U																	15108
DH-65		971				10	U																	11861
DH-65		1099				10	U																	10462
DH-65		44				114																		167
DH-66S		2472				19608		1330																10780
DH-66S		535				2569		393																1390
DH-66S		508				3086		508																1911
DH-66S		45				22		402																88
DH-66S		49				25		495																42
DH-66S		77				47		624																53
DH-66S		103				35		811																96
DH-66S		101				57		541																84
DH-66S		52				34		380																39
DH-66S		77				28		946																32
DH-66S		52				57		286																108
DH-68		3310		173000		41600		12700				41		104		192				85		27.6		46700
DH-68																								
DH-68										16														
DH-68		1470				11800								112										47400
DH-68		981				9960								83.9										46100
DH-68		935				12100								101										48800
DH-68		1080				11700								95.2										45800
DH-68		1230				12700								99.2										47500
DH-68		1160				16300								102										45100
DH-68		1100				13100								72.2										37200
DH-68		1220				13400								83.9										41500
DH-68		1410				11000								73										41800
DH-68		1200				10700								106										45700
DH-68		1220				12700								71.4										40300
DH-68		75.7				485								27.1										1600
DH-68		16.7				43.2								23.8										163
DH-68		14.5		13100		18.8		218				5	U	18.2		5	U			23.7		30.1		97
DH-68										0.5	U													
DH-69		2640		194000		20800		19000				27.6		83		91.4				81.3		51.3		49700
DH-69																								
DH-69										6														
DH-69		2230				14400								93.9										45200
DH-69		1640				13300								74.5										48400
DH-69		1590				13500								85.7										55800
DH-69		1200				13600								64.6										56000
DH-69		1420				13700								106										65600
DH-69		1130				15900								60.8										44600
DH-69		884				30200								45.2										39300
DH-69		1040				13600								53.2										42600
DH-69		1580				18100								67										62600
DH-69		20.3				69.5								23.1										217
DH-69		23.6				32.6								21.8										135
DH-69		27		16200		37		304				5.6		41.2		5	U			23.5		40.2		140
DH-69										0.5	U													
DH-70		371		22500		1770		825				19.4		63.3		8.5				35.4		50.9		1890
DH-70										2														
DH-70		1490				16700								69.1										59800
DH-70		2540				19000								56.6										69000
DH-70		2180				20500								68.9										63400
DH-70		2030				21700								76.2										68000
DH-70		1950				19900								72.5										66100
DH-70		1030				6620								32										21700
DH-70		193				888								18.7										2860
DH-70		14.2				20.2								20.3										98.7
DH-70		16.2		12300		15.8		197				5	U	15.8		5	U			23.6		33.7		84.6
DH-70										0.5	U													

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
DH-71		1150	69000	5260	1850		31.6	57.5	42.6		53.1	52.4	7710
DH-71													
DH-71						4.7							
DH-71		24.9		71.8				43.6					178
DH-71		14.5		43.8				37					136
DH-71		26.6		10.3				40.9					58.1
DH-71		25.8		11.6				33.7					41.1
DH-71		32		11.8				36.9					46.6
DH-71		34.7		62.1				34.7					185
DH-71		23.8		11.4				16					48.8
DH-71		32.8		25				31.9					67.3
DH-71		5 U	5060	13.9	88.2		5 U	15.7	5 U		27.8	1.6 U	26.8
DH-71						0.5 U							
MO1		5900		18000									6300
MO1		160		790									390
MO1		170		350									500
MO1		200		800									320
MO1		220		1200									590
MO1		140		640									330
MO1		52		140									91
MO1		48		61									58
MO1		64		27									61
MOF1		7640	17400	52900	654		79	229	405		209	19	29700
MOF1						120							
MOF1		4820		49300				251					24200
MOF1		568		4940				57					8020
MOF1		52		253				41					3690
MOF1		121		706				31					2680
MOF1		43		174				21					451
MOF1		146		668				28					1730
MOF1		79		225				22					928
MOF1		52	23200	76	642		8	5 U	5 U			60	736
MOF1											19		
MOF1						1.3							
MOF2		7080	28400	59200	1020		104	374	427		298	19	41400
MOF2						160							
MOF2		17100		52800				1310					113000
MOF2		2140		16800				83					13800
MOF2		2600		16500				77					13800
MOF2		30		156				13					131
MOF2		51		201				38					174
MOF2		20		52				34					102
MOF2		64		56				23					114
MOF2		241	23700	1520	356		8	5 U	10			64	971
MOF2											13		
MOF2						1							
MOF3		2340	20600	22900	691		25	93	122			24	13500
MOF3											124		
MOF3						46							
MOF3		1960	18700	19600	1310		20		97			21	11800
MOF3								98			104		
MOF3						73							
MOF3		8450		52500				312					62700
MOF3		3540		38300				130					26200
MOF3		84		485				25					420
MOF3		19		49				27					66
MOF3		27		54				8					76
MOF3		34		104				6					98
MOF3		89		691				16					434
MOF3		20	23600	43	231		5 U	5 U	5 U			74	36
MOF3											5 U		
MOF3						0.12							
OS-5		2191		11573									5995
OS-6		6086		11542									8564
RFISB-1		28		31	408								29
RFISB-1		48		30	345								33
RFISB-1		78		88	420								89
RFISB-1		54		42	444								41
RFISB-1		53		54	374								74

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		55,000	400	1,800	23	1,500	390	390		0.78	390	23,000
	41,000		*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
RFISB-1		53		50	329								70
RFISB-1		53		58	400								78
RFISB-1		164		436	458								562
RFISB-1		117		358	450								516
RFISB-2		51		47	377								44
RFISB-2		46		36	415								44
RFISB-2		70		63	401								0.055
RFISB-2		70		71	404								91
RFISB-2		65		77	357								91
RFISB-2		371		273	654								1159
RFISB-2		159		184	430								326
RFISB-2		132		267	398								298
RFISB-3		1109		790	385								311
RFISB-3		674		524	352								184
RFISB-3		100		88	380								55
RFISB-3		37		37	447								167
RFISB-3		25		31	417								43
RFISB-3		0.026		46	641								0.02 U
RFISB-3		68		32									51
RFISB-3		56		23	328								50
RFISB-3		48		23	450								229
RFISB-3		79		47	377								147
RFISB-4		624		465	408								107
RFISB-4		40		36	337								25
RFISB-4		59		18	943								42
RFISB-4		37		41	648								71
RFISB-4		66		21	1675								92
RFISB-4		70		24	1330								52
RFISB-4		0.03		29	1083								0.026
RFISB-4		47		23	805								48
RFISB-4		55		19	761								0.081
RFISB-4		48		28	322								894
RFISB-4		51		23	320								947
RFISB-4		63		26	152								95
SINT-1		10000		56700									18500
SINT-2		3920		16900									4350
SINT-3		1530		56900									10800
SINT-4		11400		55000									21000
SINT-5		1050		5960									2190
SINT-6		2780		22400									4320
SINT-7		6540		27800									8130
SINT-8		3570		27800									8630
SPDR-1		1720		7460									6400
SPDR-10		17200		60100									17600
SPDR-11		5100		64500									30200
SPDR-12		1090		7280									5280
SPDR-13		10200		68500									26200
SPDR-2		7020		16700									34700
SPDR-3		11400		66100									8110
SPDR-4		22500		70000									1320
SPDR-5		6360		22000									1360
SPDR-6		7300		67300									760
SPDR-7		24000		73200									2900
SPDR-8		27300		37600									6800
SPDR-9		4980		35000									7320
SPIT-1		185		919									117
SPIT-2		378		4520									118
TH1		160		310									4000
TH1		9		27									1400
TH1		68		460									1200
TH1		14		77									270
TH1		12		20									120
TH1		12		5 U									37
TH1		11		5 U									29
TH1		36		5 U									37
TH1		20		5 U									45
TH2		330		3500									3200
TH2		5		5 U									33
TH2		23		110									220

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		55,000	400	1,800	23	1,500	390	390		0.78	390	23,000
	41,000		*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
TH2		14		74									62
TH2		5 U		5 U									35
TH2		12		65									72
TH2		10		14									47
TH2		12		33									43
TH2		21		8									39
TH3		1900		26000									17000
TH3		100		1300									1400
TH3		9		83									78
TH3		19		410									340
TH3		6		56									130
TH3		20		350									340
TH3		10		79									98
TH3		14		270									320
TH3		9		25									63
TH4		370		13000									13000
TH4		73		1500									1800
TH4		7		390									340
TH4		5 U		180									81
TH4		11		6									51
TH4		11		5 U									51
TH4		9		5 U									44
TH4		9		11									60
TH4		8		5 U									46
TH5		220		1800									2300
TH5		26		340									490
TH5		5 U		5 U									72
TH5		10		26									99
TH5		11		5 U									47
TH5		7		5 U									39
TH5		12		43									300
TH5		10		5 U									44
TH5		10		5 U									43
UOS-SS04		381		1199									1882
LOS-SS01		137		396									833
LOS-SS01		1520		1333									5533
LOS-SS01		1658		2054									7180
LOS-SS01		1873		95									7074
LOS-SS02		795		749									266
LOS-SS02		248		866									525
LOS-SS02		1609		331									8332
LOS-SS02		378		146									1814
LOS-SS05		8850		21875									46625
LOS-SS05		2507		2528									846
LOS-SS05		5812		12178									52306
LOS-SS05		2414		15479									11432
LOS-SS05		0.1 U		6854									56395
LOS-SS06		4200		19400									3975
LOS-SS06		0.066		573									480
LOS-SS06		752		9614									3620
LOS-SS06		2589		25489									14504
LOS-SS06		2882		37460									7975
LOS-SS06A		32		34									101
LOS-SS06A		16		18									27
LOS-SS07		8500		22350									43725
LOS-SS07		78		0.014									0.13
LOS-SS07		363		3401									5511
LOS-SS07		471		5384									5074
LOS-SS07		123		682									3397
LOS-SS10		8350		23900									30425
LOS-SS10		2081		2129									1735
LOS-SS10		819		7455									10901
LOS-SS10		367		12240									831
LOS-SS10		349		12484									839
LOS-SS10		838		8091									12826
LOS-SS11		201		28250									11690
LOS-SS11		0.1 U		0.69									3.7
LOS-SS11		552		5887									4120
LOS-SS11		0.1 U		2502									0.8

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000	
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*	
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**	
LOS-SS11		612				4199																		666	
LOS-SS12		1522				13249																		17232	
LOS-SS12		962				11790																		9357	
LOS-SS12		223				3546																		4017	
LOS-SS12		1318				10999																		11096	
LOS-SS14		1247				7975																		4387	
LOS-SS14		1888				15362																		6263	
LOS-SS14		1213				12027																		10971	
LOS-SS14		425				1760																		1715	
LOS-SS16		3299				2675																		7529	
LOS-SS16		2736				10217																		15239	
LOS-SS16		762				3527																		4796	
LOS-SS16		1986				12936																		9604	
LOS-SS16A		797				3331																		2668	
LOS-SS16A		268				114																		96	
LOS-SS16A		47				127																		123	
LOS-SS16A		38				45																		74	
LOS-SS16A		23				26																		55	
LOS-SS16A		22				17																		57	
LOS-SS16A		18				17																		42	
LOS-SS16B		812				3361																		3002	
LOS-SS16B		136				47																		88	
LOS-SS16B		35				29																		69	
LOS-SS16B		24				25																		66	
SS19		19850				20250																		23300	
SS22		11300				21950																		23625	
RC-SS05A		3877				5904																		2921	
RC-SS05A		1138				2626																		3281	
RC-SS05A		824				2536																		17248	
RC-SS05A		154				345																		8750	
RC-SS05B		9282				238																		88	
RC-SS05B		2618				10593																		4290	
RC-SS05B		1538				5870																		20030	
RC-SS05B		151				576																		10078	
RC-SS05C		9784				8216																		2763	
RC-SS05C		0.1	U			0.17																		0.71	
RC-SS05C		303				1563																		3508	
RC-SS05C		278				1133																		0.24	
RC-SS06		17164				31161																		13165	
RC-SS06		6251				30426																		15701	
RC-SS06		6404				32828																		15922	
RC-SS06		4956				28296																		15790	
RC-SS06		1663				5814																		6263	
RC-SS06A		252				741																		3817	
RC-SS06A		257				1058																		1396	
RC-SS07A		9381				53696																		13476	
RC-SS07A		6235				47339																		21174	
RC-SS07A		2939				20406																		13337	
RC-SS07A		2085				16432																		4163	
RC-SS07A		543				3836																		1567	
RC-SS07B		11769				63648																		24378	
RC-SS07B		4735				19485																		26451	
RC-SS07B		2164				11838																		15009	
RC-SS07B		5872				25378																		21802	
RC-SS07C		15727				7687																		70223	
RC-SS07C		10145				10496																		56685	
RC-SS07C		7539				46314																		14642	
RC-SS07C		1601				2639																		12241	
RC-SS07C		637				732																		8286	
RC-SS07C		488				588																		3833	
RC-SS07D		22282				64192																		15105	
RC-SS07D		8051				77220																		12716	
RC-SS07D		7963				32081																		10795	
RC-SS07D		762				2057																		3493	
RC-SS07E		8269				39780																		30603	
RC-SS07E		10138				65314																		9945	
RC-SS07E		11818				34991																		12202	
RC-SS07E		2797				7652																		6079	
RC-SS08		6220				38210																		23906	

	3,100			**55,000**		**400**		**1,800**		**23**		**1,500**		**390**		**390**				**0.78**		**390**		**23,000**
	41,000			***720,000***		***800***		***23,000***		***310***		***20,000***		***5,100***		***5,100***				***10.0***		***5,200***		***310,000***
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
RC-SS08		12542				22940																		17690
RC-SS08		4432				6387																		13504
RC-SS08		6741				12630																		15067
RC-SS08		1367				2062																		3738
RC-SS09A		7611				34735																		12015
RC-SS09A		9989				49123																		29126
RC-SS09A		92				300																		1706
RC-SS09A		640				3249																		3026
RC-SS09B		9454				20266																		18773
RC-SS09B		4480				13826																		17694
RC-SS09B		378				1531																		10520
RC-SS09B		93				186																		1305
RC-SS09C		6098				7325																		64327
RC-SS09C		11273				30989																		26564
RC-SS09C		2686				9239																		10229
RC-SS09C		4070				5914																		37556
RC-SS09D		15421				35560																		19871
RC-SS09D		2231				11035																		13849
RC-SS09D		528				4733																		8690
RC-SS09D		1323				5490																		4688
RC-SS09D		1322				5800																		3587
RC-SS10		5442				32453																		25385
RC-SS10		4752				27156																		16287
RC-SS10		397				2223																		3785
RC-SS10		236				1380																		814
RC-SS12		31450				19975																		63650
RC-SS12		0.088				1312																		282
RC-SS12		552				2193																		2112
RC-SS12		2789				6679																		21647
RC-SS12		1026				1989																		11513
RC-SS13		3404				1.4																		30
RC-SS13		764				6649																		14836
RC-SS13		2947				18080																		14734
RC-SS13		128				919																		568
RC-SS13		133				751																		606
RC-SS14		1918				8900																		30125
RC-SS14A		3886				19220																		6270
RC-SS14A		2654				13581																		4565
RC-SS14A		2944				22732																		13188
RC-SS14A		2419				7505																		12219
RC-SS14A		1027				3701																		1571
RC-SS14B		7910				30364																		9662
RC-SS14B		1239				7237																		4076
RC-SS14B		1258				10184																		4599
RC-SS14B		1621				12347																		10478
RC-SS14B		510				2876																		1987
RC-SS14C		3134				31634																		11185
RC-SS14C		1708				12440																		5356
RC-SS14C		870				6700																		5665
RC-SS14C		1317				19812																		10209
RC-SS14C		392				5586																		12772
RC-SS14D		13741				61751																		31230
RC-SS14D		170				1508																		4148
RC-SS14D		1279				8697																		7064
RC-SS14D		1002				13438																		12693
RC-SS14D		286				3332																		5423
RC-SS16		0.46				47527																		4486
RC-SS16		3554				20303																		4165
RC-SS16		6155				31409																		9544
RC-SS16		1671				3116																		3487
RC-SS17		1813				6200																		2235
RC-SS17		10819				2																		26044
RC-SS17		0.1	U			44404																		36
RC-SS17		0.1	U			0.05	U																	13956
RC-SS17		84				1082																		511
RC-SS17		62				841																		395
RC-SS17		285				6266																		1969
RC-SS17		36				4311																		1355
RC-SS18		29200				19325																		67175

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**		**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
RC-SS18			0.11				14220																		4384
RC-SS18			9892				13279																		22649
RC-SS18			929				7753																		10003
RC-SS18			1423				3012																		7634
RC-SS18			149				238																		338
RC-SS19			10696				29364																		0.94
RC-SS19			1349				17158																		19019
RC-SS19			817				5140																		2583
RC-SS19			896				1500																		845
RC-SS20			18625				19225																		26275
RC-SS20			12210				34897																		24990
RC-SS20			11822				13584																		15140
RC-SS20			4830				20767																		35772
RC-SS20			3417				17597																		30576
RC-SS21			11441				16415																		10580
RC-SS21			1088				1435																		2874
RC-SS22			3024				26856																		17223
RC-SS22			2394				7687																		11923
RC-SS22			0.01				0.034																		0.19
RC-SS22			422				716																		1054
RC-SS22			151				195																		299
RC-SS22			478				660																		1354
RC-SS23			1987				7283																		8466
RC-SS23			4085				2691																		7707
RC-SS23			4812				3828																		15953
RC-SS23			126				113																		450
RC-SS24			0.1	U			9397																		25406
RC-SS24			329				517																		1669
RC-SS24			1892				302																		9906
RC-SS24			1594				767																		8129
RC-SS24			113				241																		519
RC-SS25			13802				0.05	U																	0.94
RC-SS25			768				0.05	U																	0.18
RC-SS25			50				0.1																		1707
RC-SS25			121				1744																		917
RC-SS26			10085				14615																		22280
RC-SS26			1393				5545																		11942
RC-SS26			321				1650																		4026
RC-SS26			139				401																		372
RC-SS26			56				128																		187
RC-SS27			6768				45482																		22831
RC-SS27			15479				46574																		18902
RC-SS27			3504				17666																		13996
RC-SS27			2399				18313																		15712
RC-SS27			921				9024																		3473
RC-SS27			6181				26889																		12331
RC-SS27A			19				21																		47
RC-SS28			0.58				50060																		18195
RC-SS28			2977				0.43																		13
RC-SS28			853				12190																		11
RC-SS28			1270				12660																		5283
RC-SS28			1736				10153																		10557
RC-SS28			452				2620																		3090
RC-SS29			4178				1.6																		24
RC-SS29			5302				40002																		23266
RC-SS29			3452				23903																		14296
RC-SS29			855				7155																		3441
RC-SS29			1865				22630																		9223
RC-SS2A			2455				15755																		7916
RC-SS2A			6449				7159																		13054
RC-SS2A			2865				2417																		9836
RC-SS2A			691				8318																		11954
UOP-SS08			1702				632																		314
UOP-SS08			202				939																		367
UOP-SS08			125				997																		350
UOP-SS08			38				83																		99
UOP-SS09			133				2199																		1001
UOP-SS09			112				747																		302
UOP-SS09			102				855																		312

	3,100			**55,000**		**400**		**1,800**		**23**		**1,500**		**390**		**390**				**0.78**		**390**		**23,000**
	41,000			***720,000***		***800***		***23,000***		***310***		***20,000***		***5,100***		***5,100***				***10.0***		***5,200***		***310,000***
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**		**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
UOP-SS09			186				1121																		290
UOP-SS09			27				134																		81
UOP-SS15			9750				3250																		3975
UOP-SS15			258				472																		1594
UOP-SS15			97				199																		720
UOP-SS15			59				214																		579
UOP-SS15			61				166																		548
UOP-SS17			415				552																		1377
UOP-SS17			196				471																		1186
UOP-SS17			114				439																		971
UOP-SS17			169				373																		921
SS21			703				3811																		1816
SS21			98				1014																		411
SS21			20				46																		95
SS21			16				31																		21
SS23			320				11600																		1093
UOS-SS03			1090				10875																		3075
UOS-SS03			6354				71196																		34579
UOS-SS03			11639				66080																		16607
UOS-SS03			2622				16145																		6833
UOS-SS03			6447				11327																		12249
UOS-SS04			12175				23625																		44050
UOS-SS04			639				443																		367
UOS-SS04			437				653																		4257
UOS-SS04			1719				1275																		22911
UOS-SS04			2274				1968																		16547
UOS-SS05			3515				376																		137
UOS-SS05			2075				13621																		4298
UOS-SS05			2059				12560																		3830
UOS-SS05			736				8720																		2944
UOS-SS05			1492				15928																		7173
UOS-SS05			295				1970																		1121
UPS-SS01			94				8813																		4628
UPS-SS01			9395				20116																		2.7
UPS-SS01			64908				64307																		13830
UPS-SS01			437				1483																		912
UPS-SS02			6011				573																		481
UPS-SS02			39				193																		164
UPS-SS02			82				619																		394
UPS-SS02			27				26																		41
UPS-SS03			1100				578																		181
UPS-SS03			43				261																		81
UPS-SS03			414				2823																		815
UPS-SS03			61				424																		91
UPS-SS03			1509				4614																		20337
UPS-SS03							753																		373
UPS-SS04			3643				39046																		11096
UPS-SS04			2065				15672																		6616
UPS-SS04			1721				22200																		6864
UPS-SS05			787				8187																		2637
UPS-SS05			0.1	U			4482																		1553
UPS-SS05			742				5158																		1647
UPS-SS06			133				945																		532
UPS-SS07			0.1	U			10425																		6421
UPS-SS07			2645				4029																		11465
UPS-SS07			2746				910																		9687
UPS-SS07			3522				932																		12951
UPS-SS08			1041				0.05	U																	1347
UPS-SS08			259				1169																		828
UPS-SS08			148				913																		612
UPS-SS08			147				722																		493
UPS-SS09			1100				917																		1611
UPS-SS09			796				3064																		13786
UPS-SS09			60				94																		191
UPS-SS09			34				74																		122
UPS-SS10			4101				2439																		5345
UPS-SS10			176				657																		1068
UPS-SS10			19				30																		28
UPS-SS10			14				23																		15

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000	
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*	
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**	
UPS-SS11		8221				3255																		3560	
UPS-SS11		451				4768																		11405	
UPS-SS11		411				6139																		15578	
UPS-SS11		128				968																		1983	
UPS-SS11		206				1314																		1725	
UPS-SS11		71				449																		288	
UPS-SS12		4039				14172																		12858	
UPS-SS12		3298				8246																		26980	
UPS-SS12		2453				5127																		22123	
UPS-SS12		2074				5595																		24333	
UPS-SS13		40				14989																		8045	
UPS-SS13		7438				14334																		9131	
UPS-SS13		0.1	U			19676																		0.05	U
UPS-SS13		1695				9636																		41455	
UPS-SS14		23				21303																		41988	
UPS-SS14		2781				16743																		41322	
SS21		35350				22575																		14875	
SS28		23600				1535																		23925	
SS29		23700				20300																		48550	
SS30		5600				12725																		7925	
SS31		6900				14600																		84650	
PPC-RZ-1	227			18700		665		1000		0.89		10		1.2		8				0.6		44		1100	
UOP-SS20	421	5	U	15100		2180		762		11		8		4.1		18		5	U	3.7		32		1250	
UOP-SS20	273	5	U	25500		1290		749		25		11		1.3		21		5	U	0.9		54		1430	
UOP-SS20	216	5	U	22500		1070		681		0.37		10		0.8		5		5	U	0.6		52		1350	
UOP-SS19		500				2706																		2585	
UOP-SS19		359				1806																		1474	
UOP-SS19		53				131																		131	
UOP-SS19		49				51																		98	
UOP-SS20		0.1	U			1094																		946	
UOP-SS20		336				2436																		1114	
UOP-SS20		61				153																		321	
UOP-SS20		28				35																		11	
LOS-SS15	679	5	U	26400		3610		685		0.8		8		2.6		25		5	U	2.1		44		3980	
LOS-SS15	573	5	U	23800		2700		683		0.65		7		2.1		15		5	U	1.8		37		3270	
LOS-SS15	31	5	U	9590		51		241		0.067		7		0.5	U	2	U	5	U	0.1	U	25		194	
LOS-SS15	23	5	U	16300		44		339		0.05	U	14		0.5	U	2	U	5	U	0.1	U	47		71	
LOS-SS3	270	5	U	18300		2780		498		17		10		9		12		5	U	5		54		731	
LOS-SS3	42	5	U	19100		193		338		0.46		10		0.8		2	U	-5	U	0.5		55		125	
LOS-SS3	26	5	U	18300		43		416		0.05	U	11		0.5	U	2	U	-5	U	0.1	U	48		63	
LOS-SS8	108	5	U	16800		825		467		0.62		11		1.2		4		5	U	1.6		45		613	
LOS-SS8	111	5	U	15800		769		358		0.05	U	12		2.1		5		-5	U	1.1		39		793	
LOS-SS8	17	5	U	13400		31		250		0.05	U	9		0.5	U	2	U	-5	U	0.6		36		71	
LOS-SS9	1220	5	U	15600		5240		476		11		84		12		133		5	U	5		34		1170	
LOS-SS9	110	5	U	14000		594		284		0.5	U	10		1.6		8		5	U	0.8		32		182	
LOS-SS9	27	5	U	16100		82		321		0.3		9		1		2	U	5	U	0.1	U	48		61	
PPC-RZ-3	85			17700		298		570		1.4		7		0.6		2				0.5		41		705	
PPC-RZ-4	356			20100		628		1010		0.85		8		1.2		8				0.7		36		1210	
RFI2SB-11	278	5	U	15700		953		448		1.4		10		2.4		9		5	U	1.5		36		662	
RFI2SB-11	131	5	U	15900		498		329		0.54		11		1.3		4		5	U	0.9		37		357	
RFI2SB-11	14	5	U	20400		17		339		0.05	U	8		0.5	U	2	U	5	U	0.1	U	60		48	
RFI2SB-11	14	5	U	19800		11		235		0.05	U	8		0.5	U	2	U	5	U	0.1	U	60		49	
RFI2SB-11	10	5	U	17900		8		223		0.5	U	5	U	5	U	5	U	5	U	1	U	52		40	
RFI2SB-11	11	5	U	17600		8		382		0.5	U	5	U	5	U	5	U	5	U	2		44		37	
RFI2SB-11	35	5	U	23600		25		804		0.5	U	10		5	U	5	U	5	U	3		51		69	
RFI2SB-11	45	5	U	20900		12		478		0.5	U	7		5	U	5	U	5	U	1	U	45		52	
RFI2SB-11	27	5	U	14200		8		142		0.5	U	5	U	5	U	5	U	5	U	1	U	37		22	
RFI2SB-11	19	5	U	9010		10		147		0.5	U	5	U	5	U	5	U	5	U	1	U	19		18	
RFI2SB-11	5	U	5	U	3160		29		151		0.5	U	5	U	5	U	5	U	5	U	1		5	U	19
RFI2SB-11	5	U	5	U	2660		26		142		0.5	U	5	U	5	U	5	U	5	U	1	U	5	U	15
RFI2SB-11	5	U	5	U	3760		30		156		0.5	U	5	U	5	U	5	U	5	U	2		5	U	24
RFI2SB-11	5	U	5	U	5500		21		97		0.5	U	5	U	5	U	5	U	5	U	1	U	5		23
RFI2SB-11	5	U	5	U	7120		14		134		0.5	U	5	U	5	U	5	U	5	U	1	U	5		18
RFI2SB-11	5	U	5	U	4260		10		158		0.5	U	5	U	5	U	5	U	5	U	1	U	5	U	10
RFI2SB-11	5	U	5	U	1250		13		91		0.5	U	5	U	5	U	5	U	5	U	1	U	5	U	6
RFI2SB-22	221	5	U	16200		1480		507		1.6		6		3.2		12		5	U	3.3		26		1340	
RFI2SB-22	1460	5	U	29500		6140		709		1.7		17		29.2		42		32		3		20		1500	
RFI2SB-22	147	5	U	10900		1040		1710		26		5	U	1.4		5		5	U	1.8		18		918	
RFI2SB-22	156	5	U	11500		842		795		29		5	U	5	U	5	U	5	U	6		25		999	

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
RFI2SB-22	235	5 U	10500	830	1280	27	5 U	5 U	5 U	5 U	6	20	923
RFI2SB-22	27	5 U	5380	118	342	0.5 U	5 U	5 U	5 U	5 U	4	12	389
RFI2SB-22	219	7	18100	1150	2780	0.5 U	8	5 U	14	5 U	11	37	2110
RFI2SB-22	6	5 U	6940	8	68	0.5 U	5 U	5 U	5 U	5 U	3	22	27
RFI2SB-22	8	5 U	9460	10	105	0.5 U	5 U	5 U	5 U	5 U	3	24	34
RFI2SB-22	16	5 U	3750	38	128	0.5 U	5 U	5 U	5 U	5 U	1	5 U	32
RFI2SB-3	526	5 U	18100	2430	491	3.7	15	7.3	26	5 U	3.8	37	1090
RFI2SB-3	3450	8	40900	16600	2040	5.2	35	14.9	210	5 U	15	32	17400
RFI2SB-3	2350	5 U	27600	18400	1540	360	23	53.2	164	5 U	20	32	7150
RFI2SB-3	2650	6	28500	17400	1020	170	21	90	166	5 U	18	38	6670
RFI2SB-3	402	5 U	8340	4380	320	140	6	13	25	5 U	6	15	1980
RFI2SB-3	50	5 U	5430	378	500	7	5 U	5 U	5 U	5 U	2	9	443
RFI2SB-3	51	5 U	17800	100	447	6.5	7	5 U	5 U	5 U	11	37	150
RFI2SB-3	27	5 U	10600	41	146	0.5 U	5 U	5 U	5 U	5 U	4	33	58
RFI2SB-3	100	5 U	11500	791	223	0.5 U	5 U	5 U	5 U	5 U	5	31	462
RFI2SB-3	26	5 U	5730	121	142	0.5 U	5 U	5 U	5 U	5 U	1	17	61
RFI2SB-3	22	5 U	18000	24	203	0.5 U	5 U	5 U	5 U	5 U	3	16	56
RFI2SB-3	19	5 U	13000	18	298	0.5 U	5 U	5 U	5 U	5 U	1	17	44
UL-BK-1	70	5 U	17000	1020	292	8.6	10	1.6	3	5 U	1.8	48	266
UL-BK-2	882	5 U	20300	8690	498	39	15	54	61	5 U	7	31	2620
UL-BK-3	389	5 U	2750	2840	159	58	5 U	45	26	5 U	5	5	664
UL-BK-4	42	5 U	16100	96	279	0.35	10	0.6	2 U	5 U	0.5	41	75
ULM-7-SL	101		15000	336	861	0.5 U	7	0.6	2		1 U	40	567
UOP-SS2	3070	12	57500	10600	3290	8.2	82	27	233	75	6	41	14100
UOP-SS2	1140	5 U	20400	6490	717	3.8	25	7	69	5 U	5	39	3270
UOP-SS2	100	5 U	15200	350	348	0.48	13	1	3	5 U	0.4	46	283
UOP-SS4	94	5 U	14500	531	406	1.2	10	0.9	3	5 U	1	36	265
UOP-SS4	58	5 U	15700	278	430	0.54	11	0.5 U	2 U	5 U	0.4	39	216
UOP-SS4	39	5 U	15700	128	330	0.16	10	0.5 U	2 U	5 U	0.3	41	128
UOS-SS21	225	5 U	14200	329	338	1.2	11	1.4	4	5 U	0.9	41	144
APSD-10				20507									4801
APSD-10				29431									4657
APSD-10				21943									4186
APSD-10				28651									5498
APSD-10				24971									5442
APSD-10				7107									2527
APSD-10				4097									1947
APSD-10				1996									1177
APSD-9				6875									1803
APSD-9				6436									1582
APSD-9				8878									1592
APSD-9				6862									1661
APSD-9				7907									1933
APSD-9				7005									1752
APSD-9				3613									1479
APSD-9				2526									1345
DH-48		1183		6294	958								4954
DH-48		37		94	507								112
DH-48		23		21	459								69
DH-48		22		18	383								50
DH-48		33		19	615								69
DH-48		22		23	456								41
DH-48		34		28	600								57
DH-48		58		24	1409								63
DH-48		65		32	1272								56
DH-48		97		25	1048								55
DH-48		79		73	1743								120
DH-63		215		627									265
DH-63		117		847									573
DH-63		24		29									45
DH-63		25		21									57
DH-63		24		14									44
DH-63		25		18									40
DH-63		48		27									39
DH-63		91		30									22
DH-63		63		29									36
DH-63		46		34									50
DH-67S		453		1988	423								1569
DH-67S		50		31	400								68

	3,100		**55,000**		**400**	**1,800**		**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**	
	41,000		***720,000***		***800***	***23,000***		***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***	
	NA	NA	NA		520	NA		NA	NA	NA	NA	NA	NA	NA	NA	
Station Name	**Copper (Cu)**	**Gold (Au)**	**Iron (Fe)**		**Lead (Pb)**	**Manganese (Mn)**		**Mercury (Hg)**	**Nickel (Ni)**	**Selenium (Se)**	**Silver (Ag)**	**Tellurium (Te)**	**Thallium (Tl)**	**Vanadium (V)**	**Zinc (Zn)**	
DH-67S		90			228	426									144	
DH-67S		15			53	330									29	
DH-67S		65			25	897									63	
DH-67S		72			25	885									54	
DH-67S		71			34	732									50	
DH-67S		66			38	673									52	
DH-67S		62			47	430									31	
DH-67S		46			35	562									10	U
DH-67S		51			38	693									32	
DH-67S		121			51	491									141	
OS-1		1464			17082										5319	
OS-10		5538			17307										8759	
OS-14		4984			40247										13856	
OS-15		7675			35703										22648	
OS-17		4262			20699										8968	
OS-19		1278			8233										5854	
OS-2		12411			21875										7822	
OS-20		352			2060										2828	
OS-3		4188			13553										7476	
OS-4		644			5382										1676	
SRB-1		4390			2617										1037	
SRB-1		899			3094										1754	
SRB-1		3095			5765										2569	
SRB-1		990			1470										516	
SRB-1		3589			16632										6944	
SRB-1		871			1769										1325	
SRB-1		130			256										143	
SRB-10		716			9200										2227	
SRB-10		819			4669										1844	
SRB-10		227			903										421	
SRB-10		512			1038										473	
SRB-10		466			1674										4868	
SRB-10		536			3030										2839	
SRB-10		765			3752										1832	
SRB-10		446			2500										1229	
SRB-10		832			5666										5957	
SRB-10		718			2491										1782	
SRB-10		1368			10735										10599	
SRB-11		498			1153										538	
SRB-11		665			2411										1154	
SRB-11		116			296										207	
SRB-11		466			2678										2606	
SRB-11		478			7579										3124	
SRB-11		826			3571										1206	
SRB-11		624			3614										1574	
SRB-11		114			557										391	
SRB-11		2722			7862										6081	
SRB-11		2207			10486										6771	
SRB-11		29			30										152	
SRB-11		22			53										89	
SRB-12		484			1760										1212	
SRB-12		285			1023										503	
SRB-12		264			1489										1296	
SRB-12		269			2342										1278	
SRB-12		242			1803										1037	
SRB-12		1298			5651										6582	
SRB-12		792			3724										3243	
SRB-12		53			140										174	
SRB-12		2968			10591										7453	
SRB-13		2479			11636										6062	
SRB-13		783			3439										1390	
SRB-13		793			2878										1767	
SRB-13		1823			7505										13025	
SRB-13		243			1010										690	
SRB-13		90			313										263	
SRB-13		1746			13331										14139	
SRB-13		7792			18349										9815	
SRB-13		21			24										49	
SRB-14		1251			12787										4611	

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
SRB-14		888				9508																		2475
SRB-14		936				9801																		2469
SRB-14		405				2031																		1740
SRB-14		801				4322																		2368
SRB-14		458				2093																		1426
SRB-14		387				2340																		1196
SRB-14		357				2030																		1036
SRB-14		157				937																		432
SRB-14		341				1794																		851
SRB-14		1761				6349																		3521
SRB-14		506				2371																		1629
SRB-14		165				535																		802
SRB-14		25				27																		66
SRB-16		241				678																		493
SRB-16		790				3434																		1213
SRB-16		153				488																		491
SRB-16		433				2138																		1173
SRB-16		1396				6689																		3492
SRB-16		236				901																		407
SRB-16		27																						47
SRB-17		418				1311																		710
SRB-17		3867				12829																		6607
SRB-17		939				3136																		1735
SRB-17		344				1564																		820
SRB-17		2481				5751																		3507
SRB-17		55				205																		151
SRB-17		3314				15610																		4756
SRB-17		21				15																		37
SRB-17		46				32																		83
SRB-18		1484				6563																		2028
SRB-18		1215				4655																		1510
SRB-18		304				1809																		701
SRB-18		1816				9792																		3435
SRB-18		256				1595																		841
SRB-18		825				4297																		2292
SRB-18		30				35																		67
SRB-19		882				5344																		1932
SRB-19		1189				6069																		1888
SRB-19		749				4085																		1233
SRB-19		504				3014																		1216
SRB-19		1548																						2532
SRB-19		78				426																		484
SRB-19		29				10	U																	58
SRB-2		1030				3185																		1628
SRB-2		5656				3184																		1623
SRB-2		1354				915																		283
SRB-2		602				1619																		599
SRB-2		269				559																		455
SRB-2		210				376																		403
SRB-2		306				1336																		924
SRB-2		1113				2196																		992
SRB-2		40				27																		77
SRB-20		1034				3834																		2578
SRB-20		1624				8735																		6656
SRB-20		213				1344																		2963
SRB-21		3201				12373																		4675
SRB-21		513				2118																		903
SRB-3		415				1816																		1438
SRB-3		296				1246																		723
SRB-3		195				681																		480
SRB-3		316				1725																		823
SRB-3		600				3712																		1733
SRB-3		701				3803																		1827
SRB-3		830				4632																		1988
SRB-3		41																						82
SRB-3		23				29																		59
SRB-4		1353				10527																		4692
SRB-4		612				2730																		1059
SRB-4		406				2148																		957

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
SRB-4		1117				4913																		2202
SRB-4		1155				5179																		2181
SRB-4		1285				6364																		2320
SRB-4		1066				5120																		1956
SRB-4		1757				5592																		2176
SRB-4		1437				3797																		1860
SRB-4		269				706																		388
SRB-4		68				121																		90
SRB-5		513				2105																		1943
SRB-5		295				1414																		1419
SRB-5		804				3950																		1956
SRB-5		2389				11409																		5668
SRB-5		3998				14105																		5818
SRB-5		3767				14510																		5836
SRB-5		1454				7223																		3571
SRB-5						19583																		7339
SRB-5		176				821																		468
SRB-5						39																		73
SRB-6		614				2991																		1869
SRB-6		862				3768																		2293
SRB-6		405				1624																		1203
SRB-6		835				3905																		2569
SRB-6		1114				6334																		2940
SRB-6		1126				6558																		3132
SRB-6		1667				8251																		3996
SRB-6		1409				7651																		3821
SRB-6		2132				7169																		4195
SRB-6		15303																						7588
SRB-6		2762				3918																		1744
SRB-7		1482				7887																		4833
SRB-7		148				501																		691
SRB-7		1340				6882																		5618
SRB-7		526				2299																		1011
SRB-7		1077				5528																		2502
SRB-7		518				2385																		1421
SRB-7		1687				14072																		3611
SRB-7		1297				7341																		2477
SRB-7		1533				6438																		2700
SRB-7		211				1092																		1321
SRB-7		19				27																		45
SRB-8		6638				47520																		12628
SRB-8		452				2553																		4220
SRB-8		370				1629																		2022
SRB-8		864				3894																		1916
SRB-8		164				631																		454
SRB-8		279				1827																		645
SRB-8		1412				6986																		2902
SRB-8		421				1301																		968
SRB-8		4523				5781																		2346
SRB-8		25																						56
SRB-9		116				375																		219
SRB-9		161				615																		673
SRB-9		269				1705																		828
SRB-9		343				2581																		1185
SRB-9		240				1278																		689
SRB-9		2147				7219																		3373
SRB-9		1875				5960																		3527
SRB-9		884				7227																		2160
SRB-9		17				12																		38
SRB-9		22				23																		52
SRT-1		6730				25004																		15110
SRT-1		2694				10555																		5221
SRT-1		1483				6406																		3090
SRT-10		1527				7503																		3053
SRT-10		1618				7674																		3320
SRT-10		1479				9197																		3772
SRT-11		564				3184																		1565
SRT-11		1103				6564																		2655
SRT-11		550				3999																		1671

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
SRT-12		474		2211									1098
SRT-12		480		2215									1089
SRT-12		4131		16365									6779
SRT-2		847		3835									2271
SRT-2		1519		6204									1954
SRT-2		812		4165									2563
SRT-3		708		3177									1895
SRT-3		538		4077									1271
SRT-3		621		2986									1522
SRT-4		735		2975									1297
SRT-4		939		3668									1020
SRT-4		915		4174									1433
SRT-5		885		5041									2358
SRT-5		2453		17585									8787
SRT-5		1058		7559									6676
SRT-6		1316		5114									2635
SRT-6		961		3665									1852
SRT-6		793		3722									1938
SRT-7		1732		11325									5970
SRT-7		790		4240									3157
SRT-7		669		4310									1613
SRT-8		1432		7983									2362
SRT-8		1530		7186									3019
SRT-8		674		3723									1327
SRT-9		597		2664									1339
SRT-9		128		462									527
SRT-9		15892		28440									9414
LOS-SS03		146		781									463
LOS-SS03		46		163									120
LOS-SS03		68		266									149
LOS-SS03		106		437									340
LOS-SS08		18600		21400									14250
LOS-SS08		1015		249									244
LOS-SS08		76		250									239
LOS-SS08		55		194									212
LOS-SS08		63		173									202
LOS-SS09		3617		3413									3374
LOS-SS09		3428		43027									22322
LOS-SS09		679		10370									9289
LOS-SS09		131		845									596
LOS-SS13		532		669									457
LOS-SS13		284		974									641
LOS-SS13		30		118									114
LOS-SS13		29		44									70
LOS-SS13		16		33									69
LOS-SS15		1134		2475									3536
LOS-SS15		520		2424									2485
LOS-SS15		1308		3768									2666
LOS-SS15		25		38									79
RCSA-01A		2757		8064									3404
RCSA-01A		3497		18000									14502
RCSA-01A		5367		41191									22025
RCSA-01A		588		6034									6646
RCSA-01A		154		647									726
RCSA-01A		75		534									282
RCSA-01B		7162		30611									18686
RCSA-01B		1549		20819									10195
RCSA-01B		629		7611									2866
RCSA-01B		70		396									239
RCSA-01B		82		613									234
RCSA-01B		49		864									399
RCSA-01C		4384		16890									21098
RCSA-01C		2091		20635									10034
RCSA-01C		215		826									467
RCSA-01C		63		661									224
RCSA-01C		48		151									114
RCSA-01D		2126		30659									11986
RCSA-01D		1936		12636									6464
RCSA-01D		479		4634									1910

	3,100			**55,000**		**400**		**1,800**		**23**		**1,500**		**390**		**390**				**0.78**		**390**		**23,000**	
	41,000			***720,000***		***800***		***23,000***		***310***		***20,000***		***5,100***		***5,100***				***10.0***		***5,200***		***310,000***	
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**	
RCSA-01D		84				295																		163	
RCSA-01E		2767				30206																		15772	
RCSA-01E		5477				34826																		14603	
RCSA-01E		683				7310																		1679	
RCSA-01E		245				3312																		724	
RCSA-01E		38				144																		108	
RC-SS01		139				5244																		10227	
RC-SS01		12972				2687																		10436	
RC-SS01		8978				2190																		11146	
RC-SS01		4277				4316																		16348	
RC-SS01		2765				3126																		10679	
RC-SS03		886				0.05	U																	0.05	U
RC-SS03		2915				2450																		8975	
RC-SS03		2225				1980																		10787	
RC-SS03		0.1	U			280																		25056	
RC-SS04		199				28239																		9307	
RC-SS04		6322				30820																		27562	
RC-SS04		289				1890																		8283	
RC-SS04		464				1066																		1494	
RC-SS11		20700				22100																		67175	
RC-SS11		7002				21428																		16770	
RC-SS11		1859				477																		10673	
RC-SS11		1982				317																		10670	
RC-SS11		1980				545																		10203	
RC-SS11		53				64																		181	
RC-SS2B		538				15258																		8770	
RC-SS2B		9989				10693																		15798	
RC-SS2B		4401				5507																		12743	
RC-SS2B		593				863																		22398	
RC-SS2C		6977				11559																		5854	
RC-SS2C		7490				25191																		18218	
RC-SS2C		4502				3601																		11426	
RC-SS2C		1371				5306																		20162	
RC-SS2D		0.1	U			2898																		1830	
RC-SS2D		891				6150																		2435	
RC-SS2D		1953				7977																		8783	
RC-SS2D		1038				3696																		7321	
UOP-SS01		0.1	U			2991																		1734	
UOP-SS01		139				686																		476	
UOP-SS01		18				34																		28	
UOP-SS01		17				23																		30	
UOP-SS02		270				0.05	U																	12492	
UOP-SS02		1929				5035																		8332	
UOP-SS02		1908				5540																		7453	
UOP-SS02		977				2189																		2666	
UOP-SS02		396				1208																		937	
UOP-SS03		268				1534																		730	
UOP-SS03		286				1889																		935	
UOP-SS03		238				2288																		1349	
UOP-SS03		37				122																		96	
UOP-SS03		38				99																		92	
UOP-SS04		96				2619																		1266	
UOP-SS04		51				386																		213	
UOP-SS04		22				41																		55	
UOP-SS04		21				50																		60	
UOP-SS05		89				1380																		657	
UOP-SS05		52				178																		128	
UOP-SS05		25				33																		55	
UOP-SS05		21				52																		50	
UOP-SS06		150				277																		155	
UOP-SS06		101				484																		223	
UOP-SS06		48				340																		176	
UOP-SS06		25				31																		89	
UOP-SS07		501				82																		85	
UOP-SS07		70				269																		214	
UOP-SS07		57				122																		157	
UOP-SS10		0.1	U			7634																		5319	
UOP-SS10		1390				1755																		19398	
UOP-SS10		233				994																		1011	

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000	
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*	
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**	
UOP-SS10		44				72																		113	
UOP-SS11		1442				0.44																		674	
UOP-SS11		74				593																		239	
UOP-SS11		28				29																		57	
UOP-SS11		20				30																		50	
UOS-SS01		14575				19350																		23625	
UOS-SS01		23599				5186																		2768	
UOS-SS01		966				10287																		4144	
UOS-SS01		671				6297																		2534	
UOS-SS01		28				89																		81	
UOS-SS01		22				60																		49	
UOS-SS02		3225				24975																		10050	
UOS-SS02		88				28537																		19494	
UOS-SS02		663				5230																		3177	
UOS-SS02		2587				25628																		10028	
UOS-SS02		197				2699																		848	
UOS-SS02		235				2238																		1000	
EH-103S		67				24		498																26	
EH-103S		49				41		693																10	U
EH-103S		51				58		412																19	
EH-103S		45				37		176																10	U
EH-103S		26				32		181																31	
EH-103S		33				43		62																10	U
EH-103S		96				43		165																24	
EH-103S		55				28		103																27	
EH-104S		43				76		421																90	
EH-104S		57				184		393																180	
EH-104S		25				35		489																65	
EH-104S		66				69		466																93	
EH-104S		70				34		1411																59	
EH-104S		64				59		1368																92	
EH-104S		65				29		728																19	
EH-104S		79				29		345																16	
EH-104S		55				32		438																23	
EH-104S		53				48		570																10	U
EH-104S		51				33		177																14	
EH-104S		33				63		314																51	
EH-104S		59				61		240																97	
EH-106S		73				236		466																253	
EH-106S		44				45		358																58	
EH-106S		30				32		348																10	U
EH-106S		33				20		515																14	
EH-106S		85				16		943																39	
EH-106S		81				18		377																10	U
EH-106S		41				36		168																10	U
EH-106S		23				14		208																10	U
EH-106S		38				25		260																10	U
EH-106S		50				33		358																10	U
EH-106S		77				43		522																140	
EH-107S		71				40		1221																76	
EH-107S		91				37		852																39	
EH-107S		55				25		401																39	
EH-107S		58				26		345																10	U
EH-107S		30				30		324																17	
EH-107S		29				33		168																10	U
EH-107S		54				47		301																63	
EH-107S		50				35		138																10	U
EH-107S		52				44		353																46	
EH-107S		42				23		200																44	
EH-107S																								10	U
EH-107S		64				40		333																141	
EH-109S		46				32		463																10	U
EH-109S		71				32		419																64	
EH-109S		62				35		595																51	
EH-109S		102				19		597																20	
EH-109S		55				42		392																11	
EH-109S		58				43		286																17	
EH-109S		57				37		279																14	
EH-109S		40				38		495																20	

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000	
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*	
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**	
EH-109S		46				40		358																18	
EH-109S		36				42		325																32	
EH-109S		56				43		298																56	
EH-109S		39				27		199																73	
EH-109S		48				51		176																86	
EH-110S		98				41		990																83	
EH-110S		78				51		801																41	
EH-110S		74				36		799																54	
EH-110S		66				37		353																30	
EH-110S		36				35		271																10	
EH-110S		54				32		448																17	
EH-110S		44				15		120																10	U
EH-110S		33				21		154																10	U
EH-110S		34				37		186																10	U
EH-110S		44				43		140																10	U
EH-110S		44				38		140																33	
EH-110S		42				43		250																47	
EH-111S		30				41		299																45	
EH-111S		19				10	U	556																10	U
EH-111S		59				28		1122																67	
EH-111S		45				25		805																47	
EH-111S		84				39		383																10	U
EH-111S		64				41		759																66	
EH-111S		65				31		623																47	
EH-111S		45				40		315																10	U
EH-111S		51				16		261																10	U
EH-111S		44				27		313																10	U
EH-111S		60				45		499																47	
EH-111S		80				38		712																58	
EH-112S		54				38		376																12	
EH-112S		44				32		969																46	
EH-112S		58				42		1276																55	
EH-112S		80				54		644																73	
EH-112S		73				31		815																64	
EH-112S		99				42		1121																54	
EH-112S		42				46		315																10	U
EH-112S		64				15		225																10	U
EH-112S		81				27		428																30	
EH-112S		45				33		381																117	
EH-112S		83				36		362																130	
EH-113S		49				98		431																111	
EH-113S		46				18		400																10	U
EH-113S		52				32		735																67	
EH-113S		51				42		968																45	
EH-113S		57				27		833																38	
EH-113S		65				41		480																19	
EH-113S		55				20		356																10	U
EH-113S		79				47		653																10	U
EH-113S		56				23		513																12	
EH-113S		57				31		354																10	U
EH-113S		47				36		322																10	U
EH-113S		37				31		253																10	U
EH-113S		59				41		220																10	U
EH-113S		24				25		226																10	U
EH-113S		43				20		301																10	U
EH-113S		20				21		254																10	U
EH-113S		46				33		259																10	U
EH-113S		47				35		357																10	U
EH-114S		26				38		310																28	
EH-114S		36				10	U	466																45	
EH-114S		71				38		559																31	
EH-114S		71				50		363																11	
EH-114S		66				38		477																23	
EH-114S		56				43		267																10	U
EH-114S		90				39		769																145	
EH-114S		67				25		430																59	
EH-114S		48				31		478																26	
EH-114S		54				36		499																11	
EH-114S		45				36		450																101	

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		55,000	400	1,800	23	1,500	390	390		0.78	390	23,000
	41,000		*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*		*10.0*	*5,200*	*310,000*
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
EH-114S		60		28	376								109
EH-115S		32		69	365								55
EH-115S		13		10 U	331								29
EH-115S		27		30	337								10 U
EH-115S		57		55	826								36
EH-115S		34		10 U	630								59
EH-115S		37		15	575								42
EH-115S		39		29	604								78
EH-115S		46		37	280								26
EH-115S		79		35	345								42
EH-115S		105		54	497								52
EH-115S		60		36	351								28
EH-115S		46		45	925								48
EH-115S		89		19	996								71
EH-115S		126		45	776								75
EH-115S		50		20	223								10 U
EH-115S		50		27	343								10 U
EH-115S		34		25	225								87
EH-118		32.8	17200	90.2	392		14.3	5 U	5 U		5 U	35.4	114
EH-118						1.1							
EH-118		15.3		14.7				43.9					51.3
EH-118		16.5		11.8				44.7					51.1
EH-118		14		11.9				37					38.7
EH-118		22.9		12.6				51					48.6
EH-118		19.8		11.5				27.9					38.3
EH-118		30.6		7.4				21					31.7
EH-118		64.8		13				46.1					51.5
EH-118		30.7		8.5				29.6					37.7
EH-118		36.3		7				10.2					33.3
EH-118		18.9		5 U				5 U					22.2
EH-118		33.4		12.9				30.2					49.3
EH-118		13.9		5.8				17.7					35.5
EH-118		5 U		5 U				22.8					29
EH-118		16.8	14700	6.5	178		5 U	5 U	5 U		5 U	21.3	27.6
EH-118						0.5 U							
EH-119		18.8	10500	74.9	272		7.2	5 U	5 U		5 U	24.5	58.8
EH-119						0.5 U							
EH-119		18.5		15.8				21.1					58
EH-119		12.5		5.9				14					34.2
EH-119		11.2		5.6				14.2					30.3
EH-119		17.2		5 U				45.6					63
EH-119		21.1		7.8				26.5					50.7
EH-119		35.6		5.2				20.2					40.3
EH-119		38.2		14.5				26.2					42.9
EH-119		42.5		6.1				29.2					48.5
EH-119		30.5		5 U				9.8					25.7
EH-119		44		5				16.3					30.6
EH-119		27.6		5 U				31.7					28.9
EH-119		20.5		5.6				10.1					24.4
EH-119		14.5		8.1				14.4					18.8
EH-119		52.7		20.3				55.1					108
EH-119		14.6		7.5				13.8					18.8
EH-119		13.5		19.4				10.8					15.3
EH-119		18.8	18000	11	164		5 U	5 U	5 U		5 U	21.1	33
EH-119						0.5 U							
EH-120		24.5	18700	79.5	366		10.7	5 U	5 U		5 U	36.4	82.6
EH-120						0.5 U							
EH-120		40.6		11.6				36.2					54.7
EH-120		15.8		7.3				21.3					40.5
EH-120		15.8		7.4				39.5					39
EH-120		33.8		7.1				27.1					53.2
EH-120		31.4		8.2				22.4					43.2
EH-120		19.4		26.5				34.6					47.5
EH-120		29.4		8.2				17.1					42.7
EH-120		39.5		7.9				30.8					59.5
EH-120		39.1		10				27.1					42.3
EH-120		43.1		11.5				22.8					44.7
EH-120		43.2		5 U				20.9					44.6
EH-120		22.9		5 U				11.2					24.7

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
EH-120		8.3		5 U				5 U					15.9
EH-120		9.6		5 U				5 U					14.6
EH-120		52.7	25000	15.9	316		9.4	5 U	5 U		5 U	52.2	67.2
EH-120						0.1 U							
EH-121		21.7	12400		274		7.2	57.3	5 U		20.9	43	70.6
EH-121						0.5 U							
EH-121		18						46.5					39.3
EH-121		29						29					37.8
EH-121		29.4						38					34.7
EH-121		27.5						32.3					33.4
EH-121		35.5						67.8					63.3
EH-121		58.9						50.2					55.8
EH-121		48.8						76.1					62
EH-121		53.6						69.4					47
EH-121		56.2						49.7					52.2
EH-121		18.3						22.7					20.4
EH-121		27.1						24.2					24.6
EH-121		14.9						19.6					14
EH-121		20.6						8					21.3
EH-121		10.3						31.5					22.7
EH-121		20.9						22.6					26.9
EH-121		9.8	11400		918		5 U	70.5	5 U		31.9	14	35.3
EH-121						0.5 U							
EH-122		16.4	15500	25.2	234		5.7	5 U	5 U		5 U	40.6	29.9
EH-122						0.1 U							
EH-122		28.7		109				34.9					81
EH-122		20.9		11.8				58.8					63.3
EH-122		21.4		12.5				47.9					60.3
EH-122		30.1		13.9				46.8					60.2
EH-122		31.4		13.4				48.7					61
EH-122		67.4		13.5				40.6					54.9
EH-122		49.1		17.8				42.8					59.3
EH-122		48.3		12.1				33.1					40.8
EH-122		27.5		10.9				38.5					36.2
EH-122		34.5		10.4				47					46.4
EH-122		53.6		5 U				30.3					67.4
EH-122		36.6		9				39.7					58.8
EH-122		34.9		13.9				53.4					66.8
EH-122		19.6		7				59.2					58.1
EH-122		20.9		5 U				34.2					43.4
EH-122		15.5	19800	8.4	389		5 U	5 U	5 U		5 U	23	41.2
EH-122						0.5 U							
EH-66		24.3	12500		224		6.3	58.9	5.6		20.9	37.4	65.2
EH-66						0.5 U							
EH-66		13.7						49.7					35.9
EH-66		23.1						18.8					34.4
EH-66		23.3						37					28.1
EH-66		25.1						38					33.3
EH-66		36.3						63.2					58.2
EH-66		71.4						56.7					62.7
EH-66		55.8						77.7					59.9
EH-66		46.2						46.2					44
EH-66		97.5						55.7					69.3
EH-66		22.7						25.3					42.4
EH-66		18.7	8240		173		5 U	23.3	5 U		21.1	17	43.4
EH-66						0.5 U							
EH-67		17.8	15100	23.5	222		6.7	5 U	5 U		5 U	36.9	31
EH-67						0.5 U							
EH-67		29.3		50.5				28.9					54.7
EH-67		46.6		141				36.4					89.4
EH-67		26.3		8.7				39.4					59.8
EH-67		33.7		8				39.6					51.9
EH-67		24.8		6.3				35.1					42.5
EH-67		45.2		5 U				37.8					50.9
EH-67		48.9		21.7				36					54
EH-67		46.9		6.4				19.5					35.1
EH-67		32.2		5 U				25.1					35.8
EH-67		31	18900	9.5	253		6.1	5 U	5 U		5 U	43.2	33.6
EH-67						0.5 U							

	3,100			**55,000**		**400**		**1,800**		**23**		**1,500**		**390**		**390**				**0.78**		**390**		**23,000**
	41,000			***720,000***		***800***		***23,000***		***310***		***20,000***		***5,100***		***5,100***				***10.0***		***5,200***		***310,000***
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
EH-68		81.5		16400		166		366				8.4		5	U	5	U			5	U	35.8		118
EH-68										0.34														
EH-68		53.5				108								27.9										123
EH-68		16.3				5.3								17.9										43.6
EH-68		16.3				10.2								22.9										59.9
EH-68		12				9.8								15.3										54.4
EH-68		20.6				21.7								33.2										66.9
EH-68		48.4				8.8								35.1										40.9
EH-68		39				6.1								8.7										34.9
EH-68		31.1		25100		8.2		338				5	U	5	U	5	U			5	U			23.5
EH-68										0.1	U													
EH-69		14		13700		25.6		176				5	U	5	U	5	U			5	U	30.5		44.2
EH-69										0.5	U													
EH-69		17.1				15.1								14.1										68.6
EH-69		69.6				5	U							40.4										67.4
EH-69		35.3				5	U							21.1										67.9
EH-69		106				6.2								7.9										59
EH-69		86				10								6.4										54.7
EH-69		38.1				12.1								17.6										42.9
EH-69		15.3		8360		5.2		245				5	U	5	U	5	U			5	U	17.4		16.4
EH-69										0.5	U													
RCSA-02A		1832				14681																		8704
RCSA-02A		797				12615																		5703
RCSA-02A		117				1205																		668
RCSA-02A		85				873																		408
RCSA-02A		30				98																		96
RCSA-02B		4382				19234																		13173
RCSA-02B		2181				20253																		16549
RCSA-02B		202				1265																		1302
RCSA-02B		31				56																		80
RCSA-02B		28				70																		89
RCSA-02B		19				23																		65
RCSA-02C		2785				15507																		13353
RCSA-02C		1275				16637																		10125
RCSA-02C		276				1508																		1625
RCSA-02C		31				60																		116
RCSA-02C		30				135																		109
RCSA-02D		35750				8989																		7970
RCSA-02D		4289				11653																		9741
RCSA-02D		394				1236																		934
RCSA-02D		38				51																		72
RCSA-02D		44				55																		78
RCSA-02E		4305				8264																		11321
RCSA-02E		2154				9564																		12626
RCSA-02E		91				255																		435
RCSA-02E		13				40																		60
RCSA-02E		21				46																		68
RCSA-02E		26				48																		69
RCSA-02F		10724				1913																		3611
RCSA-02F		378				688																		258
RCSA-02F		161				382																		171
RCSA-02F		640				70																		86
RCSA-02F		26				27																		45
RCSA-02F		17				26																		46
RCSA-02F		93				40																		58
RCSA-03		4770				60365																		39068
RCSA-03		6916				48121																		35143
RCSA-03		2544				19739																		12147
RCSA-03		76				613																		509
RCSA-03		33				203																		179
RCSA-04		3196				32348																		21874
RCSA-04		1866				39911																		16375
RCSA-04		455				7403																		2739
RCSA-04		317				2469																		1001
RCSA-04		87				1885																		487
RCSA-04		116				1151																		453
RCSA-04		1563				1593																		607
RCSA-05A		6447				61147																		41638
RCSA-05A		4624				44158																		28236

	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
Station Name	**Copper (Cu)**	**Gold (Au)**	**Iron (Fe)**	**Lead (Pb)**	**Manganese (Mn)**	**Mercury (Hg)**	**Nickel (Ni)**	**Selenium (Se)**	**Silver (Ag)**	**Tellurium (Te)**	**Thallium (Tl)**	**Vanadium (V)**	**Zinc (Zn)**
RCSA-05A		946		5460									35303
RCSA-05A		1702		18808									9009
RCSA-05A		32		230									146
RCSA-05A		197		108									91
RCSA-05B		9688		54667									34496
RCSA-05B		1971		36077									17939
RCSA-05B		1966		22928									12711
RCSA-05B		113		2270									912
RCSA-05B		80		413									172
RCSA-05B		97		1133									606
RCSA-05B		39		10419									9782
RCSA-05C		6009		62282									52549
RCSA-05C		0.31		76504									25446
RCSA-05C		1532		19261									15770
RCSA-05C		199		2269									1103
RCSA-05C		191		1519									878
RCSA-05C		949		10876									5898
RCSA-05C		108		16282									5965
RCSA-05D		6317		61424									33013
RCSA-05D		7824		56829									27958
RCSA-05D		4651		12815									10507
RCSA-05D		176		1776									651
RCSA-05D		210		1879									793
RCSA-05D		46		249									160
RCSA-05D		30		816									429
RCSA-05E		12208		39682									26441
RCSA-05E		223		2826									1695
RCSA-05E		67		557									353
RCSA-05E		274		4177									2210
RCSA-05E		79		921									681
RCSA-05E		39		125									181
RCSA-05F		5903		32478									19404
RCSA-05F		4553		21039									12929
RCSA-05F		255		1998									2448
RCSA-05F		287		1667									1895
RCSA-06		7271		46977									71979
RCSA-06		7243		57434									57288
RCSA-06		1111		9092									12514
RCSA-06		186		736									821
RCSA-06		439		2613									3951
RCSA-06		393		2001									2355
RCSA-06		29		16360									39575
RCSA-07		10354		47871									34445
RCSA-07		352		3163									4483
RCSA-07		4418		32173									25933
RCSA-07		1649		13874									5983
RCSA-07		802		6403									4615
RCSA-07		276		2057									1473
RCSA-07		3337		832									632
RCSA-07		744		184									138
RCSA-08A		2755		58640									37734
RCSA-08A		3951		49648									26067
RCSA-08A		1351		18585									19733
RCSA-08A		1368		9702									11860
RCSA-08A		3331		20819									16995
RCSA-08A		1207		12740									9370
RCSA-08B		3158		55755									39989
RCSA-08B		334		2334									32372
RCSA-08B		9166		30261									21069
RCSA-08B		1274		19504									15368
RCSA-08B		804		7030									9314
RCSA-08B		626		4897									11813
RCSA-08B		95		5554									16667
RCSA-08B		1734		3962									9265
RCSA-08B		594		176									485
RCSA-08B		44		180									235
RCSA-08C		2114		22576									14419
RCSA-08C		1319		12145									5651
RCSA-08C		968		12285									5382

	3,100			55,000		400		1,800		23		1,500		390		390				0.78		390		23,000
	41,000			*720,000*		*800*		*23,000*		*310*		*20,000*		*5,100*		*5,100*				*10.0*		*5,200*		*310,000*
	NA	NA		NA		520		NA		NA		NA		NA		NA		NA		NA		NA		NA
Station Name	**Copper (Cu)**	**Gold (Au)**		**Iron (Fe)**		**Lead (Pb)**		**Manganese (Mn)**		**Mercury (Hg)**		**Nickel (Ni)**		**Selenium (Se)**		**Silver (Ag)**		**Tellurium (Te)**		**Thallium (Tl)**		**Vanadium (V)**		**Zinc (Zn)**
RCSA-08C		2217				13190																		7526
RCSA-08C		1882				14120																		8020
RCSA-08C		585				12147																		3894
RCSA-08C		105				344																		1025
RCSA-08D		7755				18475																		11613
RCSA-08D		1256				11767																		7961
RCSA-08D		207				2333																		2136
RCSA-08D		103				730																		571
RCSA-08E		13210				13901																		8891
RCSA-08E		174				1670																		1050
RCSA-08E		221				2973																		1932
RCSA-08E		420				4185																		2606
RCSA-08E		41				148																		125
UOP-SS12		467				2371																		2843
UOP-SS12		360				295																		381
UOP-SS12		153				158																		161
UOP-SS12		40				52																		56
UOP-SS13		314				884																		576
UOP-SS13		144				78																		66
UOP-SS13		86				39																		54
UOP-SS13		466				304																		176
UOP-SS14		186				757																		738
UOP-SS14		1080				1471																		1018
UOP-SS14		65				65																		46
UOP-SS14		121				123																		94
UOP-SS16		16375				1368																		1868
UOP-SS16		235				216																		135
UOP-SS16		65				74																		68
UOP-SS16		65				64																		77
UOP-SS16		58				26																		42
UOP-SS18		200				307																		189
UOP-SS18		54				74																		87
UOP-SS18		54				54																		62
UOP-SS18		80				103																		86
EH-70-SL	46	5	U	16800		308		456		0.32		10		0.9		3		5	U	0.5		33		244
EH-70-SL	37	5	U	12100		233		252		0.069		8		0.8		4		5	U	0.4		29		227
EH-70-SL	39	5	U	13200		259		231		0.063		9		0.8		4		5	U	0.4		33		203
EH-70-SL	18	5	U	24900		38		256		0.05	U	7		0.5	U	2	U	5	U	0.1	U	63		63
EH-70-SL	11	5	U	17200		13		153		0.5	U	5	U	5	U	5	U	5	U	1	U	58		22
EH-70-SL	45	5	U	19600		16		450		0.5	U	6		5	U	5	U	5	U	1		48		44
EH-70-SL	36	5	U	29200		12		415		0.5	U	6		5	U	5	U	5	U	4		72		47
EH-70-SL	31	5	U	18300		10		273		0.5	U	5	U	5	U	5	U	5	U	1		53		30
EH-70-SL	41	5	U	16100		10		454		0.5	U	5	U	5	U	5	U	-5	U	1	U	45		29
EH-70-SL	42	5	U	19400		14		362		0.5	U	7		5	U	5	U	5	U	3		42		48
EH-70-SL	20	5	U	18600		12		251		0.5	U	5	U	5	U	5	U	5	U	1	U	58		23
EH-70-SL	25	5	U	10100		15		273		0.5	U	5	U	5	U	5	U	-5	U	1	U	21		27
EH-70-SL	19	5	U	13400		11		191		0.5	U	5	U	5	U	5	U	5	U	1	U	36		26
REF-NPS-1	107			11100		882		483		1.1		7		0.7		6				0.7		19		406
REF-NPS-2	91			11000		864		505		1.2		7		0.6		6				0.6		19		386
REF-NPS-3	43			19700		252		285		1	U	9		0.5		2	U			0.6		42		137
REF-NPS-4	59			21600		299		432		1		15		0.8		2	U			0.8		35		169
REF-NPS-5	50			15700		203		926		1	U	14		0.5	U	2	U			0.8		35		180
REF-RZ-5	1030			43800		3590		1350		11		12		33		54				2.6		31		3010
REF-US-1	63			16200		134		749		1	U	7		0.5	U	2	U			0.3		35		371
REF-US-2	126			28600		188		1030		1	U	11		0.7		2				0.5		58		526
REF-US-3	70			22300		128		600		1	U	9		0.5	U	2	U			0.4		44		252
REF-US-4	164			20700		533		1100		1.6		9		0.7		6				0.6		43		1180
REF-US-4	152			19400		527		1090		1.5		8		0.7		5				0.6		41		1180
REF-US-5	121			20100		433		1170		1	U	8		0.5		4				0.5		48		853
UOP-SS12	5830	5	U	21400		2970		427		3.3		15		5		30		5	U	4		53		2100
UOP-SS12	93	5	U	21400		58		255		0.072		8		0.5	U	2	U	5	U	0.1	U	74		88
UOP-SS12	359	5	U	16600		191		612		0.083		5	U	0.5	U	2	U	5	U	0.1	U	51		114
WPS-1	41			16700		11		608		0.05	U	8		0.5	U	2	U			0.2		38		55
WPS-2	21			15300		10	U	174		0.05	U	5	U	0.5	U	2	U			0.1	U	36		22
WPS-3	21			11700		6		152		0.05	U	5	U	0.5	U	2	U			0.1	U	27		23
WPS-3	18			10400		6		147		0.05	U	5	U	0.5	U	2	U			0.1	U	25		19
WPS-4	52			16500		4		291		0.05	U	5	U	0.5	U	2	U			0.3		37		27
WPS-5	26			13600		7		394		0.05	U	5	U	0.5	U	2	U			0.2		28		31
WPS-5	26			13200		6		247		0.05	U	5	U	0.5	U	2	U			0.2		29		28

Station Name	Copper (Cu)	Gold (Au)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Tellurium (Te)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
	3,100		**55,000**	**400**	**1,800**	**23**	**1,500**	**390**	**390**		**0.78**	**390**	**23,000**
	41,000		***720,000***	***800***	***23,000***	***310***	***20,000***	***5,100***	***5,100***		***10.0***	***5,200***	***310,000***
	NA	NA	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA
WPS-6	62		18300	4	485	0.05 U	5 U	0.5 U	2 U		0.3	39	27
DH-54		94		184	1849								551
DH-54		105		87	1353								230
DH-54		33		33	839								107
DH-54		30		30	924								81
DH-54		36		24	513								33
DH-54		40		28	745								60
DH-54		83		34	1056								80
DH-54		76		22	967								68
DH-54		74		34	946								74
SRB-15		6794		4835									2024
SRB-15		56		185									218
SRB-15		1782		7623									4129
SRB-15		185		894									500
SRB-15		7209		25936									8863
SRB-15		347		1221									614
SRB-15		140		723									540
SRB-15		16040		26528									7837
SRB-15		137		238									221
SRB-15		37		33									58
ULL-5		7155		18339									11817
SS24		4275		16575									7325

B2 Sediment Results

APPENDIX B2.

Sediment Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

						Residential Soil	77,000	31	0.39	15,000	160	70	0.29	23	3,100	55,000	400	1,800	23	1,500	390	390	0.78	390	23,000
						Industrial Soil	*990,000*	*410*	*1.6*	*190,000*	*2,000*	*800*	*5.6*	*300*	*41,000*	*720,000*	*800*	*23,000*	*310*	*20,000*	*5,100*	*5,100*	*10.0*	*5,200*	*310,000*
						Project Sediment SLV	26000.0	2.00	9.8	NE	NE	0.99	43	50.0	32	190,000	36	460	0.18	23.0	NE	1.0	NA	NA	12.0
CMS Area	Sample Area	Station Name	Sample Top	Sample Bottom	Depth Units	Sample Date	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Thallium (Tl)	Vanadium (V)	Zinc (Zn)
1	Lower Lake	LL-21-SED	0	0	feet	August 3, 2010	5010	111	901	229	10 U	228	*9*	15	932	22800	3900	726	28	13	13.9	38.6	57	22	2280
1		LL-22-SED	0	0	feet	August 3, 2010	4620	121	223	100 U	10 U	92	*6*	6	220	9000	846	192	14	7	24.9	10	*87*	19	1220
1		LL-23-SED	0	0	feet	August 3, 2010	6180	11	133	100 U	10 U	30	*8*	5	239	12100	506	562	3.5	6	2.5	3.7	7	25	1070
1		LL-24-SED	0	0	feet	August 3, 2010	4480	55	94	130	10 U	19	*17*	8	168	17300	600	465	4.1	8	11.9	5.1	*23*	56	1620
1		LL-25-SED	0	0	feet	August 3, 2010	4410	14	138	100 U	10 U	40	*6*	4	223	11100	1070	471	8	5 U	3.3	4.9	6	19	864
1	Prickly Pear Creek	PPC-102-SED	0	0	feet	July 28, 2010	3630	1.1	44	100 U	10 U	4.7	*6*	4	41	9390	118	322	0.19	5 U	0.5 U	1.1	1 U	20	420
3		PPC-103-SED	0	0	feet	July 28, 2010	1640	0.5	36	100 U	10 U	0.7	5 U	2	11	4990	43	168	0.05 U	5 U	0.5 U	0.3	1 U	10 U	125 U
5		PPC-22-SED	0	0	feet	July 30, 2010	2690	0.5	12	100 U	10 U	1.1	*7*	3	20	9090	61	329	0.5 U	5 U	0.5 U	0.3	1 U	21	259
5		PPC-23-SED	0	0	feet	July 28, 2010	4500	1.5	24	100 U	10 U	2.1	*10*	5	42	13900	165	389	0.33	5	0.5 U	1.1	1 U	32	386
2		PPC-24-SED	0	0	feet	July 28, 2010	2890	0.8	19	100 U	10 U	1.2	*8*	4	25	10100	116	419	0.28	5 U	0.5 U	0.7	1 U	25	328
3		PPC-5-SED	0	0	feet	July 28, 2010	2010	0.5 U	20	100 U	10 U	0.6	*8*	3	18	10600	64	280	0.056	5 U	0.5 U	0.4	1 U	31	177
3		PPC-5-SED	0	0	feet	July 28, 2010	1770	0.5 U	23	100 U	10 U	0.7	*7*	3	13	8740	57	253	0.058	5 U	0.5 U	0.5	1 U	24	172
1		PPC-7-SED	0	0	feet	July 28, 2010	3810	1	26	100 U	10 U	1.8	*9*	5	40	13400	173	452	0.28	6	0.5 U	1.1	1 U	30	448
2		PPC-8-SED	0	0	feet	July 28, 2010	2090	0.5 U	16	100 U	10 U	0.8	5 U	3	17	7210	92	369	0.05 U	5 U	0.5 U	0.4	1 U	17	241
off site	Reference - Prickly Pear Creek	REF-PPC-1-SED	0	0	feet	July 28, 2010	3270	0.6	20	100 U	10 U	1.1	5 U	4	24	10500	95	522	0.051	5 U	0.5 U	0.7	1 U	24	308
off site		REF-PPC-2-SED	0	0	feet	July 28, 2010	2110	0.5 U	12	100 U	10 U	0.7	5 U	3	14	7320	45	459	0.05 U	5 U	0.5 U	0.3	1 U	16	197
off site		REF-PPC-3-SED	0	0	feet	July 28, 2010	3890	0.8	19	100 U	10 U	1.1	*11*	4	27	14100	96	611	0.05 U	5 U	0.5 U	0.8	1 U	41	276
off site		REF-PPC-4-SED	0	0	feet	July 27, 2010	3900	0.6	20	100 U	10 U	1.3	*7*	5	29	12100	111	490	0.055	6	0.5 U	0.9	1 U	30	395
off site		REF-PPC-5-SED	0	0	feet	July 27, 2010	3700	0.6	18	100 U	10 U	0.9	5 U	4	23	10300	110	524	0.05 U	5 U	0.5 U	0.7	1 U	24	308
off site		REF-PPC-6-SED	0	0	feet	July 27, 2010	3780	0.8	18	100 U	10 U	1.2	*10*	5	22	13100	106	506	0.05 U	5	0.5 U	0.7	1 U	32	310
off site		REF-PPC-6-SED	0	0	feet	July 27, 2010	4350	0.6	21	100 U	10 U	1.1	*10*	5	28	12800	97	516	0.05 U	6	0.5 U	0.7	1 U	33	290
off site		REF-PPC-7-SED	0	0	feet	July 27, 2010	4030	1	21	100 U	10 U	2.4	*6*	4	38	10200	174	414	0.12	5 U	0.5 U	1.3	1 U	23	366
off site		REF-PPC-8-SED	0	0	feet	July 27, 2010	4250	0.6	20	100 U	10 U	1.2	*9*	5	25	12100	113	513	0.053	6	0.5 U	0.8	1 U	30	363
5	Upper Lake	UL-21-SED	0	0	feet	August 3, 2010	9340	14	251	218	10 U	56	*9*	5	308	13300	2550	310	230	9	1.3	6.7	5 U	31	817
5		UL-22-SED	0	0	feet	August 5, 2010	5830	17.8	115	100 U	10 U	31.3	*10*	6	316	10700	1270	299	22	9	2.9	13.7	1 U	26	1220
5		UL-23-SED	0	0	feet	August 5, 2010	6920	47.1	581	104	10 U	122	*11*	9	988	15600	13600	518	140	11	25.3	69.3	5	25	3290
5		UL-23-SED	0	0	feet	August 5, 2010	6380	40.7	531	103	10 U	105	*10*	8	720	13900	10800	409	79	11	21.8	61.4	5	24	3190
5		UL-24-SED	0	0	feet	August 5, 2010	4560	57.2	353	184	10 U	74.7	*8*	7	511	12900	3890	295	15	9	2.5	30.7	2	22	1410
5		UL-25-SED	0	0	feet	August 5, 2010	5240	4.1	57	100 U	10 U	25.5	*10*	4	105	10300	557	221	130	6	0.9	3.6	1 U	27	1010
5	Upper Lake Marsh	ULM-1-SED	0	0	feet	August 5, 2010	4430	7.8	75	100 U	10 U	9.6	*7*	4	189	12200	863	510	28	5 U	1.6	12.7	1 U	21	601
5		ULM-2-SED	0	0	feet	August 5, 2010	6330	1.1	37	100 U	10 U	4.4	*10*	6	74	11100	188	420	14	7	0.5 U	1.9	1 U	29	670
5		ULM-3-SED	0	0	feet	August 5, 2010	8730	4.3	98	114	10 U	14.1	*12*	8	155	15800	573	680	150	10	1	5.6	1 U	34	909
5		ULM-4-SED	0	0	feet	August 5, 2010	9950	2.5	108	120	10 U	11.4	*14*	9	125	19600	492	660	160	10	0.8	3.5	1 U	42	656
5		ULM-5-SED	0	0	feet	August 5, 2010	9340	6.7	121	106	10 U	29.5	*13*	8	245	12800	990	603	5.2	10	1.8	8.7	1 U	36	1220
5		ULM-5-SED	0	0	feet	August 5, 2010	8830	5.4	119	101	10 U	26	*13*	7	217	12900	991	532	27	10	1.5	6.9	1 U	35	1230
5		ULM-6-SED	0	0	feet	August 5, 2010	8680	8.5	78	105	10 U	39.8	*13*	8	280	11900	1420	381	11	11	2.5	10.6	1	37	1140
5		ULM-7-SED	0	0	feet	August 5, 2010	6010	1.5	38	104	10 U	2.9	*8*	5	71	11800	253	619	0.74	6	0.5 U	1.5	1 U	25	682
5		ULM-8-SED	0	0	feet	August 5, 2010	6140	1.9	51	100 U	10 U	4.2	*8*	4	91	11000	267	519	0.5 U	6	0.5 U	1.9	1 U	23	754
5		ULM-9-SED	0	0	feet	August 5, 2010	5560	0.9	21	100 U	10 U	1.6	*10*	5	41	12400	151	519	0.5 U	6	0.5 U	0.8	1 U	30	470
off site	Wilson Ditch	WD-25-SED	0	0	feet	August 10, 2010	5980	1.2	23	100 U	10 U	10.1	5 U	4	41	9270	320	790	1.4	5 U	0.5 U	2.2	1 U	17	421
off site		WD-26-SED	0	0	feet	August 10, 2010	7070	2.4	44	100 U	10 U	27.7	*7*	6	68	11700	536	839	120	5	0.7	3.6	1	25	583
5		WD-2-SED	0	0	feet	August 10, 2010	4430	5.9	79	100 U	10 U	20.8	5 U	5	154	8950	1610	1010	20	5 U	1.6	11.1	2	18	678
off site		WD-3-SED	0	0	feet	August 10, 2010	6650	1.9	34	100 U	10 U	19.6	*8*	5	78	12200	625	919	4.7	6	0.6	4.7	1 U	27	586
5		WD-4-SED	0	0	feet	August 10, 2010	5820	2.9	28	100 U	10 U	17.1	*6*	5	93	10300	680	1120	5	5 U	1	6.8	1 U	17	720

B3 Surface Water Results

APPENDIX B3.

Surface Water Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

			MCL[a]	na		na		6.00E-03		1.00E-02		2.00E+00		4.00E-03		5.00E-03		1.00E-01		na		1.30E+00		na		na		1.50E-02		na		na		2.00E-03		na		5.00E-02		na		na		2.00E-03		na		na	
			Tapwater[a]	3.70E+01		*3.70E+01*		*1.50E-02*		*4.50E-05*		*7.30E+00*		*7.30E-02*		*1.80E-02*		*4.30E-05*		*1.10E-02*		*1.50E+00*		*na*		*2.60E+01*		*na*		*na*		*8.80E-01*		*1.10E-02*		*7.30E-01*		*1.80E-01*		*1.80E-01*		*na*		*3.70E-04*		*1.80E-01*		*1.10E+01*	
			site-specific SLV[b]	8.70E-02		8.70E-02		1.90E-01		1.50E-01		2.20E-01		1.10E-02		2.50E-04		1.10E-02		2.40E-02		9.00E-03		na		1.00E+00		2.50E-03		na		1.70E+00		7.70E-04		5.20E-02		4.60E-03		3.80E-04		na		1.70E-02		4.40E-02		1.20E-01	
CMS Area	Station Name	Date	Note	Al (Dis)		Al (TRC)		Sb (TRC)		As (TRC)		Ba (TRC)		Be (TRC)		Cd (TRC)		Cr (TRC)		Co (TRC)		Cu (TRC)		Au (TRC)		Fe (TRC)		Pb (TRC)		Mg (Dis)		Mn (TRC)		Hg (TRC)		Ni (TRC)		Se (TRC)		Ag (TRC)		Te (TRC)		Tl (TRC)		V (TRC)		Zn (TRC)	
Parcels 16 & 19	PPC-103	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.0032		0.01	U	0.39		0.0043		7		0.07		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Parcels 16 & 19	PPC-5	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	*0.0578*		0.001	U	0.005	U	0.0052		0.01	U	0.37		0.0045		7		0.06		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Parcels 16 & 19	PPC-7	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.0033		0.01	U	0.36		0.005		7		0.06		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Parcels 16 & 19	LOWER LAKE	4/19/2011		0.1	U			*0.12*		*0.042*		0.1	U	0.001	U	0.0025		0.001	U	0.005	U	0.0078		0.01	U	0.19		0.0162		8		0.11		0.00001	U	0.01	U	0.019		0.0005	U	0.1	U	*0.0443*		0.1	U	0.01	
Parcels 10, 11, 12, and	PPC-3A	4/19/2011		0.1	U			0.003	U	0.004		0.1	U	0.001	U	0.0002		0.001	U	0.005	U	0.0031		0.01	U	0.38		0.0036		7		0.05		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Parcel 15	UPPER LAKE	4/19/2011		0.1	U			0.003	U	0.006		0.1	U	0.001	U	0.0013		0.001	U	0.005	U	0.0075		0.01	U	0.26		0.0434		7		0.05		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.05	
Parcel 15	WD-2	4/19/2011	Dry																																															
Parcel 15	WD-4	4/19/2011	Dry																																															
Parcel 15	WD-2	5/18/2011	Dry																																															
Parcel 15	WD-4	5/18/2011	Dry																																															
Parcel 15	SG-04	6/13/2011	No Access																																															
Parcel 15	WD-2	6/13/2011	Dry																																															
Parcel 15	WD-4	6/13/2011	Dry																																															
Non-Trust Property	PPC-8	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.0037		0.01	U	0.36		0.0058		7		0.06		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Non-Trust Property	PPC-23	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.0032		0.01	U	0.36		0.0048		7		0.06		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Non-Trust Property	PPC-10	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.0036		0.01	U	0.36		0.0058		7		0.06		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.06	
Non-Trust Property	SG-15	4/19/2011		0.1	U			0.003	U	0.006		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.004		0.01	U	0.42		0.007		7		0.06		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.07	
Non-Trust Property	SG-16	4/19/2011		0.1	U			0.003	U	0.005		0.1	U	0.001	U	0.0003		0.001	U	0.005	U	0.0042		0.01	U	0.46		0.0095		7		0.07		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.07	
Non-Trust Property	HVIC-1	4/20/2011		0.1	U			0.003	U	*0.022*		0.1	U	0.001	U	0.0001	U	0.001	U	0.005	U	0.0011		0.01	U	0.12		0.0006		10		0.02		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.01	U
Non-Trust Property	GP-1	4/20/2011		0.1	U			0.003	U	*0.011*		0.1	U	0.001	U	0.0001	U	0.001	U	0.005	U	0.0035		0.01	U	0.14		0.001		7		0.01	U	0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.01	U
Non-Trust Property	GP-3	4/20/2011		0.1	U			0.003	U	0.003		0.1	U	0.001	U	0.0001	U	0.001	U	0.005	U	0.0027		0.01	U	0.52		0.0017		9		0.03		0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.01	U
Non-Trust Property	GP-4	4/20/2011		0.1	U			0.003	U	0.01		0.1	U	0.001	U	0.0001	U	0.001	U	0.005	U	0.002		0.01	U	0.06		0.0011		7		0.01	U	0.00001	U	0.01	U	0.001	U	0.0005	U	0.1	U	0.0002	U	0.1	U	0.01	U
Non-Trust Property	WD-3	4/19/2011	Dry																																															
Non-Trust Property	WD-25	4/19/2011	Dry																																															
Non-Trust Property	GP-2	4/20/2011	Dry																																															
Non-Trust Property	COEH Effluent	5/18/2011	Submerged																																															
Non-Trust Property	WD-3	5/18/2011	Dry																																															
Non-Trust Property	WD-25	5/18/2011	Dry																																															
Non-Trust Property	COEH Effluent	6/13/2011	Submerged																																															
Non-Trust Property	WD-3	6/13/2011	Dry																																															
Non-Trust Property	WD-25	6/13/2011	Dry																																															
	PPC-11	4/19/2011	Dry																																															
	PPC-11	5/18/2011	Dry																																															
	PPC-11	6/13/2011	Dry																																															

[a] USPEA (June 2011)

[b] Draft Phase II RFI (April 2011)

B4 Groundwater Results

APPENDIX B4.

Groundwater Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

				MCL	na	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	na	1.30E+00	na	na	1.50E-02	na	2.00E-03	na	5.00E-02	na	na	2.00E-03	na	na
				Tapwater	*3.70E+01*	*1.50E-02*	*4.50E-05*	*7.30E+00*	*7.30E-02*	*1.80E-02*	*4.30E-05*	*1.10E-02*	*1.50E+00*	*na*	*2.60E+01*	*na*	*8.80E-01*	*1.10E-02*	*7.30E-01*	1.80E-01	1.80E-01	na	3.70E-04	1.80E-01	1.10E+01
				site-specific SLV	5.00E-02	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	1.10E-02	1.30E+00	na	2.60E+01	1.50E-02	5.00E-02	2.00E-03	1.80E+00	5.00E-02	1.00E-01	na	2.00E-03	2.60E-03	5.00E+00
CMS Area	Station Name	Date	QC Type	Sample Description	Al (Tot)	Sb (Tot)	As (Tot)	Ba (Tot)	Be (Tot)	Cd (Tot)	Cr (Tot)	Co (Tot)	Cu (Tot)	Au (Tot)	Fe (Tot)	Pb (Tot)	Mn (Tot)	Hg (Tot)	Ni (Tot)	Se (Tot)	Ag (Tot)	Te (Tot)	Tl (Tot)	V (Tot)	Zn (Tot)
5	SP-4	4/18/2011	Dry	Dry																					
offsite	WDPZ-2D	4/20/2011	Dry	Dry																					
offsite	WDPZ-1D	4/20/2011	Dry	Dry																					
offsite	WDPZ-3	4/20/2011	Dry	Dry																					
offsite	EH-128	4/15/2011	Dry	Dry																					
1	DH-61	4/18/2011	Dry	Dry																					
1	DH-12	4/18/2011	Dry	Dry																					
1	DH-16	4/18/2011	Dry	Dry																					
offsite	107 E Groschell	5/1/2011	No Access	No Access																					
offsite	109 Gail	5/6/2011	Not Operating	Not Operating																					
offsite	203 Gail	5/1/2011	No Access	No Access																					
offsite	303 Thurman	5/1/2011	No Access	No Access																					
offsite	3475 Allied	5/1/2011	No Access	No Access																					
offsite	EHC-2	4/29/2011	Not Operating	Not Operating																					
5	SP-4	6/15/2011	Dry	No Sample - Dry																					
1	DH-61	6/20/2011	Dry	No Sample - Dry																					
offsite	2540 Wylie Irrig	6/23/2011	Not Operating	Not Operating																					
offsite	401 Gail - S	6/21/2011	No Access	No SWL-No Acc																					
offsite	401 Gail - N	6/21/2011	No Access	No SWL-No Acc																					
offsite	EH-128	6/14/2011	Dry	Dry																					
offsite	WDPZ-1D	6/14/2011	Dry	Dry																					
offsite	WDPZ-1S	6/14/2011	Dry	Dry																					
offsite	WDPZ-2D	6/14/2011	Dry	Dry																					
offsite	WDPZ-3	6/14/2011	Dry	Dry																					
1	DH-61	6/14/2011	Dry	Dry																					
offsite	IP-102B	6/14/2011	No Meas	SWL Not Meas																					
offsite	IP-103B	6/14/2011	No Access	No Access																					
5	SP-4	6/14/2011	Dry	Dry																					
offsite	WDPZ-1D	7/11/2011	Dry	Dry																					
offsite	WDPZ-2S	7/11/2011	Dry	Dry																					
1	DH-61	7/11/2011	Dry	Dry																					
offsite	EH-143	8/16/2011	No Access	Damaged Well																					
offsite	WDPZ-1D	8/16/2011	Dry	Dry																					
offsite	WDPZ-3	8/16/2011	Dry	Dry																					
1	DH-61	8/16/2011	No Meas	Dry																					
1	DH-10A	4/12/2011	Split																						
1	DH-30	4/12/2011	Split																						
offsite	EH-50	4/12/2011	Split																						
1	DH-66	4/12/2011	Split																						
offsite	EH-66	4/11/2011																							
offsite	EH-121	4/11/2011																							
offsite	EH-115	4/11/2011																							
offsite	EH-53	4/11/2011																							
offsite	EH-63	4/11/2011																							
offsite	EH-54	4/11/2011																							
offsite	EH-59	4/11/2011																							
	DI BLANK	4/11/2011	Blank																						
	RINSATE	4/11/2011	Blank																						
1	DH-72	4/11/2011																							
1	DH-69	4/11/2011																							
1	DH-69	4/11/2011	Field Duplicate																						
1	DH-73	4/11/2011																							
1	DH-57	4/11/2011																							
offsite	EH-131	4/11/2011																							
offsite	EH-139	4/11/2011																							
offsite	EH-130	4/11/2011																							
	EH-130	4/11/2011	Field Duplicate																						
offsite	EH-127	4/11/2011																							
	DI BLANK	4/11/2011	Blank																						
offsite	EH-135	4/11/2011																							
offsite	EH-126	4/11/2011																							
offsite	EH-134	4/11/2011																							
	RINSATE	4/11/2011	Blank																						
offsite	EH-129	4/11/2011																							
offsite	EH-133	4/11/2011																							
offsite	EH-124	4/11/2011																							
offsite	EH-132	4/11/2011																							
5	EH-202	4/11/2011																							
offsite	EH-65	4/12/2011			0.1 U	0.003 U	***0.258***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.02 U	0.005 U	3.23	0.001 U	0.01 U	0.023	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-107	4/12/2011			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.05	0.001 U	0.01 U	***0.265***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-111	4/12/2011			0.1 U	0.003 U	***4.48***	0.1 U	0.001 U	0.001 U	0.001 U	0.001	0.003	0.01 U	0.05	0.005 U	3.25	0.001 U	0.01 U	**0.111**	0.005 U	0.1 U	0.001 U	0.02	0.01 U
offsite	EH-52	4/12/2011			0.1 U	**0.015**	***0.313***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.031	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U

APPENDIX B4.

Groundwater Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

CMS Area	Station Name	Date	QC Type	Sample Description	Al (Tot)	Sb (Tot)	As (Tot)	Ba (Tot)	Be (Tot)	Cd (Tot)	Cr (Tot)	Co (Tot)	Cu (Tot)	Au (Tot)	Fe (Tot)	Pb (Tot)	Mn (Tot)	Hg (Tot)	Ni (Tot)	Se (Tot)	Ag (Tot)	Te (Tot)	Tl (Tot)	V (Tot)	Zn (Tot)
				MCL	**na**	**6.00E-03**	**1.00E-02**	**2.00E+00**	**4.00E-03**	**5.00E-03**	**1.00E-01**	**na**	**1.30E+00**	**na**	**na**	**1.50E-02**	**na**	**2.00E-03**	**na**	**5.00E-02**	**na**	**na**	**2.00E-03**	**na**	**na**
				Tapwater	***3.70E+01***	***1.50E-02***	***4.50E-05***	***7.30E+00***	***7.30E-02***	***1.80E-02***	***4.30E-05***	***1.10E-02***	***1.50E+00***	***na***	***2.60E+01***	***na***	***8.80E-01***	***1.10E-02***	***7.30E-01***	**1.80E-01**	**1.80E-01**	**na**	**3.70E-04**	**1.80E-01**	**1.10E+01**
				site-specific SLV	5.00E-02	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	1.10E-02	1.30E+00	na	2.60E+01	1.50E-02	5.00E-02	2.00E-03	1.80E+00	5.00E-02	1.00E-01	na	2.00E-03	2.60E-03	5.00E+00
1	DH-10A	4/12/2011		Spec Split	0.1 U	***0.03***	***0.747***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	**0.06**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-10A	4/12/2011	Field Duplicate	Spec Split	0.1 U	***0.031***	***0.746***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	**0.059**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-30	4/12/2011		Spec Split	0.1 U	***0.074***	***12.6***	0.1 U	0.001 U	***0.672***	0.001 U	0.003	0.001	0.01 U	1.57	0.01	2.61	0.001 U	0.01 U	***0.478***	0.005 U	0.1 U	***0.051***	0.02	0.53
1	DH-42	4/12/2011			0.6	***0.016***	***3.99***	0.1 U	0.001 U	***2.36***	0.001 U	0.013	0.01	0.01 U	0.05	0.005 U	3.09	0.001 U	0.02	**0.127**	0.005 U	0.1 U	***0.01***	0.01	4.33
	DI BLANK	4/12/2011	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	4/12/2011	Blank		0.1 U	0.003 U	0.003	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-33	4/12/2011			0.1 U	0.005	***109***	0.1 U	0.001 U	**0.013**	0.001 U	0.003	0.013	0.01 U	0.73	0.013	0.13	0.001 U	0.01 U	**0.172**	0.005 U	0.2 U	0.001 U	0.01 U	0.2
1	APSD-11	4/12/2011			0.1 U	0.003 U	***0.097***	0.1 U	0.001 U	**0.008**	0.001 U	0.001 U	0.007	0.01 U	9.07	0.005 U	2.03	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01 U	0.06
offsite	EH-103	4/12/2011			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.003	0.001 U	0.003	0.01 U	0.06	0.005 U	0.4	0.001 U	0.01 U	**0.14**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-60	4/12/2011			0.1 U	0.003 U	***9.2***	0.1 U	0.001 U	0.001 U	0.001 U	0.005	0.004	0.01 U	0.08	0.005 U	8.05	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-61	4/12/2011			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	1.84	0.001 U	0.01 U	**0.102**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-100	4/12/2011			0.1 U	0.003 U	***7.82***	0.1 U	0.001 U	0.003	0.001 U	0.001 U	0.006	0.01 U	0.02 U	0.005 U	6.29	0.001 U	0.01	0.026	0.005 U	0.1 U	0.001 U	0.02	0.32 UJ
	EH-100	4/12/2011	Field Duplicate		0.1 U	0.003 U	***7.75***	0.1 U	0.001 U	0.003	0.001 U	0.001 U	0.006	0.01 U	0.02 U	0.005 U	6.2	0.001 U	0.01	0.026	0.005 U	0.1 U	0.001 U	0.02	0.32 UJ
offsite	EH-50	4/12/2011		Spec Split	0.1 U	0.003 U	***0.562***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	***0.218***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-66	4/12/2011		Spec Split	0.3	0.003 U	0.002	0.1 U	0.001 U	***0.474***	0.004	0.006	0.007	0.01 U	0.38	0.005 U	0.02	0.003	0.02	***2.45***	0.005 U	0.1 U	0.001 U	0.01 U	0.22 UJ
	DI BLANK	4/12/2011	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.35
	RINSATE	4/12/2011	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-13	4/12/2011			0.4	0.003 U	***11.8***	0.1 U	0.001	0.002	0.001 U	0.014	0.042	0.01 U	8.46	0.074	2.88	0.001 U	0.01	0.002	0.005 UJ	0.1 U	***0.033***	0.01 U	2.37
5	MW-4	4/13/2011																							
5	MW-1	4/13/2011																							
5	MW-9	4/13/2011																							
5	MW-5	4/13/2011																							
5	MW-8	4/13/2011																							
5	MW-10	4/13/2011																							
	DI BLANK	4/13/2011	Blank																						
1	MW-3	4/13/2011																							
5	MW-2	4/13/2011																							
	RINSATE	4/13/2011	Blank																						
5	MW-7	4/13/2011																							
5	MW-6	40646																							
5	MW-6	40646	Field Duplicate																						
5	MW-11	40646																							
offsite	EH-104	40646			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 UJ	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	***0.386***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-6	40646			0.1 U	***0.064***	***1.96***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.012	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	***0.709***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-6	40646	Field Duplicate		0.1 U	***0.063***	***1.97***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.013	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	***0.707***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-15	40646			0.4	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.011	0.01 U	0.45	0.005 U	0.01	0.001 U	0.01 U	***0.326***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	DI BLANK	40646	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-64	40646			0.1 U	0.003 U	***30.4***	0.1 U	0.001 U	**0.008**	0.001 U	0.002	0.004 UJ	0.01 U	0.65	0.005 U	1.64	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.17
	RINSATE	40646	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
5	EH-203	40646																							
1	DH-71	40646																							
1	DH-70	40646																							
offsite	EH-138	40647			0.1	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001	0.01 U	0.12 J	0.005 U	0.01 U	0.001 U	0.01 U	**0.069**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-125	40647			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 J	0.005 U	0.01 U	0.001 U	0.01 U	**0.073**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-70	40647																							
offsite	EH-120	40647			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	**0.168**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-117	40647			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	***0.218***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-102	40647			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	**0.059**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-101	40647			0.1 U	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 J	0.005 U	0.01 U	0.001 U	0.01 U	***0.196***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	DI BLANK	40647	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-51	40647			0.1 U	0.003 U	***0.068***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001	0.01 U	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	***0.257***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40647	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
5	DH-67	40647	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.002	0.001	0.004	0.01 U	0.03 J	0.005 U	0.01 U	0.001 U	0.01 U	***1.44***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
5	DH-67	40647			0.1	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.002	0.002	0.005	0.01 U	0.11 J	0.005 U	0.01 U	0.001 U	0.01 U	***1.44***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-24	40647			0.2	0.003 U	***21.7***	0.1 U	0.003	***0.063***	0.001 U	0.014	0.023	0.01 U	3.54	0.011	5.48	0.001 U	0.01 U	0.003	0.005 U	0.1 U	0.001 U	0.01 U	0.99
3	DH-7	40647																							
1	DH-53	40647																							
1	DH-52	40647																							
1	DH-52	40647	Field Duplicate																						
1	DH-51	40647																							
1	DH-5	40647																							
1	APSD-7	40647																							
	DI BLANK	40647	Blank																						
	RINSATE	40647	Blank																						
1	APSD-8	40647																							
5	APSD-9	40647																							
1	APSD-12	40647																							
5	APSD-10	40647																							

APPENDIX B4.

Groundwater Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

CMS Area	Station Name	Date	QC Type	Sample Description	Al (Tot)	Sb (Tot)	As (Tot)	Ba (Tot)	Be (Tot)	Cd (Tot)	Cr (Tot)	Co (Tot)	Cu (Tot)	Au (Tot)	Fe (Tot)	Pb (Tot)	Mn (Tot)	Hg (Tot)	Ni (Tot)	Se (Tot)	Ag (Tot)	Te (Tot)	Tl (Tot)	V (Tot)	Zn (Tot)
				MCL	na	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	na	1.30E+00	na	na	1.50E-02	na	2.00E-03	na	5.00E-02	na	na	2.00E-03	na	na
				Tapwater	*3.70E+01*	*1.50E-02*	*4.50E-05*	*7.30E+00*	*7.30E-02*	*1.80E-02*	*4.30E-05*	*1.10E-02*	*1.50E+00*	*na*	*2.60E+01*	*na*	*8.80E-01*	*1.10E-02*	*7.30E-01*	1.80E-01	1.80E-01	na	3.70E-04	1.80E-01	1.10E+01
				site-specific SLV	5.00E-02	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	1.10E-02	1.30E+00	na	2.60E+01	1.50E-02	5.00E-02	2.00E-03	1.80E+00	5.00E-02	1.00E-01	na	2.00E-03	2.60E-03	5.00E+00
offsite	EH-118	40648																							
offsite	EH-119	40648																							
offsite	EH-123	40648																							
	EH-123	40648	Field Duplicate																						
offsite	EH-206	40648																							
offsite	EH-57A	40648																							
offsite	EH-62	40648																							
	DI BLANK	40648	Blank																						
offsite	EH-58	40648																							
	RINSATE	40648	Blank																						
3	DH-11	40648																							
5	EH-204	40648																							
5	DH-2	40648																							
5	DH-1	40648																							
1	DH-76	40648																							
1	APSD-16	40648																							
1	DH-29	40648																							
1	APSD-2	40648																							
1	DH-49	40648																							
1	DH-47	40648																							
1	SDMW-1	40648																							
1	SDMW-1	40648	Field Duplicate																						
1	SDMW-4	40648																							
	DI BLANK	40648	Blank																						
	RINSATE	40648	Blank																						
1	SDMW-5	40648																							
1	DH-19R	40648																							
1	DH-74	40651																							
1	DH-75	40651																							
1	DH-55	40651			0.2	***0.075***	***0.76***	0.1 U	0.001 U	0.001 U	0.001	0.001 U	0.011	0.01 U	0.22	0.005 U	0.2	0.001 U	0.01 U	***0.182***	0.005 U	0.1 U	***0.01***	0.02	0.02
1	DH-56	40651			0.7	***0.077***	***4.24***	0.1 U	0.001 U	0.001 U	0.002	0.001 U	0.008	0.01 U	0.48	0.005 U	0.01	0.001 U	0.01 U	***0.823***	0.005 U	0.1 U	0.001 U	0.01	0.01 U
	RINSATE	40651	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-14	40651			7	0.003 U	0.003	0.1	0.001 U	0.001 U	0.03	0.005	0.023	0.01 U	5.57	0.011	0.69	0.001 U	0.03	0.001 U	0.005 U	0.2 U	0.001 U	0.01	0.03
	DI BLANK	40651	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-4	40651			0.1 U	0.003 U	***1.42***	0.1 U	0.001 U	0.001 U	0.002	0.001 U	0.001 U	0.01 U	8.69	0.005 U	3.14	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01	0.01 U
1	DH-4	40651	Field Duplicate		0.1 U	0.003 U	***1.42***	0.1 U	0.001 U	0.001 U	0.002	0.001 U	0.001 U	0.01 U	8.41	0.005 U	3.13	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01	0.01 U
1	DH-62	40651			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02	0.005 U	0.01 U	0.001 U	0.01 U	***0.193***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-58	40651			0.5	***0.087***	***1.79***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003 UJ	0.01 U	0.35	0.005 U	0.07	0.001 U	0.01 U	0.028	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-8	40651																							
1	SDMW-3	40651																							
5	DH-20	40651																							
1	DH-17	40651			41.3	0.004	***46.7***	0.6	**0.008**	**0.011**	0.022	0.019	0.38	0.01 U	34.1	0.255	2.07	0.001 U	0.03	0.003	0.005 U	0.2 U	***0.003***	0.06	9.09
1	DH-18	40651			0.2	**0.009**	***0.017***	0.1 U	0.001 U	0.004	0.001 U	0.001 U	0.061	0.01 U	0.25	0.222	0.02	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.03
1	DH-18	40651	Field Duplicate		0.2	**0.01**	***0.016***	0.1 U	0.001 U	0.004	0.001 U	0.001 U	0.06	0.01 U	0.26	0.227	0.02	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.03
	DI BLANK	40651	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40651	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-140	40661																							
offsite	EH-142	40661																							
offsite	EH-143	40661																							
offsite	EH-141	40661																							
offsite	EH-212	40661																							
offsite	EH-211	40661																							
	DI BLANK	40661	Blank																						
	RINSATE	40661	Blank																						
	EH-141	40661	Field Duplicate																						
offsite	Pele Park #1	40662			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.007	0.01 U	0.46	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01
offsite	Pele Park #2	40662			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005	0.01 U	1.86	0.005 U	0.01	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.09
offsite	2540 Wylie	40662			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.008	0.01 U	0.11	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01 U	0.03
offsite	690 Smelter Rd Yard	40662			0.1 U	0.003 U	***0.014***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.019	0.01 U	0.09	0.005 U	0.01 U	0.001 U	0.01 U	0.001	0.005 U	0.1 U	0.001 U	0.01 U	0.03
offsite	EHPW-3	40662			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EHC-1	40662			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40662	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	2540 Wylie	40662	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.009	0.01 U	0.11	0.005 U	0.01 U	0.001 U	0.01 U	0.003	0.005 U	0.1 U	0.001 U	0.01 U	0.03
offsite	2515 Canyon Ferry Rd	40665			0.1 U	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005	0.01 U	0.15	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.02
offsite	2525 Canyon Ferry Rd	40665			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.008	0.01 U	0.05	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.02
offsite	2605 Canyon Ferry Rd	40665			0.1 U	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.08	0.005 U	0.01 U	0.001 U	0.01 U	0.004	0.005 U	0.1 U	0.001 U	0.01 U	0.02
offsite	2843 Canyon Ferry Rd	40665			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.02	0.01 U	0.13	0.005 U	0.01 U	0.001 U	0.01 U	0.037	0.005 U	0.1 U	0.001 U	0.01 U	0.01
offsite	2853 Canyon Ferry Rd	40665			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.03	0.005 U	0.01 U	0.001 U	0.01 U	0.029	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	2853 Canyon Ferry Rd	40665	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.04	0.005 U	0.01 U	0.001 U	0.01 U	0.03	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	401 Gail - S	40665			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.006	0.01 U	0.23	0.005 U	0.01 U	0.001 U	0.01 U	0.016	0.005 U	0.1 U	0.001 U	0.01 U	0.04
	RINSATE	40665	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	2685 Tuohy Rd	40666			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.3	0.005 U	0.01 U	0.001 U	0.01 U	0.001	0.005 U	0.1 U	0.001 U	0.01 U	0.01

APPENDIX B4.

Groundwater Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

				MCL	na	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	na	1.30E+00	na	na	1.50E-02	na	2.00E-03	na	5.00E-02	na	na	2.00E-03	na	na
				Tapwater	*3.70E+01*	*1.50E-02*	*4.50E-05*	*7.30E+00*	*7.30E-02*	*1.80E-02*	*4.30E-05*	*1.10E-02*	*1.50E+00*	*na*	*2.60E+01*	*na*	*8.80E-01*	*1.10E-02*	*7.30E-01*	*1.80E-01*	*1.80E-01*	*na*	*3.70E-04*	*1.80E-01*	*1.10E+01*
				site-specific SLV	5.00E-02	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	1.10E-02	1.30E+00	na	2.60E+01	1.50E-02	5.00E-02	2.00E-03	1.80E+00	5.00E-02	1.00E-01	na	2.00E-03	2.60E-03	5.00E+00
CMS Area	**Station Name**	**Date**	**QC Type**	**Sample Description**	**Al (Tot)**	**Sb (Tot)**	**As (Tot)**	**Ba (Tot)**	**Be (Tot)**	**Cd (Tot)**	**Cr (Tot)**	**Co (Tot)**	**Cu (Tot)**	**Au (Tot)**	**Fe (Tot)**	**Pb (Tot)**	**Mn (Tot)**	**Hg (Tot)**	**Ni (Tot)**	**Se (Tot)**	**Ag (Tot)**	**Te (Tot)**	**Tl (Tot)**	**V (Tot)**	**Zn (Tot)**
	2685 Tuohy Rd	40666	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.28	0.005 U	0.01 U	0.001 U	0.01 U	0.001	0.005 U	0.1 U	0.001 U	0.01 U	0.01
offsite	3425 Allied	40666			0.1 U	0.003 U	***0.016***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.005	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	HS&G Batch Plant	40666			0.1 U	0.003 U	0.003	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40666	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	3465 Allied	40667			0.1 U	0.003 U	0.006	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.003	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	3480 Allied	40667			0.1 U	0.003 U	0.007	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.004	0.005 U	0.1 U	0.001 U	0.01 U	0.01
offsite	3885 US Hwy 12	40667			0.1 U	0.003 U	***0.018***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001	0.01 U	0.1	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01	0.01
offsite	802 Manlove	40667			0.1 U	0.003 U	***0.018***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01	0.01 U
	802 Manlove	40667	Field Duplicate		0.1 U	0.003 U	***0.018***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01	0.01
	RINSATE	40667	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	105 Gail	40668			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.009	0.01 U	0.04	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	105 Gail	40668	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.009	0.01 U	0.03	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	2843 Canyon Ferry Rd - S	40668			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.005	0.001 U	0.002	0.01 U	2.89	0.005 U	0.06	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	401 Gail - N	40668			2.9	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.011	0.003	0.01	0.01 U	24.3	0.006	0.7	0.001 U	0.01	0.016	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	701 Manlove	40668			0.1 U	0.003 U	***0.016***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.009	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01	0.01 U
offsite	800 Manlove	40668			0.1 U	0.003 U	***0.018***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.99	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01	0.01
	RINSATE	40668	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	1 Gail	40668			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.073	0.01 U	0.31	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	3 Gail	40668			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.023	0.01 U	0.08	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	9 Gail	40669			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.09	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	126 E Clinton-H	40669			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.084	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.008	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-140	40709																							
offsite	EH-143	40709																							
offsite	EH-142	40709																							
offsite	EH-141	40709																							
offsite	EH-138	40709			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.002	0.001 U	0.001 U	0.01 U	0.03	0.005 U	0.01 U	0.001 U	0.01 U	**0.066**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40709	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-130	40709																							
offsite	EH-125	40709			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.03	0.005 U	0.01 U	0.001 U	0.01 U	**0.073**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	EH-125	40709	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.01 U	0.02	0.005 U	0.01 U	0.001 U	0.01 U	**0.074**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	DI BLANK	40709	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-70	40709																							
offsite	EH-66	40709																							
offsite	EH-121	40709																							
offsite	EH-212	40709																							
offsite	EH-211	40709																							
1	DH-10A	40709			0.1 U	***0.035***	***0.696***	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.015	0.01 U	0.03	0.005 U	0.01	0.001 U	0.01 U	**0.092**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-10A	40709	Field Duplicate		0.1 U	***0.035***	***0.693***	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.015	0.01 U	0.04	0.005 U	0.01	0.001 U	0.01 U	**0.093**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-107	40709			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.04	0.005 U	0.05	0.001 U	0.01 U	***0.19***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-65	40709			0.1 U	0.003 U	***0.323***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.04	0.005 U	3.88	0.001 U	0.01 U	0.027	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	DI BLANK	40709	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40709	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-52	40709			0.1 U	**0.014**	***0.295***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.09	0.005 U	0.01 U	0.001 U	0.01 U	0.014	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-111	40709			0.1 U	0.003 U	***3.59***	0.1 U	0.001 U	0.001 U	0.001 U	0.001	0.003	0.01 U	0.04	0.005 U	3.01	0.001 U	0.01 U	**0.085**	0.005 U	0.1 U	0.001 U	0.01	0.01 U
1	APSD-11	40710			0.1 U	0.004	***0.092***	0.1 U	0.001 U	***0.033***	0.001 U	0.001 U	0.008	0.01 U	4.15	0.005 U	1.26	0.001 U	0.01 U	**0.169**	0.005 U	0.1 U	0.002	0.01 U	0.92
5	APSD-10	40710																							
5	APSD-9	40710																							
1	APSD-16	40710																							
1	DH-4	40710			0.1 U	0.003 U	***1.23***	0.1 U	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.01 U	7.97	0.005 U	2.83	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.02	0.01 U
1	DH-4	40710	Field Duplicate		0.1 U	0.003 U	***1.23***	0.1 U	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.01 U	7.9	0.005 U	2.86	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.02	0.01 U
1	DH-14	40710			2.9	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001	0.004	0.009	0.01 U	2.77	0.008	0.66	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.02
	DI BLANK	40710	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.07	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40710	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-58	40710			0.2	***0.06***	***1.14***	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.16 UJ	0.005 U	0.02	0.001 U	0.01 U	0.046	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-42	40710			1.9	***0.018***	***4.4***	0.1 U	0.001 U	***2.7***	0.002	0.014	0.016	0.01 U	1.14	0.04	3.08	0.005 U	0.02	**0.118**	0.005 U	0.1 U	***0.01***	0.01	4.89
1	DH-29	40710																							
offsite	EH-126	40710																							
offsite	EH-120	40710			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.003	0.001 U	0.001 U	0.01 U	0.03	0.005 U	0.01 U	0.001 U	0.01 U	***0.191***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-117	40710			0.1	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.003	0.001 U	0.002	0.01 U	0.14	0.005 U	0.01 U	0.001 U	0.01 U	**0.157**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	DI BLANK	40710	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	EH-117	40710	Field Duplicate		0.1	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.004	0.001 U	0.002	0.01 U	0.13	0.005 U	0.01 U	0.001 U	0.01 U	**0.159**	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-104	40710			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001	0.001 U	0.003	0.01 U	0.15	0.005 U	0.01 U	0.001 U	0.01 U	***0.61***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40710	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
5	DH-67	40710			1.3	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.003	0.002	0.008	0.01 U	1.46	0.005 U	0.04	0.001 U	0.01 U	***1.02***	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
5	MW-4	40711																							
5	MW-1	40711																							
5	MW-5	40711																							
5	MW-9	40711																							
5	MW-8	40711																							
	DI BLANK	40711	Blank																						
	RINSATE	40711	Blank																						
5	MW-10	40711																							

APPENDIX B4.

Groundwater Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

CMS Area	Station Name	Date	QC Type	Sample Description	Al (Tot)	Sb (Tot)	As (Tot)	Ba (Tot)	Be (Tot)	Cd (Tot)	Cr (Tot)	Co (Tot)	Cu (Tot)	Au (Tot)	Fe (Tot)	Pb (Tot)	Mn (Tot)	Hg (Tot)	Ni (Tot)	Se (Tot)	Ag (Tot)	Te (Tot)	Tl (Tot)	V (Tot)	Zn (Tot)
				MCL	na	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	na	1.30E+00	na	na	1.50E-02	na	2.00E-03	na	5.00E-02	na	na	2.00E-03	na	na
				Tapwater	3.70E+01	1.50E-02	4.50E-05	7.30E+00	7.30E-02	1.80E-02	4.30E-05	1.10E-02	1.50E+00	na	2.60E+01	na	8.80E-01	1.10E-02	7.30E-01	1.80E-01	1.80E-01	na	3.70E-04	1.80E-01	1.10E+01
				site-specific SLV	5.00E-02	6.00E-03	1.00E-02	2.00E+00	4.00E-03	5.00E-03	1.00E-01	1.10E-02	1.30E+00	na	2.60E+01	1.50E-02	5.00E-02	2.00E-03	1.80E+00	5.00E-02	1.00E-01	na	2.00E-03	2.60E-03	5.00E+00
1	MW-3	40711																							
1	MW-3	40711	Field Duplicate																						
5	MW-2	40711																							
5	MW-7	40711																							
5	MW-11	40711																							
5	MW-6	40711																							
offsite	EH-102	40711			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 UJ	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.052	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-101	40711			0.2	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 UJ	0.01 UJ	0.16 UJ	0.005 U	0.01 U	0.001 UJ	0.01 U	0.12	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-51	40711			0.1 U	0.004	0.412	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003 UJ	0.01 UJ	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	0.176	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-103	40711			0.3	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 UJ	0.01 UJ	0.29 UJ	0.005 U	0.4	0.001 UJ	0.01 U	0.149	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-61	40711			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 UJ	0.01 UJ	0.02 U	0.005 U	2.45	0.001 UJ	0.01 U	0.132	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40711	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.006	0.001 U	0.002	0.01 U	0.07	0.005 U	0.01 U	0.001 UJ	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	EH-100	40711			0.1 U	0.003 U	9.91	0.1 U	0.001 U	0.002	0.001 U	0.001 U	0.005 UJ	0.01 UJ	0.04 UJ	0.005 U	5.22	0.001 UJ	0.01	0.008	0.005 U	0.1 U	0.001 U	0.02	0.28
	DI BLANK	40711	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 UJ	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	EH-100	40711	Field Duplicate		0.1 U	0.003 U	9.99	0.1 U	0.001 U	0.002	0.002 UJ	0.001 U	0.006	0.01 UJ	0.06 UJ	0.005 U	5.2	0.001 UJ	0.02	0.008	0.005 U	0.1 U	0.001 U	0.02	0.28
1	DH-15	40714			0.1 J	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.014	0.01 UJ	0.1 J	0.005 U	0.01 U	0.001 U	0.01 U	0.334	0.005 U	0.1 U	0.001 U	0.01 U	0.01 UJ
1	DH-15	40714	Field Duplicate		0.3 J	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001	0.001 U	0.013	0.03 UJ	0.33 J	0.005 U	0.01	0.001 UJ	0.01 U	0.352	0.005 U	0.1 U	0.001 U	0.01 U	0.04
1	DH-6	40714			0.1 J	0.07	2.07	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.008 UJ	0.01 UJ	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	0.565	0.005 U	0.1 U	0.001 U	0.01 U	0.01 UJ
offsite	EH-50	40714			0.1 J	0.003 U	0.339	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 UJ	0.01 UJ	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	0.137	0.005 U	0.1 U	0.001 U	0.01 U	0.01 UJ
offsite	EH-60	40714			0.1 J	0.003 U	8.58	0.1 U	0.001 U	0.001 U	0.001 U	0.004	0.003 UJ	0.01 UJ	0.08 J	0.005 U	6.85	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 UJ
1	DH-55	40714			0.4 J	0.055	0.421	0.1 U	0.001 U	0.001 U	0.002	0.001	0.009 UJ	0.01 UJ	0.56 J	0.005 U	0.34	0.001 UJ	0.01 U	0.343	0.005 U	0.1 U	0.013	0.01	0.03 J
1	DH-56	40714			10.5	0.037	2.49	0.2	0.001 U	0.001 U	0.028	0.004	0.06	0.01 UJ	15.3	0.011	0.28	0.001 U	0.01 U	2.06	0.008	0.1	0.001 U	0.02	0.08 J
1	DH-13	40714			0.1 UJ	0.003 U	18.5	0.1 U	0.001 U	0.002	0.001 U	0.009	0.025	0.01 UJ	6.37	0.042	2.68	0.001 UJ	0.01 U	0.002	0.005 U	0.1 U	0.021	0.01 U	0.89
1	DH-12	40714			0.2 J	0.008	1.94	0.1 U	0.001 U	0.203	0.001 U	0.021	0.098	0.01 UJ	2.95	0.119	9.94	0.001 UJ	0.02	0.016	0.005 U	0.1 U	0.002	0.01 U	1.36
1	DH-18	40714			7.5	0.427	0.449	0.1 U	0.002	0.155	0.013	0.006	3.28	0.01 UJ	8.52	9.88	0.11	0.001 UJ	0.02	0.011	0.154	0.1	0.012	0.02	1.1
	RINSATE	40714	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	DI BLANK	40714	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-62	40714			0.4	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001	0.001 U	0.001	0.01 UJ	0.36	0.005 U	0.01	0.001 UJ	0.01 U	0.17	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-66	40714			0.4	0.003 U	0.002 U	0.1 U	0.001 U	0.307	0.002	0.005	0.005	0.01 UJ	0.41	0.005 U	0.01	0.002	0.01	0.982	0.005 U	0.1 U	0.001 U	0.01 U	0.17
1	DH-66	40714	Field Duplicate		0.4	0.003 U	0.002 U	0.1 U	0.001 U	0.314	0.002	0.005	0.006	0.01 UJ	0.44	0.005 U	0.01	0.002	0.01	1.02	0.005 U	0.1 U	0.001 U	0.01 U	0.17
1	DH-33	40714			0.2	0.006	105	0.1 U	0.001 U	0.01	0.001 U	0.003	0.017	0.01 UJ	0.96	0.014	0.08	0.001 UJ	0.01 U	0.109	0.005 U	0.1 U	0.001 U	0.01 U	0.18
1	DH-30	40714			0.1 U	0.08	17.4	0.1 U	0.001 U	0.289	0.001 U	0.002	0.001 U	0.01 UJ	1.5	0.005 U	2.19	0.001 U	0.01 U	0.262	0.005 U	0.1 U	0.027	0.02	0.29
1	DH-64	40714			0.1 U	0.003 U	30.8	0.1 U	0.001 U	0.006	0.001 U	0.001	0.003	0.01 UJ	0.48	0.005 U	1.18	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.12
1	DH-24	40714			0.1	0.003 U	16.8	0.1 U	0.002	0.039	0.001 U	0.008	0.011	0.01 UJ	1.86	0.005 U	3.23	0.001 U	0.01 U	0.003	0.005 U	0.1 U	0.001 U	0.01 U	0.62
	DI BLANK	40714	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	RINSATE	40714	Blank		0.1 U	0.003 U	0.007	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
1	DH-16	40714			7.3	0.003 U	0.139	0.1	0.001 U	0.001	0.005	0.009	0.032	0.01 UJ	7.08	0.03	0.61	0.001 UJ	0.01	0.051	0.005 U	0.1 U	0.001 U	0.01	0.09
1	DH-17	40714			0.1 U	0.003 U	37.8	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	0.01 UJ	0.25	0.005 U	0.46	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.06
offsite	303 Thurman	40715			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.007	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.012	0.005 U	0.1 U	0.001 U	0.01 U	0.02
offsite	109 Gail	40715			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.006	0.01 U	0.13	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	3475 Allied	40715			0.1 U	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	3475 Allied	40715	Field Duplicate		0.1 U	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	2540 Wylie	40715			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.18	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01 U	0.03
offsite	2843 Canyon Ferry Rd	40715			0.1 U	0.003 U	0.002 U	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.009	0.01 U	0.27	0.005 U	0.01 U	0.001 U	0.01 U	0.039	0.005 U	0.1 U	0.001 U	0.01 U	0.01
	Field Blank	40715	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	Pele Park #1	40716			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.02 UJ	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	Pele Park #2	40716			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.09 J	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	Pele Park #2	40716	Field Duplicate		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.01 U	0.14 J	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	2685 Tuohy Rd	40716			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.03 J	0.005 U	0.01 U	0.001 U	0.01 U	0.002	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
	Field Blank	40716	Blank		0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.02 U	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	2605 Canyon Ferry Rd	40716			0.1 U	0.003 U	0.002	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.01 U	0.06 J	0.005 U	0.01 U	0.001 U	0.01 U	0.004	0.005 U	0.1 U	0.001 U	0.01 U	0.01
offsite	203 Gail	40724			0.1 U	0.003 U	0.002 U	0.1 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004	0.01 U	0.38	0.005 U	0.01 U	0.001 U	0.01 U	0.001 U	0.005 U	0.1 U	0.001 U	0.01 U	0.01 U
offsite	3400 Tizer Dr	40724					0.002 U													0.003					
offsite	3155 Baldy	40724					0.002 U													0.001 U					
	3155 Baldy	40724	Field Duplicate				0.002 U													0.001 U					
offsite	3120 Baldy	40724					0.002 U													0.001 U					
offsite	3165 Baldy	40724					0.002 U													0.001 U					
	Field Blank	40724	Blank				0.002 U													0.001 U					
offsite	2853 Canyon Ferry	40725					0.002 U													0.033					
offsite	3160 Baldy	40725					0.002 U													0.001 U					
	3160 Baldy	40725	Field Duplicate				0.002 U													0.001 U					
offsite	3173 Baldy	40725					0.002 U													0.001 U					
offsite	3302 Baldy	40725					0.002 U													0.001 U					
	Field Blank	40725	Blank				0.002 U													0.001 U					
offsite	2715 Tuohy	40725					0.002 U													0.001 U					
offsite	3155 Tizer Dr	40725					0.002 U													0.001 U					

APPENDIX B4.

Groundwater Results (mg/L)

Screening Level Human Health Risk Assessment, East Helena Facility

				MCL	na		6.00E-03		1.00E-02		2.00E+00		4.00E-03		5.00E-03		1.00E-01		na		1.30E+00		na		na		1.50E-02		na		2.00E-03		na		5.00E-02		na		na		2.00E-03		na		na
				Tapwater	*3.70E+01*		*1.50E-02*		*4.50E-05*		*7.30E+00*		*7.30E-02*		*1.80E-02*		*4.30E-05*		*1.10E-02*		*1.50E+00*		*na*		*2.60E+01*		*na*		*8.80E-01*		*1.10E-02*		*7.30E-01*		**1.80E-01**		**1.80E-01**		**na**		**3.70E-04**		**1.80E-01**		**1.10E+01**
				site-specific SLV	5.00E-02		6.00E-03		1.00E-02		2.00E+00		4.00E-03		5.00E-03		1.00E-01		1.10E-02		1.30E+00		na		2.60E+01		1.50E-02		5.00E-02		2.00E-03		1.80E+00		5.00E-02		1.00E-01		na		2.00E-03		2.60E-03		5.00E+00
CMS Area	**Station Name**	**Date**	**QC Type**	**Sample Description**	**Al (Tot)**		**Sb (Tot)**		**As (Tot)**		**Ba (Tot)**		**Be (Tot)**		**Cd (Tot)**		**Cr (Tot)**		**Co (Tot)**		**Cu (Tot)**		**Au (Tot)**		**Fe (Tot)**		**Pb (Tot)**		**Mn (Tot)**		**Hg (Tot)**		**Ni (Tot)**		**Se (Tot)**		**Ag (Tot)**		**Te (Tot)**		**Tl (Tot)**		**V (Tot)**		**Zn (Tot)**
offsite	3175 Tizer Dr	40725							0.002	U																									0.002										
offsite	3126 Tizer Dr	40729							0.002	U																									0.001	U									
offsite	3250 Tizer Dr	40729							0.002	U																									0.001	U									
	3250 Tizer Dr	40729	Field Duplicate						0.002	U																									0.001	U									
offsite	3210 Tizer Dr	40729							0.002	U																									0.001										
offsite	2750 Tuohy	40729							0.002	U																									0.001	U									
	Field Blank	40729	Blank						0.002	U																									0.001	U									
offsite	2720 Tuohy	40729							0.002	U																									0.001	U									
offsite	3235 Tizer Dr	40729							0.002	U																									0.001	U									
offsite	3345 Baldy	40729							0.002	U																									0.001	U									
offsite	3235 Baldy - H	40730							0.002	U																									0.001	U									
offsite	3268 Ocean View	40730							0.002	U																									0.001										
offsite	3290 Tizer Dr -H	40730							0.002	U																									0.001	U									
	3290 Tizer Dr -H	40730	Field Duplicate						0.002	U																									0.001	U									
offsite	3362 Tizer Dr - H	40730							0.002	U																									0.001										
offsite	3470 Tizer Dr	40730							0.002	U																									0.001	U									
offsite	3490 Tizer Dr	40730							0.002	U																									0.001	U									
offsite	2903 Howard - I	40730							0.002	U																									0.001	U									
offsite	2903 Howard - H	40730							0.002	U																									0.002										
offsite	3512 Wylie	40730							0.002	U																									0.001	U									
	Field Blank	40730	Blank						0.002	U																									0.001	U									
offsite	2690 York -H	40731							0.002	U																									0.001	U									
offsite	2690 York - I	40731							0.002	U																									0.001										
offsite	2690 Matyas	40731							0.002	U																									0.003										
	2690 Matyas	40731	Field Duplicate						0.002	U																									0.003										
offsite	2755 Country	40731							0.002	U																									0.005										
offsite	3390 Baldy	40731							0.002	U																									0.006										
offsite	2765 Howard	40731							0.002	U																									0.01										
	Field Blank	40731	Blank						0.002	U																									0.001	U									
offsite	3468 Wylie	40731							0.002	U																									0.001	U									
offsite	2992 Herrin - 2	40738							0.002	U																									0.001	U									
offsite	2992 Herrin - 1	40738							0.002	U																									0.001	U									
offsite	2830 Howard	40738							0.002	U																									0.005										
offsite	3518 Bar H	40738							0.002	U																									0.005										
	3518 Bar H	40738	Field Duplicate						0.002	U																									0.005										
offsite	2665 York	40738							0.006																										0.001	U									
offsite	2640 Old York - H	40738							0.005																										0.002										
offsite	2806 Festival - 1	40738							0.002	U																									0.001	U									
offsite	2806 Festival - 2	40738							0.002	U																									0.003										
	Field Blank	40738	Blank						0.002	U																									0.001	U									
offsite	2865 Canyon Ferry	40743							0.002	U																									0.001	U									
	2865 Canyon Ferry	40743	Field Duplicate						0.002	U																									0.001	U									
offsite	3320 Wylie - H	40743							0.002	U																									0.001	U									
offsite	3320 Baldy	40743							0.002	U																									0.001	U									
offsite	3365 Baldy	40743							0.002	U																									0.004										
	Field Blank	40743	Blank						0.002	U																									0.001	U									
offsite	3305 Tizer Dr	40752							0.002	U																									0.001										
offsite	3362 Tizer Dr - I1	40752							0.002	U																									0.003										
offsite	3362 Tizer Dr - I2	40752							0.003																										0.001	U									
offsite	3290 Rogan Rd	40752							0.002	U																									0.001										
	3290 Rogan Rd	40752	Field Duplicate						0.002	U																									0.001										
offsite	3605 Tizer Dr - I	40752							0.002	U																									0.002										
offsite	3553 Tizer Dr	40752							0.002	U																									0.001	U									
	Field Blank	40752	Blank						0.002	U																									0.001	U									

Appendix C
Work Plan Addendum

Final Sampling and Analysis Plan

East Helena Facility Supplemental RFI Sampling and Analysis Plan

Prepared for

The Montana Environmental Trust Group, LLC

Trustee of the Montana Environmental Custodial Trust

October 2015

ch2m

7 West 6th Avenue Suite 519
Helena, Montana 59601

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Acronyms and Abbreviations

AOC	Area of Contamination
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	Corrective Measures Study
COC	constituent of concern
COEH	City of East Helena
COPC	constituent of potential concern
CSM	conceptual site model
DU	Decision Unit
FD	field duplicate
FTL	field team leader
GPS	global positioning system
Hwy	Highway
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
IDW	investigation-derived waste
IM	interim measure
ISM	Incremental Sampling Methodology
ITRC	Interstate Technology and Regulatory Council
MDEQ	Montana Department of Environmental Quality
mg/kg	milligrams per kilogram
mm	millimeter
MSMSD	matrix spike/matrix spike duplicate
OU	Operable Unit
PPC	Prickly Pear Creek
PPE	personal protective equipment
PTS	Pioneer Technical Services, Inc.
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROD	Record of Decision
SAP	sampling and analysis plan
SOP	standard operating procedure
SPHC	South Plant Hydraulic Control

USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency

SECTION 1

Introduction

The purpose of this sampling and analysis plan (SAP) is to provide information to support U.S. Environmental Protection Agency (USEPA) approval of the objectives, approach, and quality assurance (QA) measures proposed to complete sampling of the East Helena Facility in compliance with Paragraphs 37 and 38 of the First Modification to the 1998 Resource Conservation and Recovery Act (RCRA) Consent Decree (First Modification; Dreher et al., 2012). The East Helena Facility includes 20 former ASARCO parcels shown in Exhibit 3 of the First Modification and in **Figure 1-1**.

1.1 Objectives

Paragraph 37 of the First Modification requires that all former ASARCO properties be addressed in the Corrective Measures Study (CMS). However, different objectives are prescribed to different parcels based on the distinctions made in Paragraph 38 of the First Modification and associated errata page provided in Appendix A, as follows:

- The objective at Parcels 10, 11, 12, 15, 16, 17, 18, 19, 23, the portion of 8 located west of State Highway (Hwy) 518, and portions of 2 near Prickly Pear Creek (PPC) is to identify the nature and extent of constituents of concern (COCs), and the current conditions and risk sufficient to support CMS evaluations. These properties are referred to as CMS Parcels for the remainder of this document.
- The objective for remaining parcels will be to document that the East Helena Superfund Site Operable Unit 2 (OU-2) Record of Decision (ROD) (USEPA, 2009) final corrective measures are still appropriate. According to the OU-2 ROD, these parcels will be evaluated whenever a change in land use is proposed and, if necessary, cleaned up to appropriate levels for the proposed use. These properties are referred to as Undeveloped Lands for the remainder of this document.

Figure 1-1 shows the location and sampling objective for each parcel.

1.2 Property Descriptions

Descriptions of the former ASARCO properties included in the First Modification (Dreher et al., 2012), OU-2 ROD (USEPA, 2009), and *Former ASARCO East Helena Facility Corrective Measures Study Work Plan 2013* (CMS Work Plan) (CH2M HILL, 2014) are summarized in Sections 1.2.1 and 1.2.2.

1.2.1 Corrective Measures Study Parcels

For remedy identification and evaluation purposes, the CMS Parcels have been grouped based on the current and reasonably anticipated future land use as shown in **Figure 1-2**. Approaches to selecting reasonably anticipated land uses are influenced by market studies, planning, and zoning by the City of East Helena. On the basis of evaluations conducted to date, the parcels have been grouped as follows:

- Portions of Parcel 2 along PPC (referred to as Parcel 2a): This parcel includes the 100-year floodplain along the PPC riparian corridor. It will be evaluated for recreational land use.
- Parcels 10, 11, 12, 23, and the portion of Parcel 8 west of Hwy 518 (8W): Parcels 8W, 10, 11, and 12 are undergoing RCRA Corrective Action as part of the South Plant Hydraulic Control (SPHC) Interim Measure (IM). As such, final exposure surfaces on these parcels are anticipated to meet the proposed cleanup levels described in Section 5.5 of the draft *Former ASARCO East Helena Facility Interim Measures Work Plan—2015 and 2016* (draft IM Work Plan 2015 and 2016) (CH2M HILL, 2015). Additionally, as a result of significant regrading and earthwork conducted to create the new ground surface, sampling is not being proposed because it will not be representative of site conditions after the PPC Realignment is complete. No further evaluation will be conducted at Parcels 10, 11, and 12. Parcel 23 will be further evaluated for recreational land use.

- Parcel 15: A portion of this parcel is included within the approved Area of Contamination (AOC) boundary which is being addressed as part of IM implementation at the former East Helena Facility (Facility). In addition, the former City of East Helena (COEH) landfill is located within Parcel 15. No evaluation will be conducted within the AOC (except in one area located near the Rodeo Grounds), within the footprint of the former COEH landfill, or any portion anticipated to be disturbed during IM implementation. The remainder of the parcel will be further evaluated for agricultural use.
- Parcels 16 and 19: These Facility parcels are the site of ASARCO's now-demolished lead smelter and other historical industrial and manufacturing operations. The parcels have been the focus of the RCRA Corrective Action work completed to date and proposed as described in the draft IM Work Plan 2015 and 2016 (CH2M HILL, 2015). Because corrective actions are underway, these parcels will not be evaluated further in this SAP.
- Parcels 17 and 18: Parcel 17 is a part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) residential soil repository that has been remediated and capped, and therefore requires no further sampling. Parcel 18 will be disturbed as part of the SPHC IM (PPC Realignment) and significant regrading and earthwork will be conducted to create a new ground surface. Sampling is not being proposed because it will not be representative of site conditions after the PPC Realignment is complete.

1.2.2 Undeveloped Lands

The Undeveloped Lands consist of Parcels 2, 3, 4, 6, 7, 9, 13, 14, 21, 22, and the portion of 8 east of Hwy 518 (8E). These parcels are described in the OU-2 ROD as Lamping Fields, Dartman Parcel, and the East Fields. The parcels within each area are grouped by their OU-2 designation and anticipated future use (**Figure 1-2**):

- Lamping Fields: This area encompasses the portion of Parcel 2 south of PPC, and Parcels 3 and 22. This area has been sampled by the USEPA as described further in Section 2.2.1.
- Dartman Parcel: This area encompasses the portion of Parcel 2 north of PPC, and Parcels 4 and 6. This area has been sampled by the USEPA as described further in Section 2.2.2.
- East Fields: This area encompasses Parcels 7, 8E, 9, 13, and 14. Parcel 9 is a part of the CERCLA residential soil repository that is still active as part of the East Helena soil ordinance; as such, no evaluation is proposed in Parcel 9. Limited data exist for the remaining parcels in the East Fields, as discussed in Section 2.2.3. Additional sampling is recommended to evaluate whether the existing remedy remains appropriate, as discussed in Section 4.
- Parcel 21 extends south of Parcel 15 just west of S. Smelter Road and has a similar land use. As such, this parcel is evaluated in conjunction with Parcel 15 for the remainder of this SAP. No change in land use is anticipated (**Figure 1-2**). As no samples have been collected in this parcel, additional sampling is recommended to evaluate whether the existing remedy remains appropriate, as discussed in Section 4.

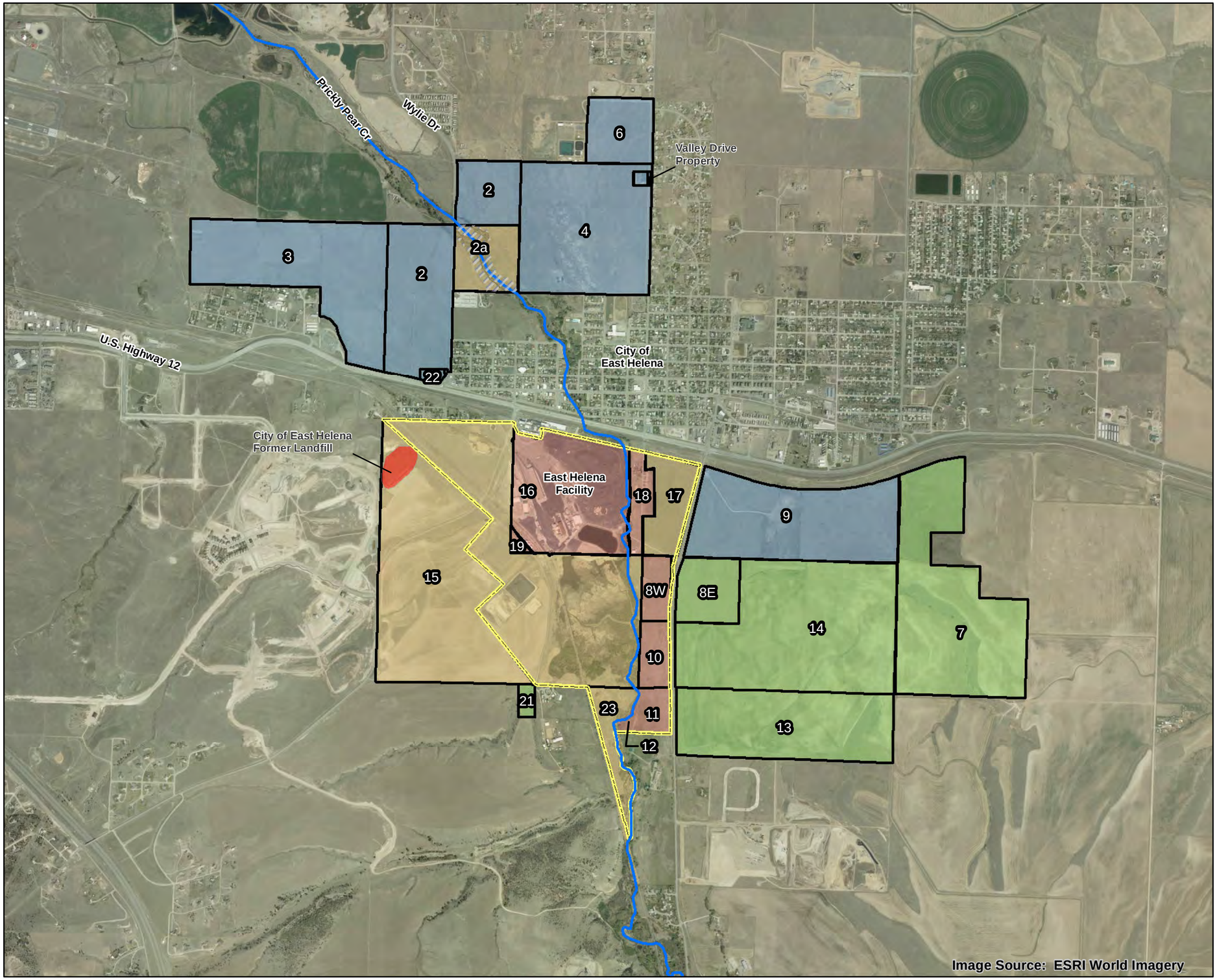
1.3 Sampling and Analysis Plan Summary

The Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust (Custodial Trust), is submitting this SAP in compliance with the First Modification (Dreher et al., 2012). Prior to the development of the sampling approach and recommendations, information presented in the OU-2 ROD (USEPA, 2009), *Third Five-Year Report for the East Helena Superfund Site* (USEPA, 2011), and draft IM Work Plan 2015 and 2016 (CH2M HILL, 2015) were evaluated. Available data were compiled and compared to the respective property objective and anticipated future land use. Consistent with the Conceptual Site Models presented in Section 2, this SAP is prepared to address only surface soil (and sediment within Parcels 2a and 23). Groundwater contamination attributable to the former Smelter site is being addressed by ongoing IM implementation as described in the draft IM Work Plan 2015 and 2016.

1.4 Document Organization

The SAP is organized into the following sections:

- **Section 1: Introduction**.
- **Section 2: Updated Conceptual Site Models** compiles the available data and summarizes the results of the evaluation of those data against the most recent conceptual site models (CSMs).
- **Section 3: Overview of Sampling Approach** describes the rationale for the proposed sample locations, field and laboratory methods, QA Plan, and data evaluation.
- **Section 4: Field Sampling Plan** presents the methodology to be employed by field personnel to implement this SAP.
- **Section 5: Quality Assurance Plan** summarizes the QA and quality control (QC) requirements needed to meet objectives.
- **Section 6: Project Management and Schedule** provides an overview of project management activities and the proposed schedule for implementation.
- **Section 7: References** contains a bibliography of documents cited in text.
- **The appendixes** contain the errata page to the First Modification (**Appendix A**), standard operating procedures (SOPs) for the SAP (**Appendix B**), coordinates for each increment sample location (**Appendix C**), and the Quality Assurance Project Plan (**Appendix D**).



LEGEND

- Parcel Boundary
- CMS Parcel Undergoing Corrective Action
- CMS Parcel Addressed in SAP
- Undeveloped Land Addressed in SAP
- Undeveloped Lands - No Further Sampling
- City of East Helena Former Landfill
- Area of Contamination Boundary
- 100-year Floodplain (approx.)
- Prickly Pear Creek

Notes:
CMS = Corrective Measures Study
SAP = Sampling and Analysis Plan

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Figure 1-1
Overview of Parcels and Sampling Objectives
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

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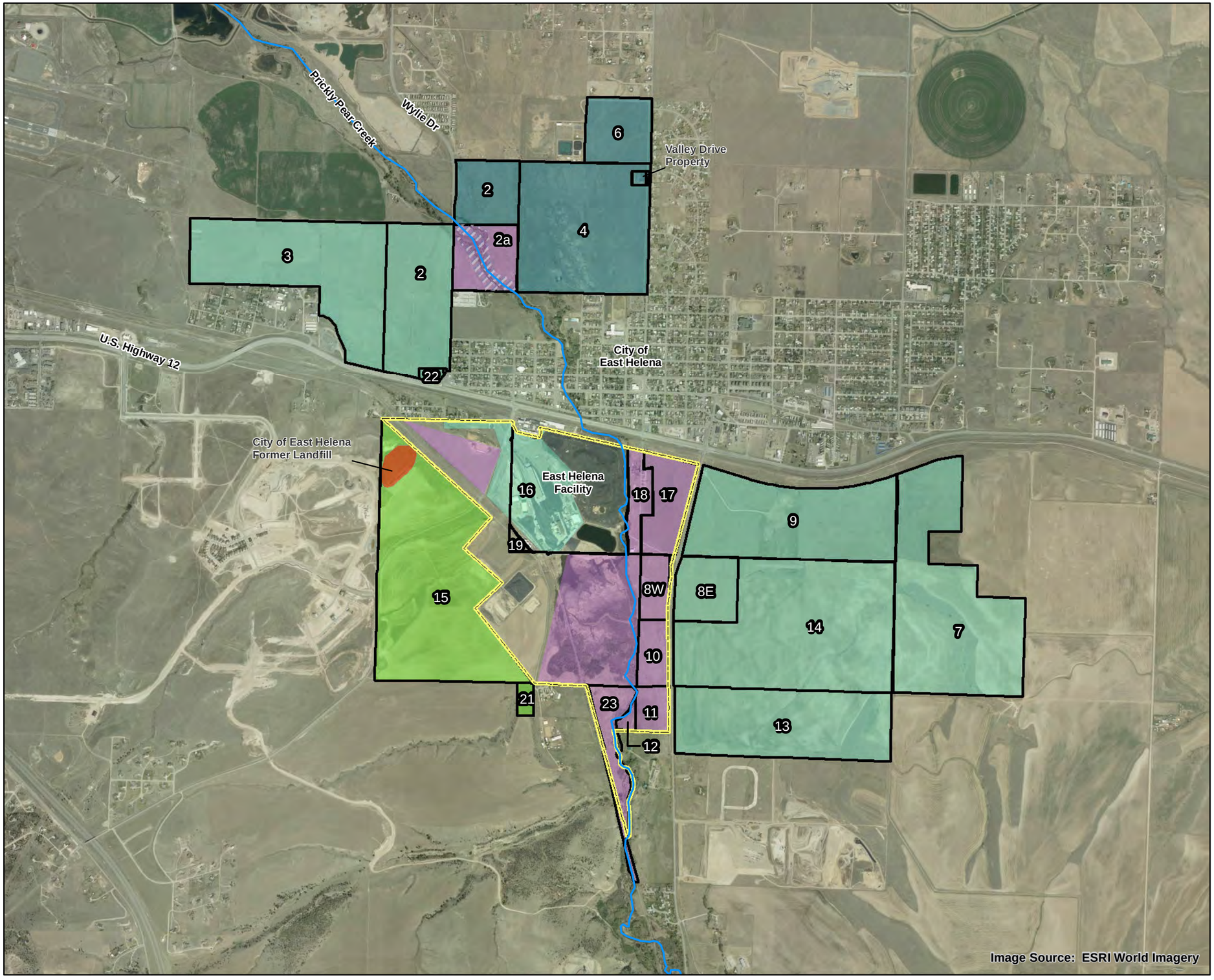

LEGEND

- Prickly Pear Creek
- 100-year Floodplain (approx.)
- Area of Contamination Boundary
- Parcel Boundary
- Agricultural
- Industrial/Commercial
- Recreational
- Residential/Civic
- City of East Helena Former Landfill

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Figure 1-2
Reasonably Anticipated Land Use
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

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SECTION 2

Updated Conceptual Site Models

The CSM presents an understanding of site conditions based on existing information regarding the potential sources of COCs to surface soil, their migration pathways, current and anticipated future land uses, and receptor exposure potential. The CSM is then used to identify data needs and develop a soil sampling approach. The CMS Work Plan 2013 (CH2M HILL, 2014) and OU-2 ROD (USEPA, 2009) provide summaries of the CSMs and final decisions for the CMS Parcels and Undeveloped Lands, respectively.

Several components of the CSM for the CMS Parcels and Undeveloped Lands are common to all properties, as follows:

- In general, the former ASARCO Smelter (former Smelter site) is the primary historical and current source of COCs to the properties.
- The primary transport mechanism to these parcels is windblown stack emissions and fugitive dust from the former Smelter site. Available long-term wind roses for the Helena, Montana, area indicate that the predominant wind direction during the operational period of the former Smelter was from the west (**Figure 2-1**).
- The potential physical transport of slag (larger than dust-sized particles) is likely to have occurred only onto adjacent properties because the slag is a dense material. However, the properties adjacent to the former Smelter site that are undergoing RCRA Corrective Action (PPC Realignment) or are a part of the AOC do not require investigation.
- The primary COCs are lead and arsenic based on information developed in the baseline risk assessment and other studies conducted by USEPA and the Agency for Toxic Substances and Disease Registry (ATSDR) (USEPA, 2009, 2011; ATSDR, 2008). Although, other inorganic constituents have been detected in soil at concentrations higher than risk-based screening levels in some locations, the elevated concentrations are co-located with elevated lead and arsenic concentrations in soil. Consistent with the conclusion in the OU-2 ROD stating that once areas are cleaned up to address lead and arsenic, risks from other constituents of potential concern (COPCs) are further minimized (USEPA, 2009), the majority of the samples will be characterized for lead and arsenic only. However, to evaluate the relative concentrations of all COPCs in surface soil, 15 percent of samples will also be analyzed for the COPC list of metals described in the *Phase II RCRA Facility Investigation, East Helena Facility* (Phase II RFI; GSI Water Solutions, Inc., 2014): antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, silver, thallium, vanadium, and zinc.
- Within the parcels, COCs are likely redistributed through tillage in agricultural lands. As described in the OU-2 ROD, soil sampling conducted on several hundred acres of agricultural and undeveloped land around East Helena reveals fairly uniform and predictable lead concentrations (USEPA, 2009).

2.1 Corrective Measures Study Parcels

Available data were evaluated in accordance with Paragraph 10 of the First Modification, which indicates that the Custodial Trust agrees to "… determine the full nature and extent of any and all releases of hazardous wastes and/or hazardous constituents at or from ASARCO properties." The parcel CSMs and associated updates based on evaluation of the available data are summarized in the following subsections.

2.1.1 Portion of Parcel 2 Along Prickly Pear Creek

This portion of Parcel 2 (Parcel 2a) is considered a riparian habitat adjacent to PPC. This includes the area within the 100-year floodplain boundary, as shown in **Figure 2-2**. Current and potential future land uses and a summary of existing sampling and analytical data in soil are presented in **Table 2-1**.

TABLE 2-1
Portion of Parcel 2 Along Prickly Pear Creek Conceptual Site Model Information
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel	Land Use	Reasonably Anticipated Future Land Use	Parcel Size (Acre)	Existing Samples	Concentration Ranges (milligrams per kilogram)			
					Lead		Arsenic	
					Min	Max	Min	Max
2a	Prickly Pear Creek habitat	recreation, open space, habitat	40	15	23.5	2,354	5	330

Historical ASARCO operations may have affected surface soil in this area through airborne particulate deposition. In addition, particulate transport by flowing water and bank scour in PPC has the potential to carry contaminants within the channel and onto the creek banks during flooding events. As noted by Pioneer Technical Services, Inc. (PTS), slag material constituted approximately 10 percent of the gravel measured in PPC during a 2014 survey of the creek bed (PTS, 2014). However, the slag pieces are noted as typically around 1 inch in diameter or larger. This size fraction is not included in soil or sediment samples, which represent the smaller-grained (less than 2-millimeter [mm]) particle size. The survey completed by PTS in 2014 is considered sufficient to characterize slag along PPC within this parcel and therefore no additional evaluation of slag material is required. Slag material will not be evaluated as part of this SAP.

Surface soil sampling data were collected throughout this parcel as part of the Phase II RFI (GSI Water Solutions, Inc., 2014) and the CERCLA OU-2 residential sampling program. The range of lead and arsenic surface soil concentrations detected in Parcel 2a falls within the concentration range detected throughout the adjoining Parcels 2, 3, and 22. However, there is a lower density of surface soil samples evaluating the lateral extent in Parcel 2a, compared with Parcels 2, 3, and 22. The vertical distribution of contaminants in soil is consistent with results in Parcels 2 and 3, which show that the highest concentrations are found within the top 6 inches to 1 foot in soil, and decrease substantially below the top 1 foot in soil. This result is consistent with windblown deposition as the primary transport mechanism. As such, no subsurface soil sampling is recommended within this parcel.

Data collected in 2010 during the Phase II RFI (GSI Water Solutions, Inc., 2014) indicate that no COCs were detected above screening levels in surface water. The BERA (Gradient, 2010) concluded that although concentrations of ASARCO-related contaminants were present in sediment, no unacceptable risk to ecological receptors occurred. As a result of the limited number of samples, however, concentrations in sediment will be further evaluated.

Additional surface soil and sediment sampling is proposed for Parcel 2a, owing to the limited spatial coverage of existing data and potential for contaminant deposition from transport within and flooding of PPC. Proposed sampling approaches for Parcel 2a are discussed in Section 3.

2.1.2 Parcels 10, 11, 12, 23, and Portion of Parcel 8 (8W)

Parcels 8W, 10, 11, 12, and 23 comprise approximately 85 acres. The parcels are located at least one-quarter mile to the south and east (upstream with respect to PPC) of the perimeter of the former Smelter site (see **Figure 2-2**). Current and potential future land uses and a summary of available soil analytical data are presented in **Table 2-2**.

The potential impact to surface soil in the northerly portion of this area may have been through deposition of windblown particulates from the former Smelter site. The reaches of PPC running through these parcels are all upstream of the former Smelter site. As such, stream sediment transport is not a mechanism for materials to have migrated from the former Smelter site to these parcels, rather sediment in these reaches represents background conditions. Five sediment samples will be collected to assess background

concentrations, and will be evaluated with the knowledge that there are activities upstream of the former Smelter site which have contributed inorganic contaminants to the PPC.

TABLE 2-2
Parcels 8W, 10, 11, 12, and 23 Conceptual Site Model Information
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel	Land Use	Reasonably Anticipated Future Land Use	Parcel Size (Acre)	Existing Samples	Concentration Ranges (milligrams per kilogram)			
					Lead		Arsenic	
					Min	Max	Min	Max
8W	Industrial (former Air Liquide)		17.75	1	2,190		188	
10	Agricultural or open space	recreation, open space, habitat	18.46	4	73	4,000	22	171
11			13.77	2	455	1,333	55	73
12			3.77	0				
23			26	3	417	739	57	78

Limited surface soil data are available for these parcels. Available data were collected during the Phase I RCRA Investigation (Phase I RI; Asarco Consulting, Inc., 2005) and the Phase II RFI (GSI Water Solutions, Inc., 2014). Because of the shared transport mechanism and similar distance from the former Smelter site, the distribution of COC concentrations in surface soil in these parcels was compared to the concentrations reported from the more densely sampled Parcels 2 and 3. Available data indicate similar concentration ranges.

Anticipated future land use for the parcels includes habitat restoration and recreational uses. Parcels 8W, 10, 11, and 12 are being addressed as part of the realignment of PPC conducted for the SPHC IM. Because active remediation is underway on these parcels, including significant regrading and replacement of surface soils, no additional soil sampling is proposed. However, the proposed sampling approach to delineate the nature and extent of COCs in soil in Parcel 23 is discussed in Section 3.

2.1.3 Parcels 15 and 21

Parcels 15 and 21 border the south and west sides of the former Smelter site and encompasses 486 and 5 acres, respectively. Portions of Parcel 15 include the AOC and Corrective Action Management Units (CAMUs) I and II, a small portion of Tito Park (an upland area between Upper and Lower Lake), 64 acres that are being excavated to 18 inches for use as borrow soil for the PPC Realignment, and 23 acres that are being excavated to an average 5 feet for use as borrow soil for the Evapotranspiration Cover System. The AOC, CAMUs I and II, portion of Tito Park, and borrow areas are being addressed under RCRA Corrective Action and as such, will be constructed to meet cleanup levels. The remaining 150 acres, as shown in **Figure 2-2**, with the exception of the former COEH landfill, are discussed as part of the updated CSM. A separate evaluation of the former COEH landfill may be conducted, if necessary, to asses past activities, landfill closure specifications, and available environmental data; as such, no sampling within the footprint of the former landfill is proposed within this SAP. As a result of its proximity to Parcel 15 and similar land use, Parcel 21 will be evaluated as a separate Decision Unit (DU) in conjunction with Parcel 15. Current and potential future land uses, parcel acreages, and a summary of sampling and analytical data in soil are presented in **Table 2-3**.

TABLE 2-3
Parcel 15 Conceptual Site Model Information
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel	Current and Reasonably Anticipated Future Land Use	Parcel Size (Acre)	Existing Samples	Concentration Ranges (milligrams per kilogram)			
				Lead		Arsenic	
				Min	Max	Min	Max
15 and 21	Agricultural, open space	155 (not including Area of Contamination and Borrow Areas)	5	158	630	41	110
		64 (Borrow Area XRF Surface Soil)	15	218	421	28	48
		64 (Borrow Area Analytical Surface Soil)	7	125	552	30	56
		64 (Borrow Area XRF post-excavation surface[a])	15	18	38	10	24

[a] The post-excavation surface is represented by samples collected from 18 to 30 inches deep. As the excavation is proposed to 18 inches, this interval represents what will become the top foot of soil post-excavation.

Note:
XRF = X-ray fluorescence

Historical ASARCO operations likely affected surface soil in Parcels 15 and 21, primarily through airborne particulate deposition. Existing data from throughout the East Helena area showed that surface soil concentrations of lead were highest in soil closest to the former Smelter site (in the 0- to 0.5-mile distance), decreasing significantly as distance increased with each 0.25-mile increment. However, because the majority of these parcels have been actively farmed and tilled, COC concentrations are expected to be more evenly distributed.

Additional surface soil sampling data collection is proposed for Parcels 15 and 21 with the exception of the 87-acre excavation areas, given that limited soil sampling data are available to characterize the nature and extent of contamination. The 64-acre excavation area was sampled in February 2015 to evaluate the soils as appropriate for borrow and include surface soil and samples from the 18- to 30-inch-depth interval; data from the 18- to 30-inch interval represent post-excavation surface conditions. As shown in **Table 2-3**, 2015 borrow area surface soil concentrations are similar to historical data and concentrations decrease significantly with depth. As the borrow areas will continue to be disturbed, samples would not be representative of future conditions and the areas will not be sampled under this SAP. The proposed sampling approach, discussed in Section 3, will consider the anticipated future use of the parcels, including agricultural use or open space.

2.1.4 Parcels 17 and 18

Parcels 17 and 18 are located to the east of the former Smelter site. Parcel 17 is overlain by the former CERCLA residential soil repository and has been remediated and capped. The former CERCLA soil repository encompassed 160 acres used since 1991 for placement of soil excavated as part of the residential non-time-critical removal action. As of 2009, most of this area has been revegetated to support wildlife or livestock uses. According to the OU-2 ROD, long-term administration of institutional controls will assure proper management of the repository (USEPA, 2009). Parcel 18 was formerly used as company housing and is

included in the SPHC IM (PPC Realignment), where it is undergoing RCRA Corrective Action. No additional sampling or review of available data is required for these parcels.

2.2 Undeveloped Lands

Undeveloped Lands are properties purchased by ASARCO but not used for smelting operations. Current land use is either agricultural or they are unused lands adjoining residential areas in East Helena, Montana (USEPA, 2009). In accordance with the OU-2 ROD, "… undeveloped land will be evaluated whenever a change in land use is proposed and, if necessary, cleaned up to the appropriate levels for the proposed use." Although no change in land use is currently anticipated, existing soil data were evaluated to assess whether additional data would change the understanding of the nature and extent of the COCs in soil. The CSMs and associated updates based on review of the available data are summarized in the following subsections.

2.2.1 Lamping Fields (Portion of Parcel 2, and Parcels 3 and 22)

A portion of Parcel 2, and Parcels 3 and 22, comprise the Lamping Fields. The individual parcels are Undeveloped Lands identified in the OU-2 ROD. A portion of Parcel 2 near the PPC riparian corridor is a CMS Parcel, as discussed in Section 2.1. These parcels have been sampled extensively as a part of earlier investigations, including the Phase I RI (Asarco Consulting, Inc., 2005), Phase II RFI (GSI Water Solutions, Inc., 2014), and the USEPA's residential sampling program described in the OU-2 ROD (USEPA, 2009). A summary of the land uses and analytical results is presented in **Table 2-4**.

TABLE 2-4
Lamping Fields Conceptual Site Model Information
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel	Land Use	Reasonably Anticipated Future Land Use	Parcel Size (Acre)	Existing Samples	Concentration Ranges (milligrams per kilogram)			
					Lead		Arsenic	
					Min	Max	Min	Max
Portion of 2	Agricultural or open space	Light-Industrial/ Commercial	95	111	38	2,599	10	156
3			157	208	27.6	4,655	5	375
22			5	9	185	3,927	41	210

Potential future uses of these parcels include mixed commercial and industrial uses. Existing soil sampling data indicate analytical results for lead in soil higher than the cleanup level for commercial and industrial use, as discussed in Section 3 (lead is 1,482 milligrams per kilogram [mg/kg] and arsenic is 572 mg/kg). Sufficient sampling has been performed in these parcels to confirm the CSM and that conditions are consistent with those considered in the OU-2 ROD, such that the final corrective measures identified in the OU-2 ROD are still appropriate. No additional soil sampling is proposed for these parcels.

2.2.2 Dartman Parcel (Portion of Parcel 2, and Parcels 4 and 6)

A portion of Parcel 2, and Parcels 4 and 6, comprise the Dartman Parcel. The individual parcels are Undeveloped Lands identified in the OU-2 ROD. These parcels have been sampled extensively as a part of the Phase I RI (Asarco Consulting, Inc., 2005), Phase II RFI (GSI Water Solutions, Inc., 2014), and the USEPA's residential sampling program described in the OU-2 ROD (USEPA, 2009). Parcel samples were obtained through grid sampling of surface soil across the entire parcel areas, and judgmental sampling along drainage areas running approximately north-south through the parcels. Samples were also collected by the East Helena School District within the Valley Drive Property when considering property acquisition. Survey coordinates for those data are not available at this time, and sample locations are therefore not shown in

Figure 2-2. The surface soil sample quantities and concentration ranges are shown in **Table 2-5,** which summarizes the land uses and sampling data for these parcels.

TABLE 2-5
Dartman Parcel Conceptual Site Model Information
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel	Land Use	Reasonably Anticipated Future Land Use	Parcel Size (Acre)	Existing Samples	Concentration Ranges (milligrams per kilogram)			
					Lead		Arsenic	
					Min	Max	Min	Max
Portion of 2	Open space or agricultural	Residential; school/civic uses	40	35	157	6,172	33	322
4			160	199	18	3,667	15	349
6			40	56	50	2,674	34	226

The grid sampling detected concentrations of lead in soil exceeding the residential cleanup level of 500 mg/kg. Some locations had arsenic concentrations higher than the residential cleanup level of 100 mg/kg (see Section 3.1). Soil samples from the drainages in these parcels generally were collected 1 foot or more below the surface. Concentrations in the samples along the drainages generally were lower, and below the residential cleanup levels.

The existing data for Parcels 4 and 6 indicate that the distribution of concentrations in surface soil resembles the distribution observed for Lamping Fields. These data and the common transport mechanism (deposition of windblown dust) suggest that the nature and extent of contaminants in Dartman Parcel is similar to the nature and extent observed in Lamping Fields. Sufficient sampling has been performed in these parcels to confirm the CSM and that conditions are consistent with those considered in the OU-2 ROD, such that the final corrective measures identified in the OU-2 ROD are still appropriate. No additional soil sampling is proposed for these parcels.

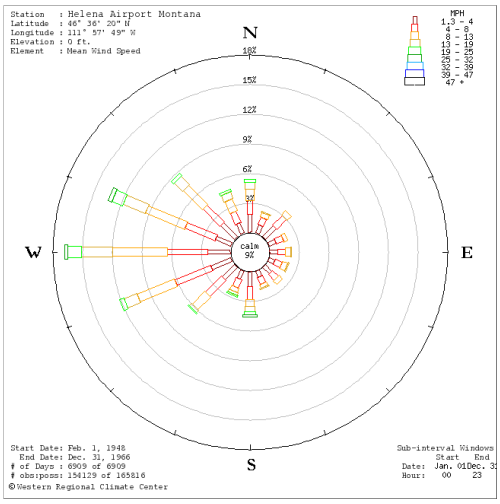
2.2.3 East Fields (Parcels 7, 9, 13, 14, and Portion of Parcel 8 [8E])

Parcels 7, 8E, 9, 13, and 14, comprise the East Fields. Parcel 9 is a part of the active CERCLA soil repository, with soil still being received from properties as required by the East Helena soil ordinance; as such, no further evaluation of available data or additional sampling is proposed for Parcel 9. Current and potential future land uses and existing soil sampling data for the remaining Parcels are summarized in **Table 2-6**.

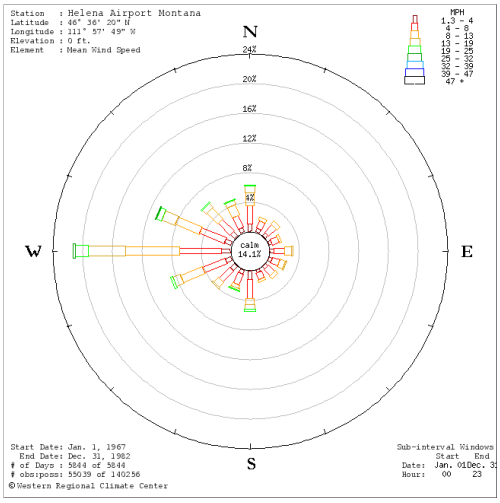
TABLE 2-6
East Fields Conceptual Site Model Information
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel	Land Use	Reasonably Anticipated Future Land Use	Parcel Size (Acre)	Existing Samples	Concentration Ranges (milligrams per kilogram)			
					Lead		Arsenic	
					Min	Max	Min	Max
8E	Industrial	industrial/technology park	58.92	2	1,000	2,190	140	188
7	Open space or agricultural		208	8	12	623	30.5	95
13			141.87	12	13	674	22.5	70
14			231.12	9	21	570	22.5	85

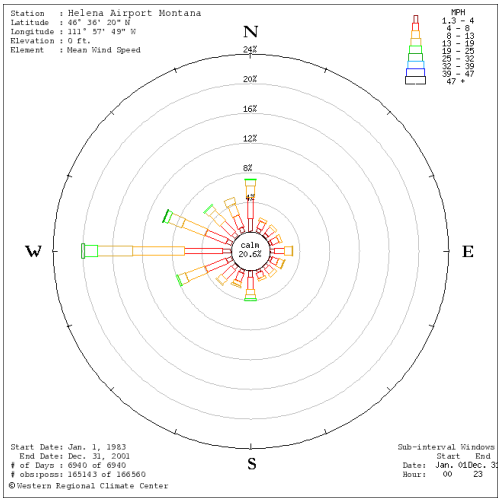
Relative limited soil sampling data are available in these parcels. However, the available data in the undeveloped Parcels 7, 13, and 14 indicate concentrations ranges similar to the more extensively sampled Parcels 2, 3, and 22. Parcels 7, 13, and 14 exhibit lower concentrations as compared to Parcel 8E. As noted by USEPA, soil sampling conducted on several hundred acres of agricultural and undeveloped land around East Helena reveals fairly uniform and predictable lead concentrations (USEPA, 2009). Concentrations observed to date within Parcels 7, 13, and 14 fall within this predicted range, however the amount of data within these parcels is limited. Therefore the sampling approach outlined in Section 3 will be used to assess whether conditions within these parcels are consistent with those considered in the OU-2 ROD.



1948-1966



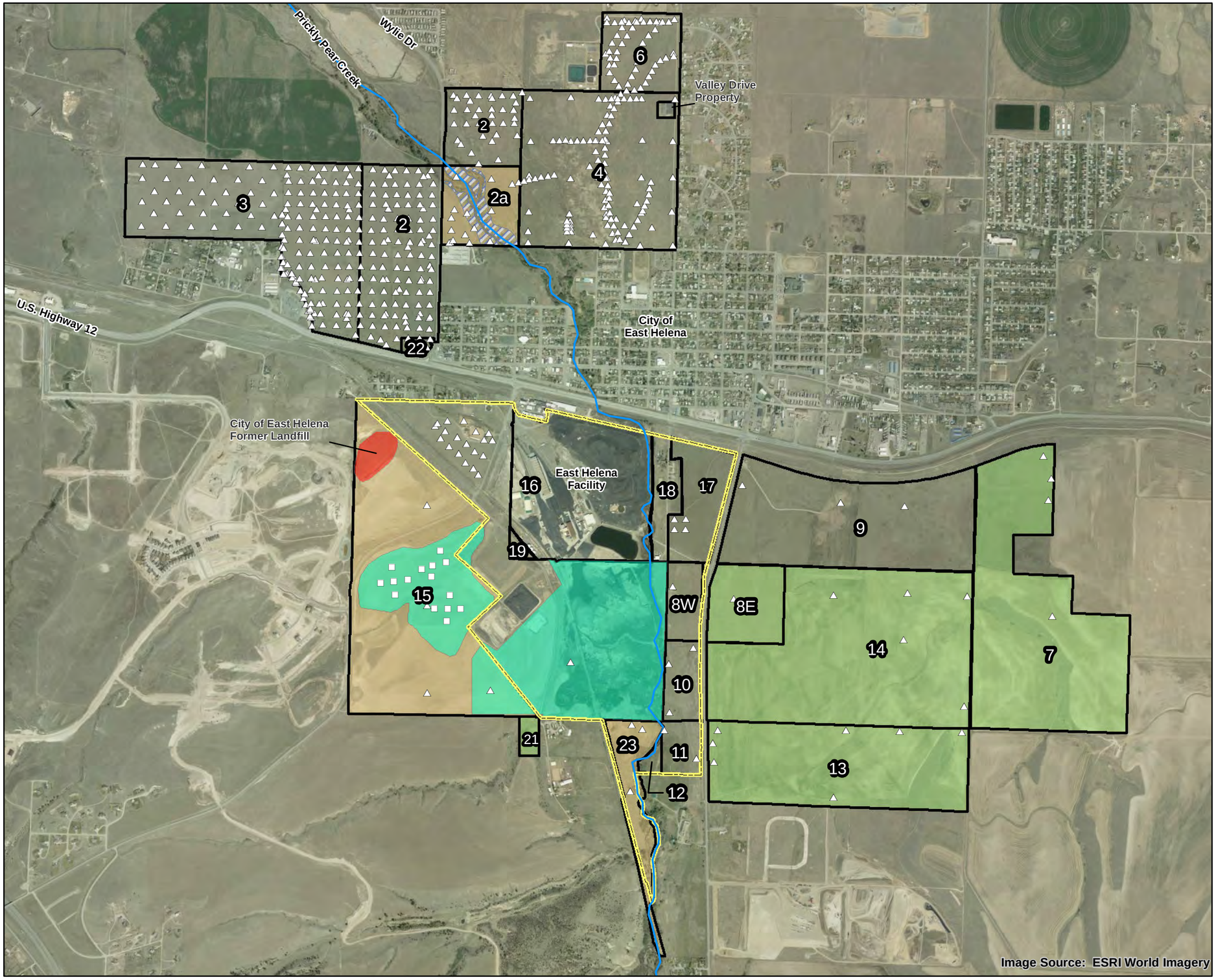
1967-1982



1983-2001

FIGURE 2-1
Wind Roses, Helena, Montana, 1948-2001
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

Source: Western Regional Climate Center,
http://www.wrcc.dri.edu/cgi-bin/wea_windrose.pl?mtMHEL



LEGEND

- Existing Surface Soil Data
- Borrow Soil Test Pit Location
- Prickly Pear Creek
- CMS Parcel Proposed Sampling Area
- Proposed Sampling Area
- Proposed Borrow Area - No Sampling
- City of East Helena Former Landfill
- Area of Contamination Boundary
- Parcel Boundary
- 100-year Floodplain (approx.)

Notes:
CMS = Corrective Measures Study
Sampling proposed within shaded areas.

N

0 1,625 3,250
Feet

Figure 2-2
Updated Conceptual Site Model
East Helena Facility Supplemental RFI
Sampling and Analysis Plan
East Helena, Montana

\\creole\Groups\GIS\00_Proj\M\METG_486085\MapFiles\021209Request\Revised_03272015\Figure2-2_CSM.mxd AESPEJO 10/13/2015 5:32:35 PM

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SECTION 3

Overview of Sampling Approach

The sampling approach for the East Helena Facility was developed based on an understanding of the proposed cleanup levels, and updated surface soil sampling and associated laboratory methodologies. This information was then incorporated for each parcel/land with the sampling objective, updated CSM, and potential future land use to develop the field sampling plan (Section 4).

3.1 Updated Sampling and Laboratory Methods

The incremental sampling methodology (ISM) is a structured composite sampling and processing protocol adopted by the Interstate Technology and Regulatory Council (ITRC) as described in the *Incremental Sampling Methodology* guidance document (ISM Guidance) (ITRC, 2012). The ISM not only describes the recommended field approaches, but incorporates prescribed laboratory processes that together are designed to provide an unbiased, statistically valid estimate of the mean value of an analyte within a DU. A general overview of the ISM, including the rationale for selecting the size of the DU, the number of increments per DU, and recommended laboratory procedures, is provided in the following subsections.

3.1.1 Size of the Decision Unit

The selection of the DU size depends on an understanding of the current CSM for the parcels which comprise the East Helena Facility. At the majority of the parcels, the low heterogeneity of the COCs and agricultural land use support the selection of a larger DU. Based on the U. S. Department of Agriculture (USDA) soil sampling guidance developed for sampling of agricultural lands (USDA, 2007), "… composite sample should represent no more than 40 irrigated acres or 100 dryland acres. Fewer acres is better." In addition, the Iowa State University Extension Office publication (2003) recommends that samples should represent 10 acres or less. As such, for the majority of the parcels, a 10-acre DU is considered appropriate.

For the purposes of this investigation, it is assumed that the future land use of Parcels 13 and 14 is anticipated to be based on parcel subdivisions (subparcels) that were recorded by the former owner for sale or transfer. Each subparcel is assumed to be sold or transferred as a whole parcel and to have a consistent land use. As part of the undeveloped lands, which do not require additional characterization, these properties are being sampled to document that the OU-2 ROD final corrective measures are still appropriate; therefore, the selection of each subparcel as a DU is appropriate.

For those parcels through which PPC passes, 2a and 23, the CSM is that deposition occurred from flooding events within the 100-year floodplain. This process would result in a high distributional heterogeneity. Therefore, a smaller DU of 1 acre is recommended.

3.1.2 Number of Increments

A minimum of 30 increments (subsamples that form the composite) are required per DU and are combined to form a single sample. The number of increments is generally dependent on the distributional heterogeneity of soil concentrations within a DU. Based on existing data and as noted in the OU-2 ROD, there is little heterogeneity in COC concentrations within the parcels and undeveloped lands (USEPA, 2009). In addition, these lands are primarily used as agricultural, which homogenizes soil through plowing. For these reasons, 30 increments per DU are recommended. Given that the DU at Parcels 2a and 23 is only 1 acre, 30 increments is also considered appropriate.

3.1.3 Laboratory Procedures

Once the field sample is collected, the sample should be mixed and subsequently subsampled with the same number of increments (this step is conducted in the laboratory). To collect the subsample, the sample is dried (typically air-dried), and some form of particle size reduction is performed; for example, milling typically is performed for metals. This procedure is followed to reduce the fundamental error, which

generally represents the relative difference between the true population and the estimate of the mean obtained from sampling. Appendix A of the ISM Guidance (ITRC, 2012) provides additional description. Because the CSM for most of the properties is distribution of COCs by primarily windblown deposition of small particulates, disaggregating the sample using a 2-mm sieve prior to milling is recommended. Sample disaggregation breaks up the soil aggregates and removes small pebbles. This is recommended since milling alone crushes the small pebbles, releasing potentially naturally occurring metals into the subsample matrix and subsequently potentially biasing the results high. Procedures to implement the disaggregation and milling are provided in Section 5.3.

After the entire sample has been dried, sieved, or otherwise prepared, a variety of techniques may be employed to complete the incremental subsampling process, i.e. the laboratory will similarly collect subsamples from the sample to obtain the aliquot required for analysis. The laboratory will be responsible for selecting an appropriate subsampling technique to meet the requirements of the ISM as described in Section 5 of the ISM Guidance (ITRC, 2012). The samples will then be analyzed via USEPA method SW-846 6020.

3.2 Data Evaluation

3.2.1 Surface Soil

Consistent with the data evaluation conducted as part of the Phase II RFI (GSI Water Solutions, Inc., 2014) at the facility, soil data will initially be compared to USEPA Regional Screening Levels (RSLs). This screening level comparison will be used to identify chemicals of potential concern for protection of human health from direct contact and ingestion of soil. It should be noted that this screening provides a conservative assessment of potential risk and is not necessarily indicative of actual or site-specific risks.

Soil data collected as part of this SAP will be compared to the June 2015 RSLs and Montana background concentrations of metals in soil summarized in **Table 3-1**. For comparison, **Table 3-1** also summarizes the RSLs and background values presented in the Phase II RFI (GSI Water Solutions, Inc., 2014).

3.2.2 Sediment

Sediment results in Parcel 2a will be compared to the residential soil RSLs summarized in **Table 3-1**. The concentrations of arsenic and lead reported in Parcel 23 will be used to assess upstream contributions to sediment within PPC and will be considered when evaluating results from Parcel 2a.

TABLE 3-1
Regional Screening Levels for Soil and Sediment
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

	Resident Soil RSL (mg/kg)		Industrial Soil RSL (mg/kg)		Background (mg/kg)		
Constituent	**P2RFI**	**June 2015**	**P2RFI**	**June 2015**	**P2RFI**	**September 2013[a]**	**Laboratory RL (mg/kg)**
Antimony	31	31	410	470	0.66	0.4	0.1
Arsenic	0.39	0.68	1.6	3	17	22.5	0.2
Barium	15,000	15,000	190,000	220,000	NA	429	5
Cadmium	70	71	800	980	0.24	0.7	0.1
Chromium (tot)	0.29[b]	120,000	5.6[b]	1,800,000	NA[b]	41.7	0.3
Chromium VI		0.3		6.3		NC	0.3
Cobalt	23	23	300	350	NA	10	1
Copper	3,100	3,100	41,000	47,000	16	165	5
Iron	55,000	55,000	720,000	820,000	15,000	24,400	5
Lead	400	400	800	800	12	29.8	1
Manganese	1,800	1,800	23,000	26,000	340	880	5
Mercury	5.6	7.8	34	40	0.08	NC	0.05
Selenium	390	390	5,100	5,800	0.07	0.7	0.5
Silver	390	390	5,100	5,800	NA	0.3	0.3
Thallium[c]	NA	0.78	NA	120	NA	0.41	0.1
Vanadium[d]	5.5	390	72	5,800	NA	52.6	1
Zinc	23,000	23,000	310,000	350,000	47	118	5

[a] Table 4-4 of *Project Report—Background Concentrations of Inorganic Constituents in Montana Surface Soils*. Prepared for Montana Department of Environmental Quality (MDEQ) by Hydrometrics, Inc. Note that "NC" stands for "Not calculated due to nondetects."

[b] P2RFI only analyzed total chromium, using RSLs based on the lower of the chromium III or chromium VI values.

[c] Thallium RSLs are based on the values for thallium (soluble salts).

[d]2010 vanadium values were based on the lowest (metallic vanadium) value that is not in the June 2015 RSL table; the lowest 2015 resident vanadium RSL (vanadium and compounds) was used.

Notes:

	=	Project screening levels by media
mg/kg	=	milligrams per kilogram
NA	=	not applicable
P2RFI	=	Phase II RFI; values were presented in Table 4-2 and summarized as follows: RSL Summary Table - November 2010 for 10^{-6} excess cancer risk for residential exposure scenario. RSL Summary Table - November 2010 for 10^{-6} excess cancer risk for industrial exposure scenario. *Background Concentrations for Inorganics in Soil,* December 2007, MDEQ.
RFI	=	RCRA Facility Investigation
RL	=	reporting limit (based off no matrix interference; RL could be raised as a result of matrix interference).
RSL	=	U.S. Environmental Protection Agency Regional Screening Level RSL Summary Table - June 2015 for 10^{-6} excess cancer risk for residential exposure scenario. RSL Summary Table - June 2015 for 10^{-6} excess cancer risk for industrial exposure scenario.

SECTION 4

Field Sampling Plan

This section presents the methodology to be employed by field personnel to implement this SAP, and outlines the scope of work and procedures guide developed for project team use during implementation. The SOPs were prepared by Hydrometrics, Inc., and are referenced in this section where appropriate. Appendix B contains applicable SOPs.

4.1 Scope of Work

The recommended sampling by parcel or parcel group was selected based on the updated CSMs, sampling objectives, and ISM Guidance (ITRC, 2012). **Table 4-1** provides a summary of the number of native samples and associated sample media (to include riparian areas where sediment sampling is proposed), QC samples, and analytical methods.

TABLE 4-1
Proposed Sampling and Analysis
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel/Area	Media	No. of Native Samples	DU	Analyses
Portion of Parcel 2 along PPC (2a)	Surface Soil (0 to 6 inches)	4	2, 10, 19, 27	COPCs
		24	1, 3-9, 11-18, 20-26, 28	arsenic and lead
	Sediment	11	NA	arsenic and lead
Parcel 23	Surface Soil (0 to 6 inches)	5	2, 8, 14, 20, 26	COPCs
		28	1, 3-7, 9-14, 15-20, 21-25, 27-33	arsenic and lead
		5	NA	arsenic and lead
15		3	2, 7, 12	COPCs
		13	1, 3-6, 8-11, 13-16	arsenic and lead
East Fields		5	2, 7, 12, 17, 22	COPCs
		25	1, 3-6, 8-11, 13-16, 18-21, 23-30	arsenic and lead

Notes:

All samples will be analyzed using Inductively Coupled Plasma Mass Spectrometry via SW-846 Method 6020.
COPC = constituent of potential concern; antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, silver, thallium, vanadium, and zinc.
DU = Decision Unit
NA = not applicable
mg/kg = milligrams per kilogram
PPC = Prickly Pear Creek

4.1.1 Portion of Parcel 2 Along Prickly Pear Creek (2a)

Sediments within this portion of PPC are being sampled and analyzed to assess potential impacts via stream transport of material from the former Smelter site. In addition, the land adjacent to PPC is being evaluated within the 100-year floodplain and to the edge of the parcel boundaries. The sediment sampling locations are placed along PPC to evaluate potential deposition of slag and dust from the former Smelter site. Sampling within the 100-year floodplain is proposed to evaluate deposition during flooding. As indicated in Section 2.1.1, existing data show a decrease in concentrations, with depth; this is consistent with airborne deposition as the primary transport mechanism. As such, the need to collect subsurface soil samples is eliminated. Surface soil samples from 0 to 6 inches below ground surface will be collected within the floodplain and adjacent lands for evaluation of potential recreation use. **Figure 4-1** shows the proposed sediment and surface soil sample locations within 1-acre DUs.

4.1.2 Parcel 23

Parcel 23 is located upstream of the former Smelter site and therefore was not subject to potential contamination from stream flow or flooding events. Because upstream activities have been known to contribute inorganic contaminants to PPC, five sediment samples will be collected to assess background concentrations of arsenic and lead. In addition, the surface soil will be evaluated for recreational use. **Figure 4-2** shows the proposed sediment and surface soil sample locations (from 0 to 6 inches below ground surface) within 1-acre DUs.

4.1.3 Parcels 15 and 21

Parcels 15 and 21 can be divided into four categories: the portion that includes the AOC, areas that will be disturbed as part of ongoing corrective actions, the former COEH landfill, and the remainder of the parcels. The remainder of Parcel 15, which is currently used as agricultural land and is proposed for continued agricultural use, a portion of the AOC adjacent to the Rodeo Grounds, and Parcel 21 will be sampled from 0 to 6 inches below ground surface within the 10-acre DUs, as shown in **Figure 4-3**.

4.1.4 East Fields

The East Fields are agricultural lands consisting of Parcels 7, 8E, 9, 13, and 14. Parcel 9 is not proposed for sampling as part of the active CERCLA soil repository. Parcels 13 and 14 will be sampled based on the subdivision of the parcels by the previous owner, as shown in **Figure 4-4**. Each subparcel will be sampled as one DU. As conducted in Parcels 4 and 6, both judgmental and grid-based surface soil sampling approaches are recommended to assess concentrations within the remaining Parcels 7 and 8E. Parcels 7 and 8E are proposed to be sampled within 10-acre DUs; across those units, judgmental sampling will be collected along the predominant wind direction (westerly) , as shown in **Figure 2-1,** resulting in sampling of all of the DUs west of Parcel 9, within Parcel 7. In addition, random samples will be collected across the Parcels 7 and 8 grids.

4.2 Sample Collection

This section outlines the field procedures for flagging the increment locations within each DU, and sample collection and handing.

4.2.1 Field Preparations

As a result of the number of increments and spatial distribution of the sample locations, the global positioning system (GPS) coordinates of each increment will be provided to a land surveyor licensed in the State of Montana. In advance of the field sampling team, the surveyor will flag each increment location within each proposed DU and label each flag with a unique identifier. The identifier will be provided as follows: P#-D#-I# where P represents the parcel number, D represents the DU number within that parcel, and I represents the increment identifier (a through cc) within that DU. Appendix C contains a figure showing each parcel, DU, and increment location accompanied by a table summarizing each increment GPS position. Appendix C will be provided to the land surveyor and field sampling teams.

4.2.2 Surface Soil Sampling Procedures

Within each DU, 30 increments of an equal-mass of soil, collected at equal spacing across each DU, will be combined to make each sample. **Figure 4-5** shows how a typical, square-shaped DU is divided and the increment locations selected. Given the nonsquare shapes of some of the DUs, geographic information system tools will be used to divide odd-shaped DUs into equal portions and provide the coordinates of each increment, as described in Section 4.2.1.

Each increment should be collected using a stainless steel incremental sampling tool such as a soil step probe to consistently collect a measured amount of soil from the desired sample interval (in this case, 0 to 6 inches). The sampling tool will be advanced into the soil and ejected into a 2-gallon, heavy-duty, resealable plastic bag. Alternative sampling tools may be used as soil conditions warrant and will be documented. This process will be repeated at each increment collection location, and all increments will be combined together into one bag for each DU.

Bags will be labeled with the parcel number, DU number (provided in Appendix C), date, time, requested analyses, and sample collector's initials. Each sample will be recorded in a bound and numbered logbook to be maintained per Hydrometrics, Inc., SOP-31 (see Appendix B). The Parcel number (P#), DU number (DU#), and sample media (SS for surface soil) will be written on the laboratory chain-of-custody as the sample identifier (for example, P15-DU5-SS).

Quality assurance and quality control (QA/QC) samples will be collected to meet the requirements outlined in Section 5. Field QA/QC samples include field duplicates (FDs) and matrix spike/matrix spike duplicates (MSMSDs). To collect FD samples, an additional aliquot of soil will be collected immediately adjacent to the native sample location and placed in a separate, resealable bag labeled as the native sample except that the DU number will be replaced with FD-1, -2, -3, etc., and numbered sequentially as collected, and the sample time will be omitted from the label. Owing to the volume of soil anticipated for each DU, each sample for MSMSD analysis will be labeled on the sample bag and on the chain-of-custody. The laboratory will split the sample appropriately after the sample has been properly prepared following the procedures outlined in Section 5.3 (Laboratory Sample Preparation).

Although the sampling tool does not need to be decontaminated in between increments within each DU, the procedures outlined in Section 5.4 (Decontamination Procedures) will be followed after all increments are collected for each DU.

4.2.3 Sediment Sampling Procedures

Sediment samples will be collected using procedures similar to those described by the Montana Department of Environmental Quality (MDEQ) in the *Water Quality Bureau Field Procedures Manual for Water Quality Assessment Monitoring* (Version 3.2) (MDEQ, 2012). For each proposed sample location, five subsamples will be collected within an approximate 10-foot radius. The subsample locations should be sketched in the field notebook.

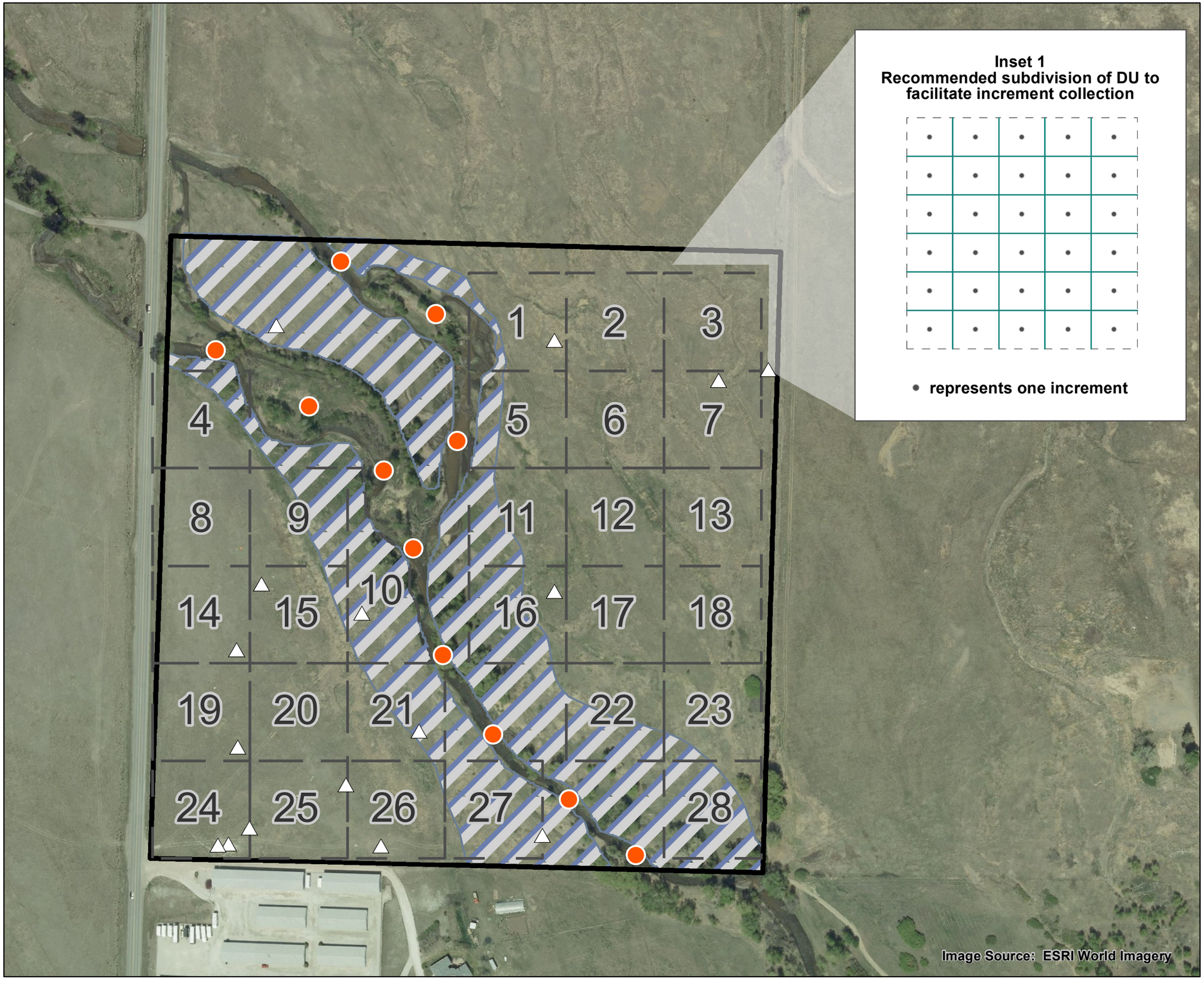
At each subsample location, sediment will be scooped from the streambed with a nonmetallic scoop and placed in a large-volume plastic compositing jar or bowl. Approximately equal amounts of sediment will be obtained from each subsample location. The composite sample will be thoroughly mixed.

The mixed composite sample will be sieved through a 2-mm stainless steel sieve into a laboratory-provided sample container labeled with sample identification information to include the parcel number, sample number (1 through 11 at Parcel 2a and 1 through 5 at Parcel 23), and sample media (SD for sediment), date, time, requested analyses, and sample collector's initials. Sample numbers (for example, 2a-11-SD) will be documented in the field notebook. One location within each Parcel (2a and 23) will be selected for FD and MSMSD analysis and documented in the field notebook. At this location, a sufficient volume of sediment should be collected from the five subsample locations to fill four sample jars. For the FDs, the sample identifications will be 2a-FD1-SD at Parcel 2a and 23-FD1-SD at Parcel 23 and the sample time will be omitted from the labels.

Nondisposable equipment will be decontaminated as described in Section 5.4 (Decontamination Procedures), before collecting samples at the next sample location. Samples will be packed, stored, and shipped as described in Section 4.2.4. The center location of the subsamples will be measured using a hand-held GPS or by a land surveyor licensed in the State of Montana, and recorded in the field notebook or provided by the surveyor, respectively.

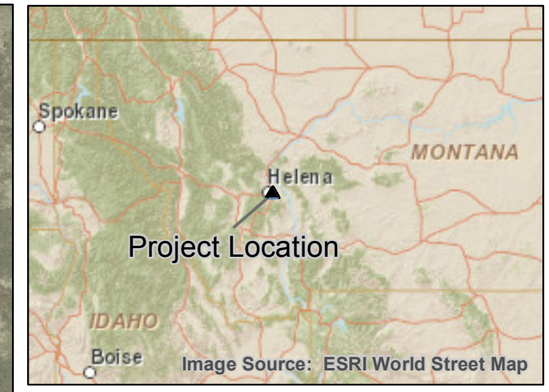
4.2.4 Sample Handling, Storage and Shipping

Samples will be managed and shipped as described in the Hydrometrics, Inc., SOP-4 included in Appendix B.



Inset 1
Recommended subdivision of DU to facilitate increment collection

• **represents one increment**



LEGEND

- △ Existing Surface Soil Data
- ● Proposed Sediment Sample Location
- [1] Proposed ISM DU
- ▨ 100-year Floodplain (approx.)

Notes:
1. ISM = Incremental Sampling Methodology
2. One ISM surface soil sample proposed within each 1-acre decision unit (DU).
3. Each ISM DU sample will be collected from 30 increments (see Inset 1).

N

0 250 500
Feet

FIGURE 4-1
Proposed Sample Locations - Portions of Parcel 2 Along Prickly Pear Creek
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

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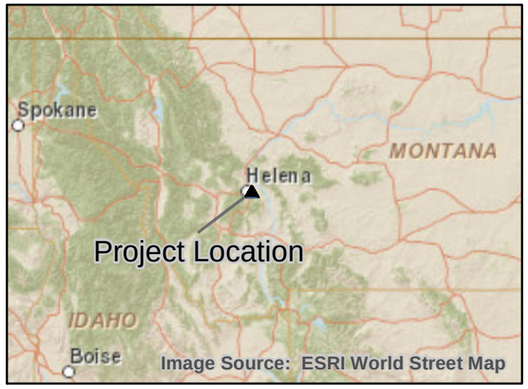

LEGEND

- Proposed Sediment Sample Location
- Existing Surface Soil Data
- Proposed ISM DU
- Undergoing Corrective Action - no sampling proposed

Notes:
1. ISM = Incremental Sampling Methodology
2. One ISM surface soil sample proposed within each 1-acre decision unit (DU).
3. Each ISM DU sample will be collected from 30 increments (see Inset 1 on Figure 4-1).

N

0 750 1,500
Feet

FIGURE 4-2
Proposed Sample Locations - Parcels 10, 11, 12, and 23
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

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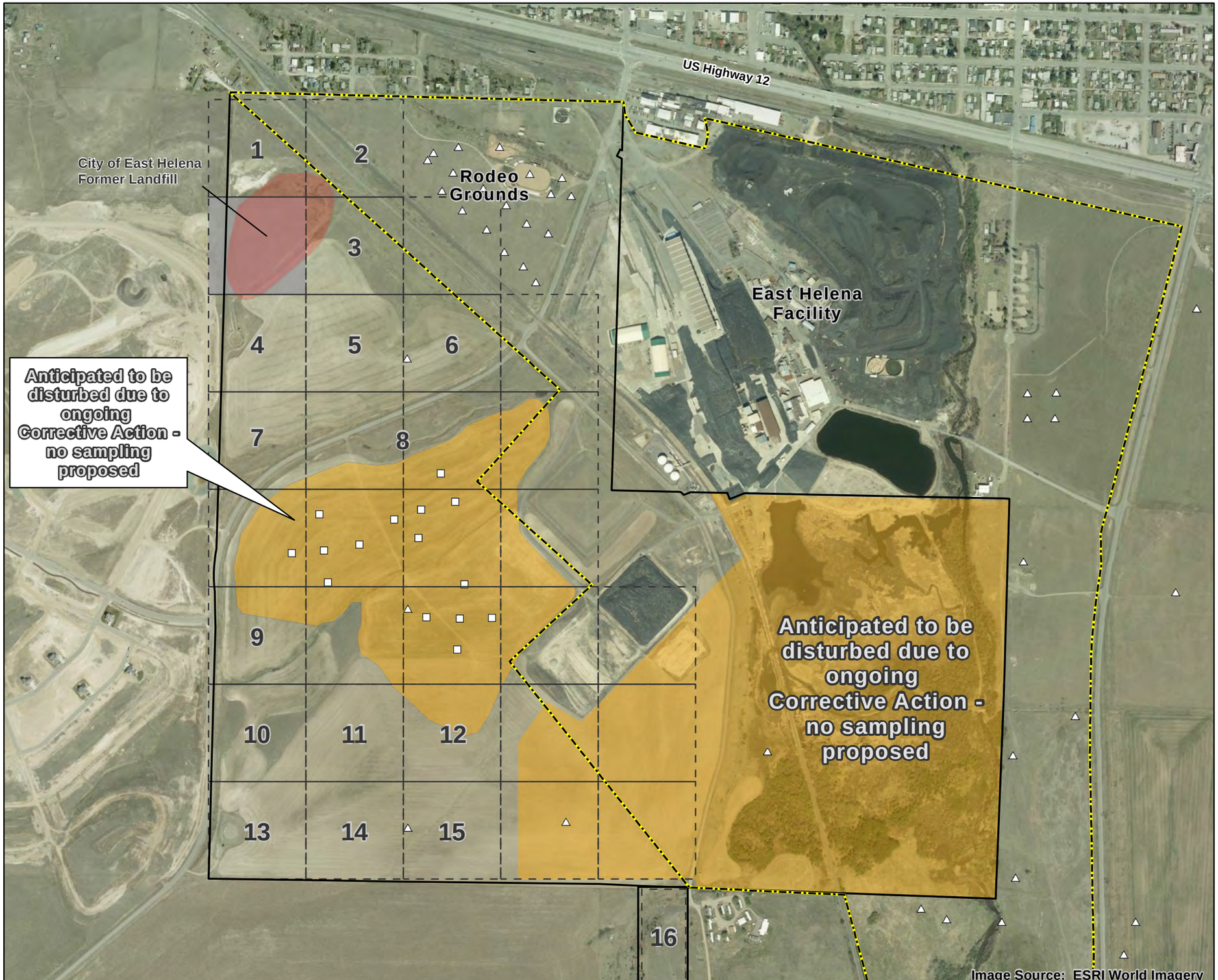

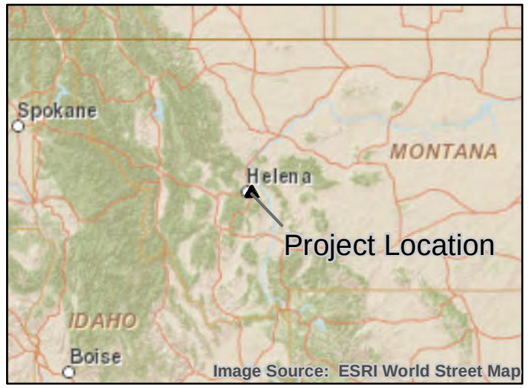

LEGEND

- △ Existing Surface Soil Data
- □ Borrow Soil Test Pit Location
- [1] Proposed ISM DU
- City of East Helena Former Landfill
- Parcel Boundary

Notes:
1. ISM = Incremental Sampling Methodology
2. One ISM surface soil sample proposed within each 10-acre decision unit (DU).
3. Each ISM DU sample will be collected from 30 increments (see Inset 1 on Figure 4-1).
4. The DU that encompasses the former landfill will not be sampled as part of this investigation.
5. Although it is within the Area of Concern, a DU has been added near the Rodeo Grounds (shown as DU No. 2).

N

0 660 1,320
Feet

FIGURE 4-3
Proposed Sample Locations - Parcels 15 and 21
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

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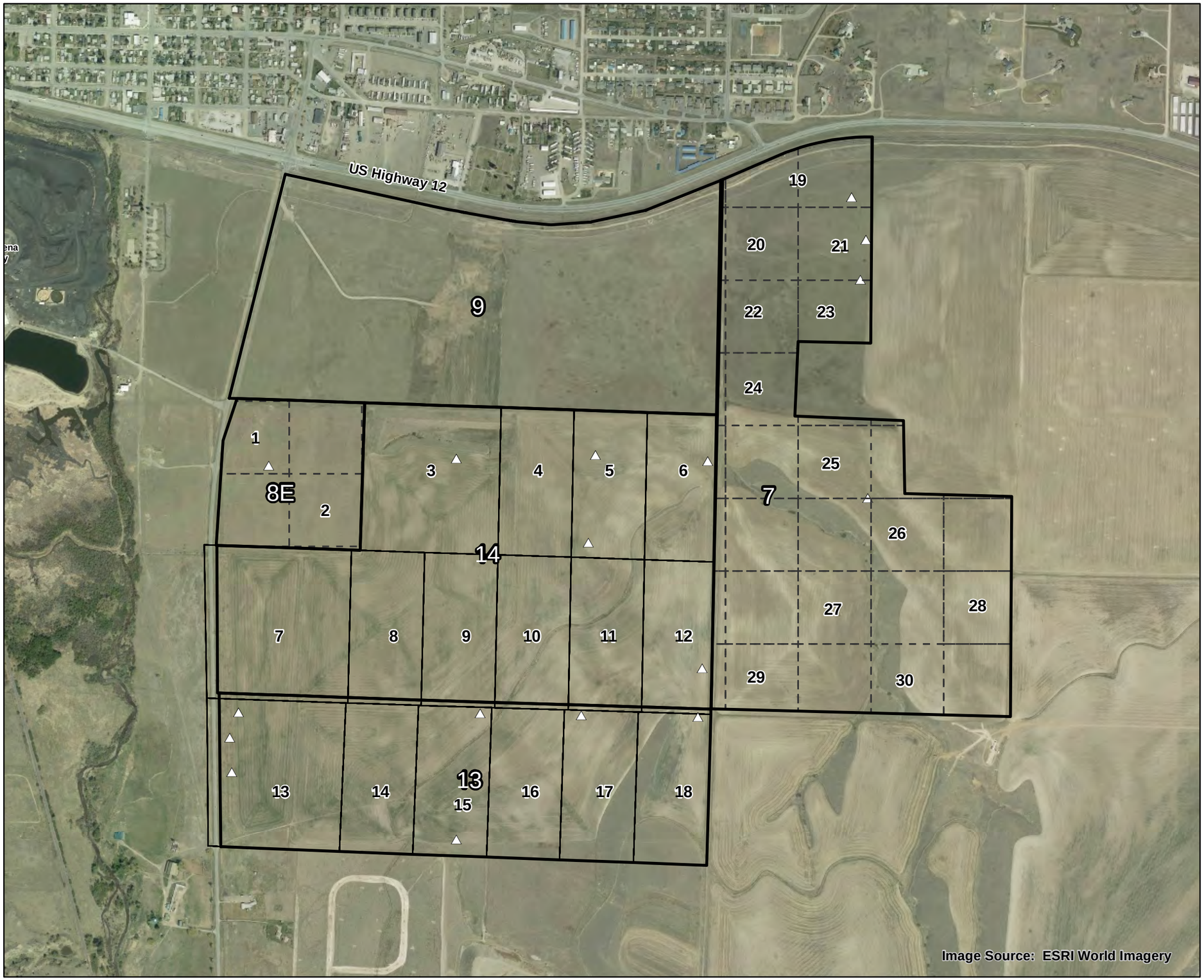

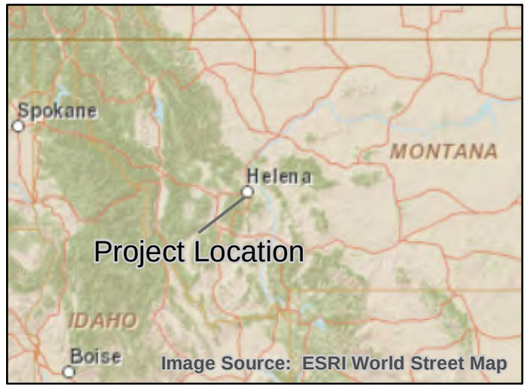

LEGEND

- △ Existing Surface Soil Data
- [1] Proposed ISM DU
- Parcel Boundary

Notes:
1. ISM = Incremental Sampling Methodology
2. Judgmental - One ISM surface soil sample proposed along the predominant wind direction (westerly) within the portion of Parcel 7 located east of the former active Smelter.
3. Random grid sampling across the remainder of the DUs within Parcels 7 and 8.
4. The DUs within Parcels 13 and 14 are obtained from the existing parcels subdivisions.
5. Each ISM DU sample will be collected from 30 increments (see Inset 1 on Figure 4-1).

N

0 750 1,500 2,250
Feet

FIGURE 4-4
Proposed Sample Locations - East Fields
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

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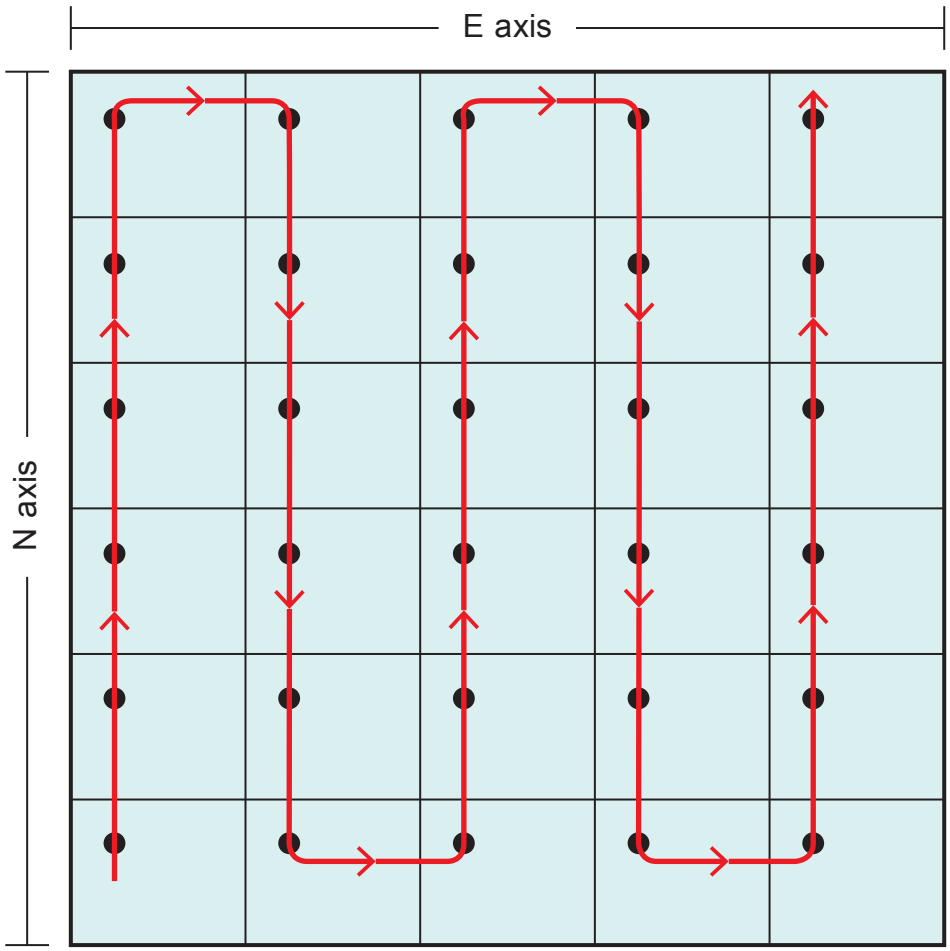

General Procedure:

1. Select a random location within the starting grid (any corner may be selected as the starting grid), then pace or otherwise measure the distance in a straight line along either the N axis or E axis to the subsequent grid. For ease of implementation, increment locations will be provided (Appendix C) to a licensed surveyor and flagged in the field prior to sample collection, following the guidelines outlined in this figure.
2. A serpentine pattern should be used.
3. Within a 10-acre DU, the distance between increments is approximately 110 feet along the N axis and 130 feet along the E axis.
4. Within a 1-acre DU, the distance between increments is approximately 35 feet along the N axis and 43 feet along the E axis.

FIGURE 4-5
Systematic Sampling Grid (Random Start)
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

SECTION 5

Quality Assurance Plan

To obtain data that are scientifically valid, defensible, and of sufficient quality to support decision-making, QA/QC measures are outlined in this section and adhere to the procedures outlined in the *Quality Assurance Project Plan Update 2015, East Helena Facility*, located in Appendix D (QAPP; Hydrometrics, 2015), unless otherwise noted.

5.1 Quality Assurance/Quality Control Samples

Laboratory and field QC samples will be included in the analytical batch with native environmental samples. **Table 5-1** provides a summary of the recommended QC samples. A description of the QC sample requirements follows.

Field duplicate samples will be collected to measure the precision of the sampling and analysis process. Duplicate samples will be collected from at least 10 percent of the total number of sample locations. The source information will be recorded in the field notes, but not on the chain-of-custody form prepared by the field team at the time of sample collection. The identity of the duplicates will not be given to the analytical laboratory. The source information will be forwarded to the QA reviewer to aid in the review and validation of the data.

Matrix Spike/Matrix Spike Duplicate samples will be collected and shipped to the laboratory for spike sample analyses. Five percent of the samples collected will be accompanied by spike samples. However, if a MSMSD sample has not been collected in a 14-day time period, a spike sample will be collected and sent for sample analyses.

An **equipment rinsate blank** consists of a sample of the rinsate water after it has been used to decontaminate sampling equipment. This blank monitors contamination that may be introduced as a result of poor equipment decontamination. One rinsate blank will be collected per day.

An **ambient field blank** is a sample of the rinsate water prepared in the laboratory that will be used for rinsing (decontaminating) equipment before it is used. This blank monitors contamination that might be introduced from the decontamination water or ambient field conditions. One field blank will be collected at each parcel.

TABLE 5-1
Summary of Quality Assurance and Quality Control Samples
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

			QC Samples		
Parcel/Area	**Media**	**Analyses**	**DU**	**FD**	**MSMSD**
Portion of Parcel 2 along PPC (2a)	Surface Soil (0 to 6 inches)	COPCs	10	x	x
		Arsenic and lead	3, 17	x	
			28	x	x
	Sediment	Arsenic and lead	NA	x	x
Parcel 23	Surface Soil (0 to 6 inches)	COPCs	20	x	x
		Arsenic and lead	3, 17	x	
			28	x	x

TABLE 5-1
Summary of Quality Assurance and Quality Control Samples
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Parcel/Area	Media	Analyses	QC Samples		
			DU	FD	MSMSD
	Sediment	Arsenic and lead	NA	x	x
15 and 21		COPCs	12	x	x
		Arsenic and lead	10	x	x
East Fields		COPCs	12	x	x
		Arsenic and lead	3	x	
			20	x	x

Notes:

All samples will be analyzed using Inductively Coupled Plasma Mass Spectrometry via SW-846 Method 6020.
COPC = constituent of potential concern; antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, silver, thallium, vanadium, and zinc.
DU = Decision Unit
FD = field duplicate
MSMSD = matrix spike/matrix spike duplicate
NA = not applicable
PPC = Prickly Pear Creek
QC = quality control

5.2 Chain-of-Custody

Chain-of-custody forms will be filled out and signed by the sampling team member(s) who collected the sample whenever custody is transferred to another sampling team member, a project team member, or a shipping company. The individual who receives the sample will sign and date the form, as well. Subsequent transfers will follow these same procedures. In the case of custody transfer to a shipping company, the bill of lading will be attached to the chain-of-custody form accompanying the sample in lieu of a recipient's signature. The original of the two-part form will accompany the sample and the copy will be retained by the field team leader (FTL).

A chain-of-custody seal will be affixed to the outside of each cooler if the samples are to be shipped by an overnight bonded shipping company. The seal will be placed over the cooler seam and then signed and dated. Nylon-reinforced tape will be placed over the seal to reduce the potential for accidental tearing. Shipping bills will be retained by the FTL and will become part of the project documentation. Shipping bill numbers will be recorded on the chain-of-custody form accompanying the respective samples.

Personnel authorized to act as laboratory sample custodians will sign for incoming field samples, obtain documents of shipment, and verify data entered onto the sample custody forms. Upon receipt of samples in the laboratory, the sample custodian will record the following information into the laboratory information system:

- Date, time, and location of the sample collection
- Date and time the sample was received by the laboratory
- Method of shipment
- Other descriptive information (preserving pH, temperature, etc.)

A unique sequential laboratory number will be assigned to each sample. Before sample preparation and subsequent analysis, the sample will be placed in a designated secure area. Custody for all samples will be continuously maintained by the laboratory.

5.3 Laboratory Sample Preparation

General procedures for preparing ISM samples in the laboratory are summarized in Section 6.2.2.3 of the ISM Guidance (ITRC, 2012). An overview of the sample preparation process is provided in this section. A qualified laboratory capable of conducting ISM will be contracted by the Custodial Trust and should follow internal SOPs for the ISM.

Soil and sediment samples will be returned to the laboratory and conditioned before mixing and particle size reduction is conducted. Sample conditioning consists of disaggregating and air-drying the samples to an appropriate moisture level based on the boiling point of the target analyte. Sample disaggregation will ensure that all particles pass through a maximum #10 (2-mm) sieve. Once disaggregated and dried, the entire sample will be thoroughly mixed; mills and blenders may be used for this step.

After mixing, the samples undergo particle size reduction. Mills, grinders, pulverizers, or mortar and pestles typically are used; however, the laboratory should select a method that will not introduce metals into the sample during size reduction. Once the particle size is reduced, the sample will be subsampled. A variety of techniques may be used for subsampling, but the final subsample mass must be used completely in the analytical sample preparation step. For this reason, the final target mass and the mass needed for analytical sample preparation must be considered when choosing the process. Section 6.2.2.7 of the ISM Guidance (ITRC, 2012) describes the various subsampling methods. The subsample will then be analyzed using the appropriate USEPA SW-846 method for either arsenic and lead analysis, or for the full COPC list.

5.4 Decontamination Procedures

Decontamination will be conducted in accordance with the Hydrometrics, Inc., SOP-7 (see Appendix B). Surface soil sampling equipment will be decontaminated in between each DU, and sediment sampling equipment will be decontaminated after the collection of each sample.

5.5 Investigation-derived Waste Management

Efforts will be made to minimize investigation-derived waste (IDW) generation. IDW may include soil, sediment, decontamination fluids, disposable sampling equipment, and disposable personal protective equipment (PPE).

Field personnel will attempt to return unused soil to its source immediately after generation or, if warranted, dispose the soil within the interim cover system located at the former Smelter site. Disposable PPE and disposable sampling equipment generally will be handled as solid waste, containerized, and disposed of within a trash receptacle located within the former Smelter site. Wash and rinse waters generated during equipment decontamination generally will be discharged to the ground or, if warranted, collected and treated within the former Smelter site's high-density sludge water treatment system.

SECTION 6

Project Management and Schedule

This section provides an overview of project management activities and the proposed schedule to complete the SAP, conduct sampling, and prepare the associated documentation.

The Custodial Trust will manage all activities as part of the responsibilities and obligations set forth in the Settlement Agreement and First Modification. The Custodial Trust will communicate relevant information about the SAP, results, and progress to USEPA, as Lead Agency, as well as to the federal and state beneficiaries of the Custodial Trust. **Figure 6-1** shows the current, overall project organization and lines of communication.

6.1 Public Participation

Public involvement is a critical part of the overall corrective measures recommendations for the East Helena Facility. General communication with the public will continue to follow the *Draft Community Relations Plan, Former ASARCO Smelter Facility, East Helena, Montana* prepared by the Custodial Trust (2010), as well as the requirements of the First Modification.

The Custodial Trust holds meetings with the East Helena Entire Cleanup Team in Coordination group to provide information to key local stakeholders and attends the East Helena City Council meetings. The Custodial Trust's website: http://www.mtenvironmentaltrust.org/east-helena contains links to news on cleanup progress, design documents, meeting materials, and future meeting dates.

6.2 Documentation and Reporting

After sampling is complete and the analytical data are reviewed, a report summarizing field activities, results of the sampling, and recommended path forward will be prepared for the Custodial Trust and subsequent beneficiary review. If warranted, the report will include recommendations for corrective measures implementation at one or more of the CMS Parcels. Data collected from the Undeveloped Lands will be used to evaluate current conditions and confirm that the existing remedy at those locations is appropriate; no further action is anticipated at these parcels.

6.3 Preliminary Schedule

Table 6-1 summarizes key dates for the development of the SAP, subsequent implementation, and reporting. The schedule is considered a living document and will be revised on a regular basis as needed.

TABLE 6-1
Preliminary Schedule
East Helena Facility Supplemental RFI Sampling and Analysis Plan, East Helena, Montana

Proposed Activity	Anticipated Completion Date
Submit Draft SAP for Custodial Trust Review	January 9, 2015
Present Summary of SAP to USEPA	March 12, 2015
Submit Final SAP for Beneficiary Review	October 2015
Begin Field Implementation	November 2015
Complete Field Implementation (after ground has thawed)	May 2016
Submit Draft Summary Report for Custodial Trust Review	July 2016

Notes:

SAP = Sampling and Analysis Plan

USEPA = U.S. Environmental Protection Agency

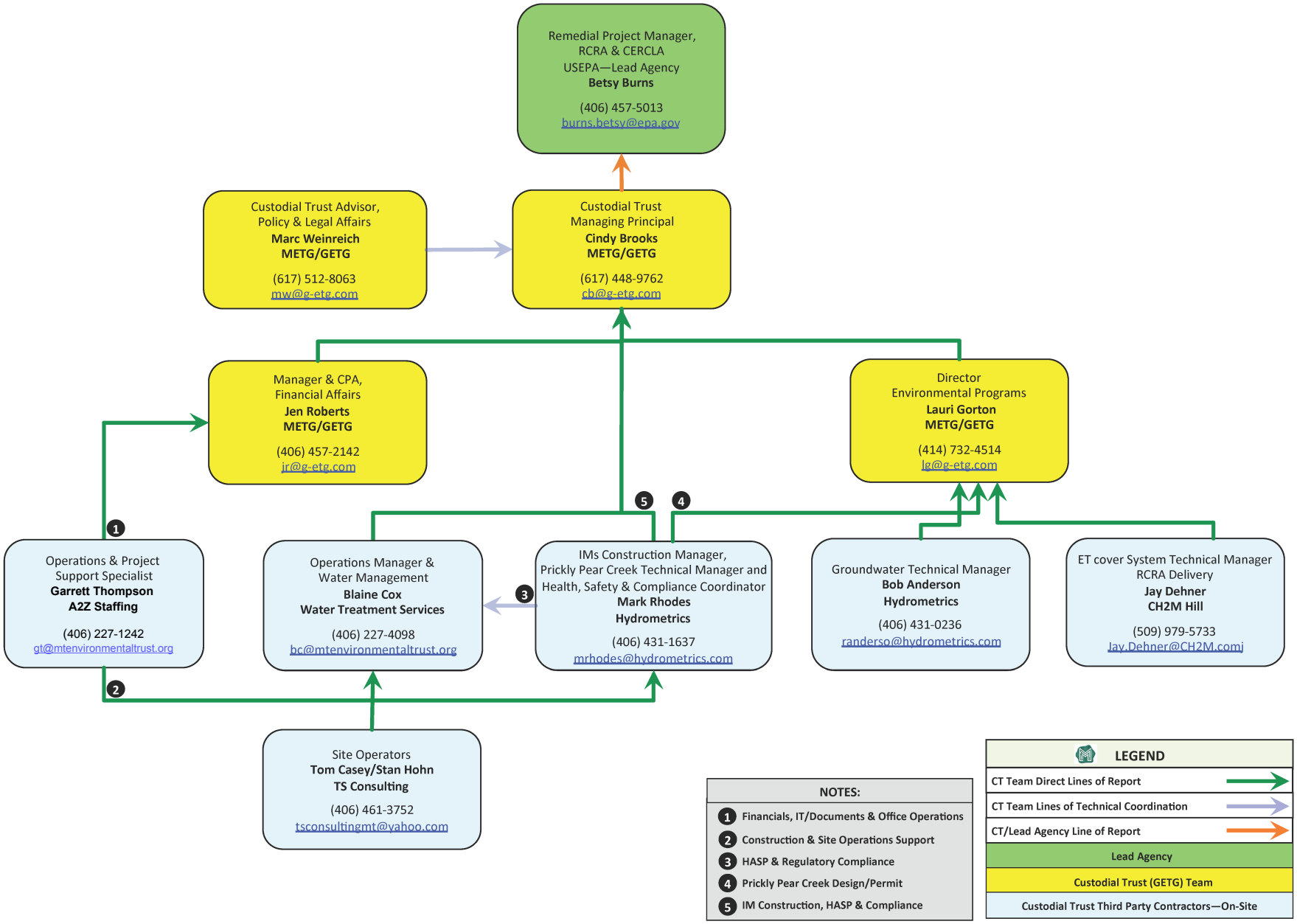

FIGURE 6-1
Project Organization and Lines of Communication
East Helena Facility Supplemental RFI Sampling and Analysis Plan
East Helena, Montana

SECTION 7

References

Asarco Consulting, Inc. 2005. *Phase I RCRA Facility Investigation Site Characterization Report, East Helena Facility.* Prepared for ASARCO Incorporated. February 2003 (Revised 2005).

CH2M HILL. 2014. *Former ASARCO East Helena Facility Corrective Measures Study Work Plan 2013*. Draft. Prepared for The Montana Environmental Trust Group, LLC, and the Montana Environmental Custodial Trust. January.

CH2M HILL. 2015. *Former ASARCO East Helena Facility Interim Measures Work Plan—2015 and 2016*. Draft. Prepared for The Montana Environmental Trust Group, LLC, and the Montana Environmental Custodial Trust. December.

Dreher, Robert G., E. Rockler, M.W. Cotter, L. Johnson/United States District Court for the District of Montana. 2012. First Modification to the 1998 Consent Decree. Civil Action No. CV 98-H-CCL. Case 6:98-cv-00003-CCL. Document 38. Filed January 17.

Gradient. 2010. *Draft Baseline Ecological Risk Assessment for the East Helena Facility*. Prepared for The Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust. December.

GSI Water Solutions, Inc. 2014. *Phase II RCRA Facility Investigation*, *East Helena Facility*. April 29.

Hooper, M.J., G.P. Cobb, S.T. McMurry. 2002. *Wildlife Biomonitoring at the Anaconda Smelter Site, Deer Lodge County, Montana*. Texas Cooperative Fish and Wildlife Research Center, Texas Tech University.

Hydrometrics, Inc. 2011. *Quality Assurance Project Plan for Environmental Data Collection Activities, East Helena Facility*.

Interstate Technology & Regulatory Council (ITRC). 2012. *Incremental Sampling Methodology.* ISM-1. Washington, D.C.: Interstate Technology & Regulatory Council, Incremental Sampling Methodology Team. www.itrcweb.org.

Iowa State University Extension Office. 2003. *Take a Good Soil Sample to Help Make Good Decisions*. Revised September.

Montana Department of Environmental Quality (MDEQ). 2012. *Water Quality Planning Bureau Field Procedures Manual for Water Quality Assessment Monitoring Version 3.2.* Helena, Montana. February.

Montana Environmental Custodial Trust (Custodial Trust). 2010. *Draft Community Relations Plan, Former ASARCO Smelter Facility, East Helena, Montana*. May.

Pioneer Technical Services, Inc. (PTS). 2014. *Prickly Pear Creek North of Highway 12 Geomorphic and Sediment Transport Assessment, East Helena, Montana*. October.

U.S. Department of Agriculture (USDA). 2007. *Sampling Soils for Nutrient Management*. April.

U.S. Environmental Protection Agency (USEPA). 2005. *Technical Memorandum: Supplemental Ecological Risk Assessment for the East Helena Smelter Site, Montana.* USEPA with technical assistance from Syracuse Research Corporation, Denver, Colorado.

U.S. Environmental Protection Agency (USEPA). 2009. *East Helena Superfund Site, Operable Unit No. 2, Residential Soils and Undeveloped Lands, Final Record of Decision.* USEPA ID: MTD006230346. September.

U.S. Environmental Protection Agency (USEPA). 2011. *Third Five-Year Report for the East Helena Superfund Site, East Helena, Lewis and Clark County, Montana*. September.

Appendix A
Errata Page to the First Modification

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MONTANA

UNITED STATES OF AMERICA, Plaintiff, v. MONTANA ENVIRONMENTAL TRUST GROUP, LLC Solely in its representative capacity as Trustee of the Montana Environmental Custodial Trust (and not individually) for the benefit of the United States and State of Montana Defendant.	Civil Action No. CV 98-3-H-CCL JOINT NOTICE OF ERRATA TO FIRST MODIFICATION TO CONSENT DECREE

Plaintiff and Defendant hereby give notice of filing errata to Exhibit 3 to the First Modification to Consent Decree (the "First Modification"), the East Helena Plant Property Map. The corrected Exhibit 3 is filed together with this notice.

On the original Exhibit 3, notwithstanding the range and township descriptions in the upper right corner, which are correct as to the parcel marked as "8", the lack of a clearly identified boundary lines for parcel 8 inaccurately suggested that the western boundary of parcel 8 was defined by State Highway 518 and that parcel 8 therefore appeared to lie, in its entirety, west of State Highway 518. Also due to a lack of a clearly identified boundary line, the original Exhibit 3 inaccurately suggested that the parcels marked as "10" and "17" fully encompass the land west of State Highway 518, and east of Montana Avenue.

In the First Modification, the parties intended to include all of the property west of State Highway 518 in future final agency analyses and decisions on remedies to be made under the First Modification. By identifying parcels "10" and "17" in Paragraph 38, the parties believed they had done so.

In fact, parcel 8, as correctly described by the range and township description on the East Helena Property Map, extends west across State Highway 518 to Montana Avenue, to an area between parcels 10 and 17. The parties' intention was to include this portion of parcel 8, located west of State Highway 518, in the exceptions to the application of the OU2 ROD remedies listed in

Paragraph 38. Therefore, Paragraph 38 of the First Modification to Consent Decree is replaced with the following, with the underlined portion being added for purposes of clarification:

> Unless significant new information is found, which was not previously considered by EPA in the development of the final agency decisions set forth in the OU2 ROD, the final corrective measures for the parcels of real property transferred by ASARCO to the Custodial Trust shall be the measures set forth in the OU2 ROD, and each CNS task described below shall fully take into account the application of the OU2 ROD remedies to these specific properties, except that final agency decisions on remedies for those properties designated on Exhibit 3 by the numbers 10, 11, 12, 15, 16, 17, 18, 19, 23, <u>the portion of 8 located west of State Highway 518</u>, and the portions of 2 near Prickly Pear Creek, shall be made by EPA after completion of the investigations and studies set forth in this Decree.

Nothing in this Notice is intended to modify any other portion of the Consent Decree.

This Joint Notice of Errata to First Modification to Consent Decree does not require notice and public comment.

DATED this 30th day of May, 2013.

Respectfully submitted,

FOR THE UNITED STATES OF AMERICA

DEPARTMENT OF JUSTICE

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CERTIFICATE OF SERVICE

I hereby certify that on May 30, 2013, a copy of the foregoing document was served on the following persons by the following means:

_____ Hand Delivery
_____ Mail
_____ Overnight Delivery Service
_____ Fax (include fax number in address)
___x___ E-Mail (include email in address)

1. Cynthia Brooks [cb@g-etg.com], Trustee, Montana Environmental Trust Group, LLC;

2. Stephen R. Brown [srbrown@GARLINGTON.COM], Attorney for the Montana Environmental Trust Group, LLC.

/s/Elliot Rockler
Attorney for the United States

Appendix B
Standard Operating Procedures

HSOP-4

CHAIN-OF-CUSTODY PROCEDURES, PACKING, AND SHIPPING SAMPLES

Prepared by: Mark T Walker **Date:** 6/04

Reviewed by: Walter Crane **Date:** 6/04

Approved by: Michael M. Wright **Date:** 6/04

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

REVISION HISTORY

Revised by: Mark T Walker **Date:** 10/2010

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1.0 SCOPE AND APPLICATION

HSOP-4 presents procedures to be followed when shipping samples of environmental media (e.g., air, water, soil, waste material) to a laboratory for analysis. All samples submitted should be accompanied by chain-of-custody documentation.

2.0 SUMMARY OF METHOD

Samples of environmental media submitted to laboratories for analysis are often shipped via commercial carrier. Samples are packed in shipping containers to minimize the potential for container breakage or leaking. Each shipment will be accompanied by sample documentation, including chain-of-custody forms and a list of required analytical parameters, methods, and detection limits. Samples are cooled with ice during transport, to maintain temperature at approximately 4°C (±2°C). Shipments of hazardous materials must conform to International Air Transport Association (IATA) Dangerous Goods regulations and/or Department of Transportation (DOT) regulations, as well as any carrier-specific requirements.

3.0 HEALTH AND SAFETY WARNINGS

Field personnel should be aware of the health and safety precautions to be followed during any field event, and should be familiar with any project-specific hazards. This may include review of project-specific health and safety plans, site-specific and/or organization-specific safety requirements and training.

- Care should be exercised when handling samples of hazardous or potentially hazardous waste. Personal protective equipment (PPE) should be utilized (gloves, safety glasses, coveralls) as appropriate.
- Glass sample containers should be handled with extreme care to avoid breakage, loss of sample, and possible injury.

4.0 INTERFERENCES

Not Applicable

5.0 PERSONNEL QUALIFICATIONS

Personnel should be familiar with the project work plan and objectives, and with the operation of equipment listed in Section 6.0 below. Personnel should also familiarize themselves with the schedule of the shipping location to be used for shipping samples. For projects involving hazardous materials, consult the project work plan, courier regulations,

and any state and federal air or ground shipping regulations for details on shipping hazardous material.

6.0 EQUIPMENT AND SUPPLIES

- Shipping container (metal or plastic cooler);
- Packing material (bubble wrap, Styrofoam peanuts);
- Absorbent material (clay absorbents, rock wool);
- Shipping tape;
- Shipping strap;
- Custody seals;
- Chain-of-custody (COC) forms;
- Heavy-duty or contractor grade garbage bags or similar plastic bags;
- Ziploc bags; and
- Ice.

7.0 CHAIN-OF-CUSTODY PROCEDURE

1. Chain-of-custody involves ensuring that samples are traceable from the time of collection until received by the analytical laboratory. The laboratory is responsible for custody during processing and analysis. A sample is under custody if:

    - It is in your possession;
    - It is in your view, after being in your possession; or
    - It was in your possession and you then placed it in a designated secure or locked area to prevent tampering.

2. When ready to ship samples, set out samples in a clean, secure area to complete chain-of-custody forms. Chain-of-custody forms may be obtained from the project laboratory, or from Hydrometrics' Data Quality Department. An example COC form is shown in Attachment 1. Each sample should be identified on the form by its sample number, date and time of collection, and analysis requested. Check sample labels against information recorded in field notebook and on chain-of-custody to ensure consistency and guard against transcription errors (HSOP-29). It is usually best to use one chain-of-custody form per shipping container, covering the samples included in the container. When shipping multiple coolers to the laboratory, label chain-of-custody forms as "Cooler 1 of 3," "Cooler 2 of 3," etc. While chain-of-custody forms obtained from various sources may differ, certain information regarding sampling dates and times, sample identification, contact information, and requested parameters for analysis should be included on all acceptable forms. Complete all fields on the chain-of-custody form, as applicable to the

particular sampling event. Examples of typical COC information to be completed are as follows:

a) **Company Name:** Enter "Hydrometrics, Inc."

b) **Project Name:** Enter the project name and Hydrometrics' project number

c) **Report Mail Address:** Enter the name, address, and e-mail address of the person who should receive the laboratory report.

d) **Contact Name:** Enter the name of the project manager, sampling personnel, or other responsible contact.

e) **Phone/Fax:** Enter the phone and fax number of the contact person for the project.

f) **E-mail:** Enter the e-mail address for the contact person.

g) **Sampler:** Print the name of the person who collected the samples.

h) **Invoice Address:** Enter the address where the invoice should be sent.

i) **Invoice Contact and Phone:** Enter the name and phone number of the person responsible for approving the invoice.

j) **Purchase Order:** Enter the Hydrometrics' Purchase Order number for the sample order.

k) **Quote/Bottle Order:** Enter the laboratory quote number for the project or bottle order number provided with the sample bottle order.

l) Note any special reporting requirements or formats.

m) **Sample Identification:** Enter the unique sample number assigned to the sample.

n) **Collection Date:** Enter the date each sample was collected. Do not use ditto (") marks, arrows or lines to represent the same date.

o) **Collection Time:** Enter the time each sample was collected. Do not use ditto (") marks, arrows or lines to represent the same time.

p) **Number of Containers and Matrix:** Enter the number of bottles the sample is contained in followed by a dash and then a letter representing the type of sample matrix (i.e. A=Air, W=Water, S=Soil/Solid, V=Vegetation, B=Bioassay, O=Other).

q) **Analysis Requested:** Write the analysis to be performed on each sample and check the box for each sample you want to receive this analysis. Also include an analytical parameter list.

r) **Remarks:** Use this field to make notes or comments to the laboratory.

(Note: If a laboratory-provided COC form is used, be sure to follow any additional instructions included from the laboratory.)

3. Record shipping information (tracking numbers, name of courier, other pertinent information) on chain-of-custody form. Sign and date chain-of-custody form, and retain one copy of form for project file.

8.0 PACKING AND SHIPPING PROCEDURE

1. Seal drain holes in bottom of shipping cooler (inside and out) to prevent leakage. Check sample container lids to ensure they are tightly sealed.

2. Line bottom of cooler with packing material (bubble wrap). Open and place two heavy-duty plastic bags in cooler (one inside the other).

3. Seal samples within individual plastic or bubble wrap bags, as necessary. All glass containers (VOAs, amber glass bottles, glass soil jars) should be placed in individual bubble wrap bags. Place sealed sample containers in shipping cooler, inside double plastic bags. In most instances, a labeled temperature blank should be included with the samples to allow the laboratory to check the sample temperature upon arrival. The temperature blank is generally a small vial or bottle filled with tap water and labeled "Temperature Blank." Ensure that temperature blank meets temperature requirements upon receipt by laboratory.

4. Cover samples with ice, inside double plastic bags.

5. Close and seal double plastic bags, by knotting or with shipping tape. Fill any empty space in cooler with additional packing material or absorbent material.

6. Record shipping information (tracking numbers, name of courier, other pertinent information) on chain-of-custody form. Sign and date chain-of-custody form, and retain one copy of form for project file.

7. Place original chain-of-custody, sample parameter list, cover letter, and any other documentation needed by the laboratory into a plastic Ziploc bag. Seal Ziploc bag and tape to the inside of the shipping container lid.

8. Label outside of shipping container with sampling organization name, address, and phone number, laboratory destination name, address, and phone number, and any required DOT shipping labels.

9. Place custody seals on front and back of cooler (see Attachment 2) and tape in place with shipping tape to avoid accidental breakage. Wrap cooler securely in at least two places with a minimum of three wraps of shipping tape. Shipping strap may also be used to provide additional insurance against the cooler opening during shipment.

10. Deliver sample containers to the shipping location. Since samples should reach the laboratory as soon as possible to protect sample integrity, **overnight shipping is required,** unless unavailable at the shipping location. Retain copies of shipping receipts for the project file. Shipping receipts and tracking numbers serve as chain-of-custody documentation during sample transport from the sampler to the laboratory.

11. Additional guidance may be found in the EPA's *Contract Laboratory Program Guidance for Field Samplers* (EPA, 2004). More stringent shipping requirements may apply to samples collected under CLP protocols. The project work plan should be consulted to determine any special requirements.

9.0 DATA AND RECORDS MANAGEMENT

The following documents generated during sample packing and shipping will be retained in the project file:

- Chain-of-custody form;
- Analytical parameter list;
- Cover letter; and
- Shipping receipts.

10.0 QUALITY CONTROL/QUALITY ASSURANCE

- Field personnel should cross-reference information on sample labels, in the field notebook, and on sample chain-of custody forms during the sample packing and shipping process.
- Data quality review will include checking of sample documentation to ensure consistency.
- Temperature blank measurements by the laboratory upon arrival of samples will document that samples were maintained at the appropriate temperature during shipping.

11.0 REFERENCES

EPA, 2004. Contract Laboratory Program Guidance for Field Samplers (Draft Final). EPA 540-R-00-003. January, 2004.

Hydrometrics HSOP-29: Labeling and Documentation of Samples

CHAIN OF CUSTODY RECORD

Hydrometrics, Inc.

3020 Bozeman Ave. • Helena, MT 59601 • (406) 443-4150

PROJ. NO.	PROJECT NAME
SAMPLERS: *(Signature)*	

DATE	TIME	COMP	GRAB	SAMPLE NUMBER	NO. OF CON-TAINERS	Commons UF / RAW	Nutrients UF / H_2SO_4	Diss. Metal F / HNO_3	CN UF / NaOH	Total Metals UF / HNO_3	Total Recoverable Metals UF / HNO_3	BTEX	TPH									REMARKS

Attachment 1
Example Chain-of-Custody Form

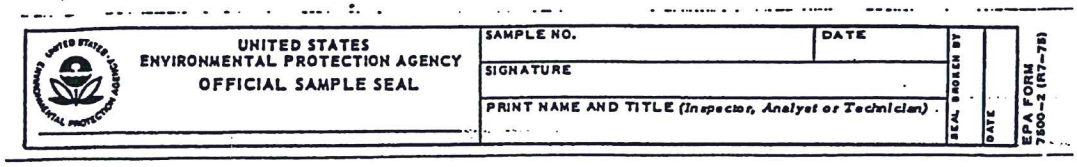
Relinquished *(Signature)*	Date / Time	Received by *(Signature)*	Lab	P.O. #	Shipped via: Bus FedEx UPS Other _____ Air Bill # _____
Relinquished *(Signature)*	Date / Time	Received by *(Signature)*	Remarks		
Relinquished *(Signature)*	Date / Time	Received for Laboratory by *(Signature)*	Date / Time	Enclosed: ☐ Parameter sheet w/detection limits ☐ QA / AC standard mixing instructions ☐ Cover letter ☐ Other _____	

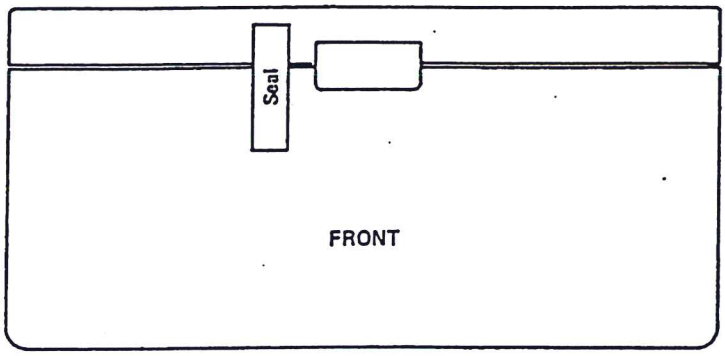
Split Samples:
☐ Accepted ☐ Declined _____
Signature

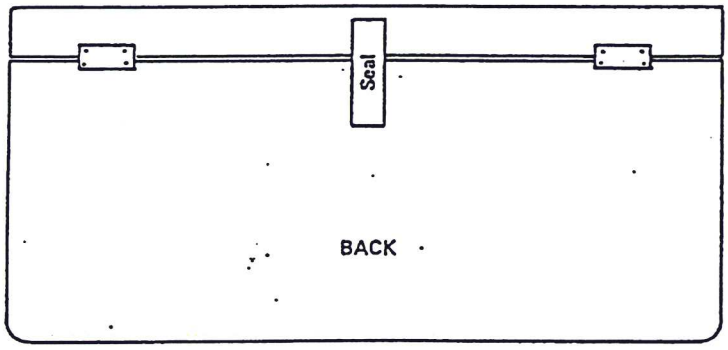
HFORM-1 07/11
TNO 406-443-8550

Return results & electronic copy to:
QA / QC Dept. at address at top of page

Attachment 2: Example of Custody Seals and Placement







HSOP-7

DECONTAMINATION OF SAMPLING EQUIPMENT

Prepared by: Mark T Walker **Date:** 6/04

Reviewed by: [illegible] **Date:** 6/04

Approved by: Michael R. Wright **Date:** 6/04

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REVISION HISTORY

Revised by: _____ **Date:** 01/2014

Reviewed by: _____ **Date:** 01/2014

Approved by: _____ **Date:** 01/2014

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1.0 SCOPE AND APPLICATION

HSOP-7 presents general procedures to be followed to decontaminate reused sampling equipment between sampling locations. Examples of equipment that may require decontamination are:

- Non-disposable air sampling equipment;
- Water level probes;
- Reusable bailers;
- Containers used to obtain composite samples;
- Water filtration apparatus;
- Concrete or soil coring devices; and
- Drill rig or other heavy equipment.

2.0 SUMMARY OF METHOD

Sampling equipment is cleaned between sampling locations to minimize the potential for cross-contamination. Basic decontamination procedures consist of soap and water, tap water, and/or deionized water rinses. More involved decontamination procedures may be specified and described in the project work plan or Quality Assurance Project Plan (QAPP).

3.0 HEALTH AND SAFETY WARNINGS

Minimum personal protective equipment (PPE) to be worn during decontamination procedures consists of safety glasses or goggles, latex or nitrile gloves, and steel-toed safety boots. Additional PPE may be required by the work plan or project Health and Safety plan. Use caution when handling organic solvents and non-phosphate detergents to prevent spills, leaks, or contact with incompatible materials. Also, ensure that ventilation is adequate when using volatile solvents for decontamination. Material safety data sheets (MSDS) for all chemical substances used during decontamination should be available at the site where decontamination activities are performed.

4.0 INTERFERENCES

Not Applicable

5.0 PERSONNEL QUALIFICATIONS

Personnel conducting decontamination activities should be familiar with the usage of the equipment being cleaned, and with the intended suite of analytes for samples collected with the equipment, if any. Additional training such as 40-hour HAZWOPER certification may be required for decontamination of equipment that has contacted hazardous material.

6.0 EQUIPMENT AND SUPPLIES

- Tap water;
- Deionized water;
- Organic solvent (acetone, hexane, methanol);
- Non-phosphate detergent;
- Plastic sheeting;
- Pressure washer;
- Latex or nitrile gloves;
- Buckets; and
- Brushes.

7.0 PROCEDURE

1. Select an appropriate area for cleaning and drying equipment to be decontaminated. The area should be free of potential contaminants and sheltered from inclement weather (if possible). Cover decontamination area with plastic sheeting if necessary.
2. Disassemble any equipment that may have trapped material within components.
3. For equipment used to sample for inorganic constituents, the following three-step process is usually sufficient for decontamination:

   - Wash equipment in warm water and non-phosphate detergent, scrubbing with brushes as necessary to remove visible contaminants;
   - Rinse equipment with clean tap water;
   - Rinse equipment with deionized (DI) water and air dry.

   For organic parameters, decontamination of water or soil sampling equipment may require additional steps:

   - Rinse equipment with solvent (hexane, acetone); and
   - Rinse equipment with DI water and air dry.

Note that organic solvents will not be used for decontamination when cleaning equipment for use in collecting volatile constituents in air samples.

4. Rinse water from decontamination should be disposed of according to work plan requirements. Moderate quantities of non-hazardous rinse water can typically be disposed of on the ground. Organic solvents should be containerized and disposed of in accordance with local environmental regulations.
5. Heavy equipment used for sampling purposes (including drill rig auger flights and tools) should be cleaned as necessary between sampling locations with a hot- or cold-water pressure washer. If practical, soap and water may be used to scrub equipment as well.

6. DI water should be obtained from a source with documented capability to produce contaminant-free water. The source of DI water used and other specifics of decontamination procedures should be recorded in the field notebook.
7. Drying and storage of decontaminated equipment should be in a contaminated-free, protected area if possible. Equipment that will not be used again immediately may be storage in plastic bags or other clean containers for additional protection.

8.0 DATA AND RECORDS MANAGEMENT

Decontamination procedures will be documented in the field notebook, which is maintained in accordance with HSOP-31.

9.0 QUALITY CONTROL/QUALITY ASSURANCE

The effectiveness of decontamination procedures and the potential for cross-contamination of samples may be assessed through the collection and analysis of equipment rinsate blank samples, as described in HSOP-13. In general, equipment rinsate blank collection involves thoroughly decontaminating sampling equipment, then rinsing the clean equipment with deionized water, and capturing the rinse water in containers to be submitted to the laboratory for the parameters of interest. The project work plan and QAPP should be reviewed for project-specific directions regarding collection and analysis of equipment rinsate blanks.

10.0 REFERENCES

Hydrometrics HSOP-13: Equipment Rinsate Blank Collection

Hydrometrics HSOP-31: Field Notebooks

HSOP-31

FIELD NOTEBOOKS

Prepared by: Mark T Walker **Date:** 6/04

Reviewed by: Walter Crane **Date:** 6/04

Approved by: Michael R. Wright **Date:** 6/04

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1.0 SCOPE AND APPLICATION

HSOP-31 presents general guidance on recording field activities in a dedicated project notebook. Field books are intended to provide sufficient data and observations to enable participants to reconstruct events that occurred during the implementation of the project. In legal proceedings, field notes are typically admissible as evidence and subject to cross-examination.

2.0 SUMMARY OF METHOD

Bound notebooks with sequentially numbered pages are used to record observations, sampling information, weather conditions, and other pertinent information during field activities. Entries are made in permanent ink, and signed and dated at the bottom of each page. Both original notebooks and copies of field notes are retained as part of the project file.

3.0 HEALTH AND SAFETY WARNINGS

Field personnel should be aware of the health and safety precautions to be followed during any field event, and should be familiar with any project-specific hazards. This may include review of project-specific health and safety plans, site-specific and/or organization-specific safety requirements and training.

4.0 INTERFERENCES

The primary potential problem with recording information in field notebooks is dealing with incorrect entries. In no case should erasures be made or information be obliterated or made illegible. Errors should simply be crossed out with a single line, dated, and initialed by the person making the original entry.

5.0 PERSONNEL QUALIFICATIONS

No specific qualifications are necessary for recording information in field notebooks. Personnel should be familiar with the scope and objectives of the project in order to record more meaningful field observations.

6.0 EQUIPMENT AND SUPPLIES

- Bound notebook with water resistant, sequentially numbered pages
- Pen (indelible ink)

7.0 PROCEDURE

1. New field notebooks should be labeled with the project title and number on the cover. Inside the front cover, write Hydrometrics' address and phone number as contact

information, in case the notebook is lost. Multiple field notebooks may be required for large or ongoing projects; these should be assigned sequential numbers or labeled on the cover with the inclusive dates of observations recorded in the notebook (e.g., Project X, May 2002 through May 2004).

2. Notebook entries should begin on a fresh page for each day during a field event. While specific entry formats may vary with personal preference, the intent of the field notebook is to provide a daily record of significant events, observations, and measurements, as well as sampling information. All entries should be accompanied by date and time. Examples of information to be recorded in the field notebook includes:

   - Weather conditions;
   - Personnel on-site, including arrival and departure times and identities of visitors and observers;
   - Purpose of daily activities;
   - Site sketch maps;
   - Health and safety briefing information;
   - Field meter calibration information;
   - Identification and description of sampling sites (see HSOP-2); and
   - Descriptions of photos taken;
   - Communication logs;
   - Documentation of deviation from methods;
   - Sampling instrument decontamination records.

   Sampling-specific information should include (see also HSOP-29):

   - Sample number, date, and time;
   - Site identifier;
   - Description of sample containers, preservation, and sample collection method;
   - Sample tag number (if applicable);
   - Field parameter measurements and water calibration (static water level, total well depth, pH, specific conductance, water temperature, turbidity, color, odor, etc.); and
   - Soil depth intervals and descriptions.

   This list is not meant to be exhaustive, and other pertinent information should also be recorded in the field notebook as determined by field personnel.

3. The field notebook will be used to record communication with individuals on-site and on the phone that could result in a deviation from the SAP or that could impact the quality of the data being collected as part of the investigations.

4. Observations and measurements should be recorded in indelible ink, at the time they are made.

5. If erroneous entries are recorded, corrections should be made by deleting incorrect information with a single line, and dating and initialing the deletion in the notebook. Do not erase or obliterate incorrect entries, or remove pages from the notebook.
6. Blank and unused portions of notebook pages should be crossed out with a single line.
7. At the conclusion of the field event, review notebook entries, sign and date each page (if not already done), and photocopy notebook pages for inclusion in the project file. Original notebooks may be maintained in the project file, or in the files of individual field personnel at the discretion of the project manager.

8.0 DATA AND RECORDS MANAGEMENT

Copies of field notes are retained in the project file. Original field notebooks are maintained in the project file, or in the files of individual field personnel at the discretion of the project manager. Completed (filled) notebooks should be placed in the project files or the Data Quality Department notebook library, at the discretion of the project manager. Copies of field notebooks should be updated in project files at the end of each field event.

9.0 QUALITY CONTROL/QUALITY ASSURANCE

Standard procedure requires review of field notes by a person other than the person who recorded the field notes, prior to entering the information into the project files, to check for inaccurate, incomplete, or unclear entries, blank pages, or other problems with documentation. Peer review of notebook entries should also be conducted at least once per day during field activities.

10.0 REFERENCES

Hydrometrics HSOP-2: Determination, Identification, and Description of Field Sampling Sites

Hydrometrics HSOP-29: Labeling and Documentation of Samples

Appendix C
Sample Location Survey Coordinates

Path: Y:\00_Proj\M\METG_486085\MapFiles\021209Request\Revised_03272015\GRID\2a.mxd Date Saved: 4/23/2015 12:24:06 PM

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P2a-DU1-bb	46.59821	-111.92702	865542.89503	1358818.99910
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P2a-DU1-e	46.59830	-111.92758	865577.26314	1358681.52667
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P2a-DU1-g	46.59839	-111.92744	865611.63124	1358715.89478
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P2a-DU2-bb	46.59824	-111.92620	865547.34484	1359026.68012
P2a-DU2-c	46.59814	-111.92674	865512.97673	1358889.20770
P2a-DU2-cc	46.59834	-111.92620	865581.71295	1359026.68012
P2a-DU2-d	46.59823	-111.92675	865547.34484	1358889.20770
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P2a-DU2-g	46.59841	-111.92662	865610.64500	1358923.20579
P2a-DU2-h	46.59833	-111.92661	865581.71295	1358923.57581
P2a-DU2-i	46.59823	-111.92661	865547.34484	1358923.57581
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P2a-DU2-u	46.59824	-111.92634	865547.34484	1358992.31202
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P2a-DU2-y	46.59796	-111.92619	865444.24052	1359026.68012
P2a-DU2-z	46.59805	-111.92619	865478.60863	1359026.68012

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P2a-DU3-b	46.59805	-111.92593	865475.12490	1359092.07301
P2a-DU3-bb	46.59825	-111.92539	865543.86111	1359229.54543
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P2a-DU3-cc	46.59834	-111.92540	865578.22922	1359229.54543
P2a-DU3-d	46.59824	-111.92594	865543.86111	1359092.07301
P2a-DU3-dd	46.59843	-111.92541	865609.37659	1359227.45521
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P2a-DU3-j	46.59815	-111.92580	865509.49301	1359126.44111
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P2a-DU3-l	46.59796	-111.92579	865440.75679	1359126.44111
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P2a-DU3-s	46.59843	-111.92554	865609.23948	1359193.60104
P2a-DU3-t	46.59834	-111.92553	865578.22922	1359195.17733
P2a-DU3-u	46.59825	-111.92553	865543.86111	1359195.17733
P2a-DU3-v	46.59815	-111.92552	865509.49301	1359195.17733
P2a-DU3-w	46.59806	-111.92552	865475.12490	1359195.17733
P2a-DU3-x	46.59796	-111.92552	865440.75679	1359195.17733
P2a-DU3-y	46.59797	-111.92538	865440.75679	1359229.54543
P2a-DU3-z	46.59806	-111.92538	865475.12490	1359229.54543

Station_ID	Latitude	Longitude	Northing	Easting
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P2a-DU4-bb	46.59759	-111.92972	865336.56623	1358135.12750
P2a-DU4-c	46.59749	-111.93023	865304.56609	1358007.12693
P2a-DU4-cc	46.59768	-111.92972	865368.56637	1358135.12750
P2a-DU4-d	46.59758	-111.93023	865336.56623	1358007.12693
P2a-DU4-dd	46.59776	-111.92973	865400.56651	1358135.12750
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P2a-DU4-k	46.59740	-111.93009	865272.56594	1358039.12708
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P2a-DU4-m	46.59732	-111.92996	865240.56580	1358071.12722
P2a-DU4-n	46.59741	-111.92997	865272.56594	1358071.12722
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P2a-DU4-v	46.59750	-111.92984	865304.56609	1358103.12736
P2a-DU4-w	46.59741	-111.92984	865272.56594	1358103.12736
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P2a-DU5-bb	46.59764	-111.92700	865334.18545	1358818.99910
P2a-DU5-c	46.59753	-111.92754	865299.81734	1358681.52667
P2a-DU5-cc	46.59773	-111.92700	865368.55356	1358818.99910
P2a-DU5-d	46.59763	-111.92755	865334.18545	1358681.52667
P2a-DU5-dd	46.59783	-111.92701	865402.92166	1358818.99910
P2a-DU5-e	46.59772	-111.92755	865368.55356	1358681.52667
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P2a-DU5-j	46.59754	-111.92741	865299.81734	1358715.89478
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P2a-DU5-m	46.59735	-111.92726	865231.08113	1358750.26289
P2a-DU5-n	46.59745	-111.92726	865265.44924	1358750.26289
P2a-DU5-o	46.59754	-111.92727	865299.81734	1358750.26289
P2a-DU5-p	46.59763	-111.92727	865334.18545	1358750.26289
P2a-DU5-q	46.59773	-111.92728	865368.55356	1358750.26289
P2a-DU5-r	46.59782	-111.92728	865402.92166	1358750.26289
P2a-DU5-s	46.59783	-111.92714	865402.92166	1358784.63099
P2a-DU5-t	46.59773	-111.92714	865368.55356	1358784.63099
P2a-DU5-u	46.59764	-111.92714	865334.18545	1358784.63099
P2a-DU5-v	46.59754	-111.92713	865299.81734	1358784.63099
P2a-DU5-w	46.59745	-111.92713	865265.44924	1358784.63099
P2a-DU5-x	46.59735	-111.92712	865231.08113	1358784.63099
P2a-DU5-y	46.59736	-111.92699	865231.08113	1358818.99910
P2a-DU5-z	46.59745	-111.92699	865265.44924	1358818.99910

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU6-a	46.59738	-111.92671	865235.53094	1358889.20770
P2a-DU6-aa	46.59758	-111.92617	865304.26715	1359026.68012
P2a-DU6-b	46.59747	-111.92671	865269.89905	1358889.20770
P2a-DU6-bb	46.59767	-111.92617	865338.63526	1359026.68012
P2a-DU6-c	46.59756	-111.92672	865304.26715	1358889.20770
P2a-DU6-cc	46.59776	-111.92618	865373.00336	1359026.68012
P2a-DU6-d	46.59766	-111.92672	865338.63526	1358889.20770
P2a-DU6-dd	46.59784	-111.92619	865401.79783	1359024.92210
P2a-DU6-e	46.59775	-111.92672	865373.00336	1358889.20770
P2a-DU6-f	46.59784	-111.92673	865403.73160	1358888.01118
P2a-DU6-g	46.59784	-111.92660	865402.95810	1358922.04553
P2a-DU6-h	46.59776	-111.92659	865373.00336	1358923.57581
P2a-DU6-i	46.59766	-111.92658	865338.63526	1358923.57581
P2a-DU6-j	46.59757	-111.92658	865304.26715	1358923.57581
P2a-DU6-k	46.59747	-111.92658	865269.89905	1358923.57581
P2a-DU6-l	46.59738	-111.92657	865235.53094	1358923.57581
P2a-DU6-m	46.59738	-111.92643	865235.53094	1358957.94391
P2a-DU6-n	46.59748	-111.92644	865269.89905	1358957.94391
P2a-DU6-o	46.59757	-111.92644	865304.26715	1358957.94391
P2a-DU6-p	46.59766	-111.92645	865338.63526	1358957.94391
P2a-DU6-q	46.59776	-111.92645	865373.00336	1358957.94391
P2a-DU6-r	46.59784	-111.92646	865402.57134	1358957.62690
P2a-DU6-s	46.59784	-111.92632	865401.79783	1358991.66126
P2a-DU6-t	46.59776	-111.92631	865373.00336	1358992.31202
P2a-DU6-u	46.59767	-111.92631	865338.63526	1358992.31202
P2a-DU6-v	46.59757	-111.92631	865304.26715	1358992.31202
P2a-DU6-w	46.59748	-111.92630	865269.89905	1358992.31202
P2a-DU6-x	46.59738	-111.92630	865235.53094	1358992.31202
P2a-DU6-y	46.59739	-111.92616	865235.53094	1359026.68012
P2a-DU6-z	46.59748	-111.92617	865269.89905	1359026.68012

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU7-a	46.59740	-111.92588	865236.60450	1359096.63030
P2a-DU7-aa	46.59760	-111.92534	865305.34072	1359234.10272
P2a-DU7-b	46.59749	-111.92589	865270.97261	1359096.63030
P2a-DU7-bb	46.59769	-111.92535	865339.70882	1359234.10272
P2a-DU7-c	46.59758	-111.92589	865305.34072	1359096.63030
P2a-DU7-cc	46.59778	-111.92535	865374.07693	1359234.10272
P2a-DU7-d	46.59768	-111.92590	865339.70882	1359096.63030
P2a-DU7-dd	46.59788	-111.92536	865407.38010	1359233.48896
P2a-DU7-e	46.59777	-111.92590	865374.07693	1359096.63030
P2a-DU7-f	46.59786	-111.92591	865406.85810	1359096.20285
P2a-DU7-g	46.59787	-111.92577	865407.90210	1359130.13288
P2a-DU7-h	46.59778	-111.92576	865374.07693	1359130.99841
P2a-DU7-i	46.59768	-111.92576	865339.70882	1359130.99841
P2a-DU7-j	46.59759	-111.92575	865305.34072	1359130.99841
P2a-DU7-k	46.59749	-111.92575	865270.97261	1359130.99841
P2a-DU7-l	46.59740	-111.92575	865236.60450	1359130.99841
P2a-DU7-m	46.59740	-111.92561	865236.60450	1359165.36651
P2a-DU7-n	46.59750	-111.92561	865270.97261	1359165.36651
P2a-DU7-o	46.59759	-111.92562	865305.34072	1359165.36651
P2a-DU7-p	46.59768	-111.92562	865339.70882	1359165.36651
P2a-DU7-q	46.59778	-111.92563	865374.07693	1359165.36651
P2a-DU7-r	46.59787	-111.92563	865407.38010	1359164.58490
P2a-DU7-s	46.59787	-111.92550	865407.90210	1359198.51493
P2a-DU7-t	46.59778	-111.92549	865374.07693	1359199.73462
P2a-DU7-u	46.59769	-111.92549	865339.70882	1359199.73462
P2a-DU7-v	46.59759	-111.92548	865305.34072	1359199.73462
P2a-DU7-w	46.59750	-111.92548	865270.97261	1359199.73462
P2a-DU7-x	46.59741	-111.92547	865236.60450	1359199.73462
P2a-DU7-y	46.59741	-111.92534	865236.60450	1359234.10272
P2a-DU7-z	46.59750	-111.92534	865270.97261	1359234.10272

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU8-a	46.59675	-111.93019	865033.67948	1358007.23601
P2a-DU8-aa	46.59694	-111.92968	865099.02741	1358137.93188
P2a-DU8-b	46.59684	-111.93020	865066.35345	1358007.23601
P2a-DU8-bb	46.59703	-111.92968	865131.70138	1358137.93188
P2a-DU8-c	46.59693	-111.93020	865099.02741	1358007.23601
P2a-DU8-cc	46.59712	-111.92969	865164.37535	1358137.93188
P2a-DU8-d	46.59702	-111.93020	865131.70138	1358007.23601
P2a-DU8-dd	46.59721	-111.92969	865197.04931	1358137.93188
P2a-DU8-e	46.59711	-111.93021	865164.37535	1358007.23601
P2a-DU8-f	46.59720	-111.93021	865197.04931	1358007.23601
P2a-DU8-g	46.59720	-111.93008	865197.04931	1358039.90998
P2a-DU8-h	46.59711	-111.93008	865164.37535	1358039.90998
P2a-DU8-i	46.59702	-111.93007	865131.70138	1358039.90998
P2a-DU8-j	46.59693	-111.93007	865099.02741	1358039.90998
P2a-DU8-k	46.59684	-111.93007	865066.35345	1358039.90998
P2a-DU8-l	46.59675	-111.93006	865033.67948	1358039.90998
P2a-DU8-m	46.59675	-111.92993	865033.67948	1358072.58395
P2a-DU8-n	46.59684	-111.92994	865066.35345	1358072.58395
P2a-DU8-o	46.59693	-111.92994	865099.02741	1358072.58395
P2a-DU8-p	46.59702	-111.92994	865131.70138	1358072.58395
P2a-DU8-q	46.59711	-111.92995	865164.37535	1358072.58395
P2a-DU8-r	46.59720	-111.92995	865197.04931	1358072.58395
P2a-DU8-s	46.59720	-111.92982	865197.04931	1358105.25791
P2a-DU8-t	46.59711	-111.92982	865164.37535	1358105.25791
P2a-DU8-u	46.59702	-111.92981	865131.70138	1358105.25791
P2a-DU8-v	46.59693	-111.92981	865099.02741	1358105.25791
P2a-DU8-w	46.59685	-111.92981	865066.35345	1358105.25791
P2a-DU8-x	46.59676	-111.92980	865033.67948	1358105.25791
P2a-DU8-y	46.59676	-111.92967	865033.67948	1358137.93188
P2a-DU8-z	46.59685	-111.92968	865066.35345	1358137.93188

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU9-a	46.59676	-111.92940	865031.48027	1358206.00243
P2a-DU9-aa	46.59696	-111.92886	865100.21648	1358343.47485
P2a-DU9-b	46.59685	-111.92940	865065.84838	1358206.00243
P2a-DU9-bb	46.59705	-111.92887	865134.58459	1358343.47485
P2a-DU9-c	46.59695	-111.92941	865100.21648	1358206.00243
P2a-DU9-cc	46.59715	-111.92887	865168.95269	1358343.47485
P2a-DU9-d	46.59704	-111.92941	865134.58459	1358206.00243
P2a-DU9-dd	46.59723	-111.92888	865200.18086	1358342.91376
P2a-DU9-e	46.59714	-111.92942	865168.95269	1358206.00243
P2a-DU9-f	46.59722	-111.92942	865198.67967	1358205.42650
P2a-DU9-g	46.59722	-111.92929	865199.24076	1358238.86934
P2a-DU9-h	46.59714	-111.92928	865168.95269	1358240.37053
P2a-DU9-i	46.59704	-111.92928	865134.58459	1358240.37053
P2a-DU9-j	46.59695	-111.92927	865100.21648	1358240.37053
P2a-DU9-k	46.59686	-111.92927	865065.84838	1358240.37053
P2a-DU9-l	46.59676	-111.92926	865031.48027	1358240.37053
P2a-DU9-m	46.59676	-111.92913	865031.48027	1358274.73864
P2a-DU9-n	46.59686	-111.92913	865065.84838	1358274.73864
P2a-DU9-o	46.59695	-111.92914	865100.21648	1358274.73864
P2a-DU9-p	46.59705	-111.92914	865134.58459	1358274.73864
P2a-DU9-q	46.59714	-111.92914	865168.95269	1358274.73864
P2a-DU9-r	46.59723	-111.92915	865199.80185	1358273.05537
P2a-DU9-s	46.59723	-111.92901	865200.36294	1358308.72774
P2a-DU9-t	46.59714	-111.92901	865168.95269	1358309.10674
P2a-DU9-u	46.59705	-111.92900	865134.58459	1358309.10674
P2a-DU9-v	46.59696	-111.92900	865100.21648	1358309.10674
P2a-DU9-w	46.59686	-111.92899	865065.84838	1358309.10674
P2a-DU9-x	46.59677	-111.92899	865031.48027	1358309.10674
P2a-DU9-y	46.59677	-111.92885	865031.48027	1358343.47485
P2a-DU9-z	46.59686	-111.92886	865065.84838	1358343.47485

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU10-a	46.59620	-111.92857	864823.08420	1358409.26221
P2a-DU10-aa	46.59640	-111.92817	864890.83008	1358510.88104
P2a-DU10-b	46.59630	-111.92857	864856.95714	1358409.26221
P2a-DU10-bb	46.59631	-111.92817	864856.95714	1358510.88104
P2a-DU10-c	46.59639	-111.92857	864890.83008	1358409.26221
P2a-DU10-cc	46.59621	-111.92816	864823.08420	1358510.88104
P2a-DU10-d	46.59648	-111.92858	864924.70303	1358409.26221
P2a-DU10-dd	46.59622	-111.92803	864823.08420	1358544.75398
P2a-DU10-e	46.59658	-111.92858	864958.57597	1358409.26221
P2a-DU10-f	46.59667	-111.92859	864992.44891	1358409.26221
P2a-DU10-g	46.59676	-111.92859	865026.32186	1358409.26221
P2a-DU10-h	46.59685	-111.92860	865060.19480	1358409.26221
P2a-DU10-i	46.59695	-111.92860	865094.06775	1358409.26221
P2a-DU10-j	46.59704	-111.92860	865127.94069	1358409.26221
P2a-DU10-k	46.59686	-111.92846	865060.19480	1358443.13515
P2a-DU10-l	46.59676	-111.92846	865026.32186	1358443.13515
P2a-DU10-m	46.59667	-111.92845	864992.44891	1358443.13515
P2a-DU10-n	46.59658	-111.92845	864958.57597	1358443.13515
P2a-DU10-o	46.59649	-111.92844	864924.70303	1358443.13515
P2a-DU10-p	46.59639	-111.92844	864890.83008	1358443.13515
P2a-DU10-q	46.59630	-111.92844	864856.95714	1358443.13515
P2a-DU10-r	46.59621	-111.92843	864823.08420	1358443.13515
P2a-DU10-s	46.59621	-111.92830	864823.08420	1358477.00809
P2a-DU10-t	46.59630	-111.92830	864856.95714	1358477.00809
P2a-DU10-u	46.59640	-111.92831	864890.83008	1358477.00809
P2a-DU10-v	46.59649	-111.92831	864924.70303	1358477.00809
P2a-DU10-w	46.59658	-111.92831	864958.57597	1358477.00809
P2a-DU10-x	46.59667	-111.92832	864992.44891	1358477.00809
P2a-DU10-y	46.59677	-111.92832	865026.32186	1358477.00809
P2a-DU10-z	46.59649	-111.92817	864924.70303	1358510.88104

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU11-a	46.59677	-111.92751	865022.37155	1358681.52667
P2a-DU11-aa	46.59697	-111.92697	865091.10776	1358818.99910
P2a-DU11-b	46.59687	-111.92751	865056.73966	1358681.52667
P2a-DU11-bb	46.59707	-111.92697	865125.47587	1358818.99910
P2a-DU11-c	46.59696	-111.92752	865091.10776	1358681.52667
P2a-DU11-cc	46.59716	-111.92698	865159.84397	1358818.99910
P2a-DU11-d	46.59706	-111.92752	865125.47587	1358681.52667
P2a-DU11-dd	46.59726	-111.92698	865194.21208	1358818.99910
P2a-DU11-e	46.59715	-111.92752	865159.84397	1358681.52667
P2a-DU11-f	46.59724	-111.92753	865194.21208	1358681.52667
P2a-DU11-g	46.59725	-111.92739	865194.21208	1358715.89478
P2a-DU11-h	46.59715	-111.92739	865159.84397	1358715.89478
P2a-DU11-i	46.59706	-111.92738	865125.47587	1358715.89478
P2a-DU11-j	46.59696	-111.92738	865091.10776	1358715.89478
P2a-DU11-k	46.59687	-111.92738	865056.73966	1358715.89478
P2a-DU11-l	46.59678	-111.92737	865022.37155	1358715.89478
P2a-DU11-m	46.59678	-111.92723	865022.37155	1358750.26289
P2a-DU11-n	46.59687	-111.92724	865056.73966	1358750.26289
P2a-DU11-o	46.59697	-111.92724	865091.10776	1358750.26289
P2a-DU11-p	46.59706	-111.92725	865125.47587	1358750.26289
P2a-DU11-q	46.59716	-111.92725	865159.84397	1358750.26289
P2a-DU11-r	46.59725	-111.92726	865194.21208	1358750.26289
P2a-DU11-s	46.59725	-111.92712	865194.21208	1358784.63099
P2a-DU11-t	46.59716	-111.92711	865159.84397	1358784.63099
P2a-DU11-u	46.59707	-111.92711	865125.47587	1358784.63099
P2a-DU11-v	46.59697	-111.92711	865091.10776	1358784.63099
P2a-DU11-w	46.59688	-111.92710	865056.73966	1358784.63099
P2a-DU11-x	46.59678	-111.92710	865022.37155	1358784.63099
P2a-DU11-y	46.59679	-111.92696	865022.37155	1358818.99910
P2a-DU11-z	46.59688	-111.92696	865056.73966	1358818.99910

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU12-a	46.59680	-111.92668	865026.82136	1358889.20770
P2a-DU12-aa	46.59700	-111.92614	865095.55757	1359026.68012
P2a-DU12-b	46.59690	-111.92669	865061.18946	1358889.20770
P2a-DU12-bb	46.59710	-111.92615	865129.92567	1359026.68012
P2a-DU12-c	46.59699	-111.92669	865095.55757	1358889.20770
P2a-DU12-cc	46.59719	-111.92615	865164.29378	1359026.68012
P2a-DU12-d	46.59709	-111.92669	865129.92567	1358889.20770
P2a-DU12-dd	46.59729	-111.92616	865198.66189	1359026.68012
P2a-DU12-e	46.59718	-111.92670	865164.29378	1358889.20770
P2a-DU12-f	46.59727	-111.92670	865198.66189	1358889.20770
P2a-DU12-g	46.59728	-111.92657	865198.66189	1358923.57581
P2a-DU12-h	46.59718	-111.92656	865164.29378	1358923.57581
P2a-DU12-i	46.59709	-111.92656	865129.92567	1358923.57581
P2a-DU12-j	46.59699	-111.92655	865095.55757	1358923.57581
P2a-DU12-k	46.59690	-111.92655	865061.18946	1358923.57581
P2a-DU12-l	46.59681	-111.92655	865026.82136	1358923.57581
P2a-DU12-m	46.59681	-111.92641	865026.82136	1358957.94391
P2a-DU12-n	46.59690	-111.92641	865061.18946	1358957.94391
P2a-DU12-o	46.59700	-111.92642	865095.55757	1358957.94391
P2a-DU12-p	46.59709	-111.92642	865129.92567	1358957.94391
P2a-DU12-q	46.59719	-111.92643	865164.29378	1358957.94391
P2a-DU12-r	46.59728	-111.92643	865198.66189	1358957.94391
P2a-DU12-s	46.59728	-111.92629	865198.66189	1358992.31202
P2a-DU12-t	46.59719	-111.92629	865164.29378	1358992.31202
P2a-DU12-u	46.59709	-111.92628	865129.92567	1358992.31202
P2a-DU12-v	46.59700	-111.92628	865095.55757	1358992.31202
P2a-DU12-w	46.59691	-111.92628	865061.18946	1358992.31202
P2a-DU12-x	46.59681	-111.92627	865026.82136	1358992.31202
P2a-DU12-y	46.59682	-111.92614	865026.82136	1359026.68012
P2a-DU12-z	46.59691	-111.92614	865061.18946	1359026.68012

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU13-a	46.59682	-111.92586	865027.89492	1359096.63030
P2a-DU13-aa	46.59702	-111.92532	865096.63113	1359234.10272
P2a-DU13-b	46.59692	-111.92586	865062.26303	1359096.63030
P2a-DU13-bb	46.59712	-111.92532	865130.99924	1359234.10272
P2a-DU13-c	46.59701	-111.92587	865096.63113	1359096.63030
P2a-DU13-cc	46.59721	-111.92533	865165.36734	1359234.10272
P2a-DU13-d	46.59711	-111.92587	865130.99924	1359096.63030
P2a-DU13-dd	46.59731	-111.92533	865199.10193	1359233.48896
P2a-DU13-e	46.59720	-111.92587	865165.36734	1359096.63030
P2a-DU13-f	46.59729	-111.92588	865199.62393	1359097.24685
P2a-DU13-g	46.59730	-111.92574	865199.10193	1359130.13288
P2a-DU13-h	46.59720	-111.92574	865165.36734	1359130.99841
P2a-DU13-i	46.59711	-111.92573	865130.99924	1359130.99841
P2a-DU13-j	46.59702	-111.92573	865096.63113	1359130.99841
P2a-DU13-k	46.59692	-111.92572	865062.26303	1359130.99841
P2a-DU13-l	46.59683	-111.92572	865027.89492	1359130.99841
P2a-DU13-m	46.59683	-111.92558	865027.89492	1359165.36651
P2a-DU13-n	46.59692	-111.92559	865062.26303	1359165.36651
P2a-DU13-o	46.59702	-111.92559	865096.63113	1359165.36651
P2a-DU13-p	46.59711	-111.92560	865130.99924	1359165.36651
P2a-DU13-q	46.59721	-111.92560	865165.36734	1359165.36651
P2a-DU13-r	46.59730	-111.92561	865199.10193	1359164.58490
P2a-DU13-s	46.59730	-111.92547	865199.10193	1359199.03693
P2a-DU13-t	46.59721	-111.92546	865165.36734	1359199.73462
P2a-DU13-u	46.59712	-111.92546	865130.99924	1359199.73462
P2a-DU13-v	46.59702	-111.92546	865096.63113	1359199.73462
P2a-DU13-w	46.59693	-111.92545	865062.26303	1359199.73462
P2a-DU13-x	46.59683	-111.92545	865027.89492	1359199.73462
P2a-DU13-y	46.59684	-111.92531	865027.89492	1359234.10272
P2a-DU13-z	46.59693	-111.92531	865062.26303	1359234.10272

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU14-a	46.59617	-111.93016	864824.55682	1358008.08146
P2a-DU14-aa	46.59637	-111.92964	864891.22517	1358141.41815
P2a-DU14-b	46.59627	-111.93017	864857.89100	1358008.08146
P2a-DU14-bb	46.59646	-111.92964	864924.55935	1358141.41815
P2a-DU14-c	46.59636	-111.93017	864891.22517	1358008.08146
P2a-DU14-cc	46.59655	-111.92965	864957.89352	1358141.41815
P2a-DU14-d	46.59645	-111.93017	864924.55935	1358008.08146
P2a-DU14-dd	46.59664	-111.92965	864991.22769	1358141.41815
P2a-DU14-e	46.59654	-111.93018	864957.89352	1358008.08146
P2a-DU14-f	46.59663	-111.93018	864991.22769	1358008.08146
P2a-DU14-g	46.59663	-111.93005	864991.22769	1358041.41563
P2a-DU14-h	46.59654	-111.93005	864957.89352	1358041.41563
P2a-DU14-i	46.59645	-111.93004	864924.55935	1358041.41563
P2a-DU14-j	46.59636	-111.93004	864891.22517	1358041.41563
P2a-DU14-k	46.59627	-111.93003	864857.89100	1358041.41563
P2a-DU14-l	46.59618	-111.93003	864824.55682	1358041.41563
P2a-DU14-m	46.59618	-111.92990	864824.55682	1358074.74980
P2a-DU14-n	46.59627	-111.92990	864857.89100	1358074.74980
P2a-DU14-o	46.59636	-111.92991	864891.22517	1358074.74980
P2a-DU14-p	46.59645	-111.92991	864924.55935	1358074.74980
P2a-DU14-q	46.59655	-111.92991	864957.89352	1358074.74980
P2a-DU14-r	46.59664	-111.92992	864991.22769	1358074.74980
P2a-DU14-s	46.59664	-111.92979	864991.22769	1358108.08398
P2a-DU14-t	46.59655	-111.92978	864957.89352	1358108.08398
P2a-DU14-u	46.59646	-111.92978	864924.55935	1358108.08398
P2a-DU14-v	46.59637	-111.92977	864891.22517	1358108.08398
P2a-DU14-w	46.59627	-111.92977	864857.89100	1358108.08398
P2a-DU14-x	46.59618	-111.92976	864824.55682	1358108.08398
P2a-DU14-y	46.59619	-111.92963	864824.55682	1358141.41815
P2a-DU14-z	46.59628	-111.92964	864857.89100	1358141.41815

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU15-a	46.59618	-111.92937	864819.59593	1358208.27191
P2a-DU15-aa	46.59638	-111.92883	864888.33214	1358345.74433
P2a-DU15-b	46.59627	-111.92937	864853.96403	1358208.27191
P2a-DU15-bb	46.59647	-111.92883	864922.70025	1358345.74433
P2a-DU15-c	46.59637	-111.92937	864888.33214	1358208.27191
P2a-DU15-cc	46.59657	-111.92884	864957.06835	1358345.74433
P2a-DU15-d	46.59646	-111.92938	864922.70025	1358208.27191
P2a-DU15-dd	46.59665	-111.92884	864988.47693	1358345.12035
P2a-DU15-e	46.59655	-111.92938	864957.06835	1358208.27191
P2a-DU15-f	46.59664	-111.92939	864988.47693	1358207.63308
P2a-DU15-g	46.59665	-111.92925	864989.22010	1358241.81911
P2a-DU15-h	46.59656	-111.92925	864957.06835	1358242.64001
P2a-DU15-i	46.59646	-111.92924	864922.70025	1358242.64001
P2a-DU15-j	46.59637	-111.92924	864888.33214	1358242.64001
P2a-DU15-k	46.59627	-111.92923	864853.96403	1358242.64001
P2a-DU15-l	46.59618	-111.92923	864819.59593	1358242.64001
P2a-DU15-m	46.59618	-111.92909	864819.59593	1358277.00812
P2a-DU15-n	46.59628	-111.92910	864853.96403	1358277.00812
P2a-DU15-o	46.59637	-111.92910	864888.33214	1358277.00812
P2a-DU15-p	46.59647	-111.92910	864922.70025	1358277.00812
P2a-DU15-q	46.59656	-111.92911	864957.06835	1358277.00812
P2a-DU15-r	46.59665	-111.92912	864989.22010	1358275.26195
P2a-DU15-s	46.59665	-111.92897	864989.22010	1358311.67750
P2a-DU15-t	46.59656	-111.92897	864957.06835	1358311.37622
P2a-DU15-u	46.59647	-111.92897	864922.70025	1358311.37622
P2a-DU15-v	46.59637	-111.92896	864888.33214	1358311.37622
P2a-DU15-w	46.59628	-111.92896	864853.96403	1358311.37622
P2a-DU15-x	46.59619	-111.92896	864819.59593	1358311.37622
P2a-DU15-y	46.59619	-111.92882	864819.59593	1358345.74433
P2a-DU15-z	46.59628	-111.92882	864853.96403	1358345.74433

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU16-a	46.59620	-111.92748	864813.66197	1358681.52667
P2a-DU16-aa	46.59640	-111.92694	864882.39818	1358818.99910
P2a-DU16-b	46.59630	-111.92749	864848.03007	1358681.52667
P2a-DU16-bb	46.59650	-111.92695	864916.76629	1358818.99910
P2a-DU16-c	46.59639	-111.92749	864882.39818	1358681.52667
P2a-DU16-cc	46.59659	-111.92695	864951.13439	1358818.99910
P2a-DU16-d	46.59648	-111.92749	864916.76629	1358681.52667
P2a-DU16-dd	46.59668	-111.92696	864985.50250	1358818.99910
P2a-DU16-e	46.59658	-111.92750	864951.13439	1358681.52667
P2a-DU16-f	46.59667	-111.92750	864985.50250	1358681.52667
P2a-DU16-g	46.59668	-111.92737	864985.50250	1358715.89478
P2a-DU16-h	46.59658	-111.92736	864951.13439	1358715.89478
P2a-DU16-i	46.59649	-111.92736	864916.76629	1358715.89478
P2a-DU16-j	46.59639	-111.92735	864882.39818	1358715.89478
P2a-DU16-k	46.59630	-111.92735	864848.03007	1358715.89478
P2a-DU16-l	46.59620	-111.92735	864813.66197	1358715.89478
P2a-DU16-m	46.59621	-111.92721	864813.66197	1358750.26289
P2a-DU16-n	46.59630	-111.92721	864848.03007	1358750.26289
P2a-DU16-o	46.59640	-111.92722	864882.39818	1358750.26289
P2a-DU16-p	46.59649	-111.92722	864916.76629	1358750.26289
P2a-DU16-q	46.59658	-111.92723	864951.13439	1358750.26289
P2a-DU16-r	46.59668	-111.92723	864985.50250	1358750.26289
P2a-DU16-s	46.59668	-111.92709	864985.50250	1358784.63099
P2a-DU16-t	46.59659	-111.92709	864951.13439	1358784.63099
P2a-DU16-u	46.59649	-111.92708	864916.76629	1358784.63099
P2a-DU16-v	46.59640	-111.92708	864882.39818	1358784.63099
P2a-DU16-w	46.59630	-111.92708	864848.03007	1358784.63099
P2a-DU16-x	46.59621	-111.92707	864813.66197	1358784.63099
P2a-DU16-y	46.59621	-111.92694	864813.66197	1358818.99910
P2a-DU16-z	46.59631	-111.92694	864848.03007	1358818.99910

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU17-a	46.59623	-111.92666	864818.11177	1358889.20770
P2a-DU17-aa	46.59643	-111.92612	864886.84799	1359026.68012
P2a-DU17-b	46.59633	-111.92666	864852.47988	1358889.20770
P2a-DU17-bb	46.59653	-111.92612	864921.21609	1359026.68012
P2a-DU17-c	46.59642	-111.92666	864886.84799	1358889.20770
P2a-DU17-cc	46.59662	-111.92613	864955.58420	1359026.68012
P2a-DU17-d	46.59651	-111.92667	864921.21609	1358889.20770
P2a-DU17-dd	46.59671	-111.92614	864989.13130	1359024.92210
P2a-DU17-e	46.59661	-111.92667	864955.58420	1358889.20770
P2a-DU17-f	46.59670	-111.92668	864989.95230	1358889.20770
P2a-DU17-g	46.59671	-111.92654	864989.95230	1358923.57581
P2a-DU17-h	46.59661	-111.92654	864955.58420	1358923.57581
P2a-DU17-i	46.59652	-111.92653	864921.21609	1358923.57581
P2a-DU17-j	46.59642	-111.92653	864886.84799	1358923.57581
P2a-DU17-k	46.59633	-111.92652	864852.47988	1358923.57581
P2a-DU17-l	46.59623	-111.92652	864818.11177	1358923.57581
P2a-DU17-m	46.59624	-111.92638	864818.11177	1358957.94391
P2a-DU17-n	46.59633	-111.92639	864852.47988	1358957.94391
P2a-DU17-o	46.59643	-111.92639	864886.84799	1358957.94391
P2a-DU17-p	46.59652	-111.92640	864921.21609	1358957.94391
P2a-DU17-q	46.59661	-111.92640	864955.58420	1358957.94391
P2a-DU17-r	46.59671	-111.92640	864989.95230	1358957.94391
P2a-DU17-s	46.59671	-111.92627	864988.74454	1358991.66126
P2a-DU17-t	46.59662	-111.92626	864955.58420	1358992.31202
P2a-DU17-u	46.59652	-111.92626	864921.21609	1358992.31202
P2a-DU17-v	46.59643	-111.92625	864886.84799	1358992.31202
P2a-DU17-w	46.59633	-111.92625	864852.47988	1358992.31202
P2a-DU17-x	46.59624	-111.92625	864818.11177	1358992.31202
P2a-DU17-y	46.59624	-111.92611	864818.11177	1359026.68012
P2a-DU17-z	46.59634	-111.92611	864852.47988	1359026.68012

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU18-a	46.59624	-111.92583	864813.97701	1359096.63030
P2a-DU18-aa	46.59644	-111.92529	864882.71322	1359234.10272
P2a-DU18-b	46.59633	-111.92583	864848.34511	1359096.63030
P2a-DU18-bb	46.59653	-111.92530	864917.08132	1359234.10272
P2a-DU18-c	46.59643	-111.92584	864882.71322	1359096.63030
P2a-DU18-cc	46.59663	-111.92530	864951.44943	1359234.10272
P2a-DU18-d	46.59652	-111.92584	864917.08132	1359096.63030
P2a-DU18-dd	46.59672	-111.92531	864984.54992	1359232.66354
P2a-DU18-e	46.59661	-111.92585	864951.44943	1359096.63030
P2a-DU18-f	46.59671	-111.92585	864985.30360	1359095.94479
P2a-DU18-g	46.59671	-111.92572	864984.13861	1359129.79896
P2a-DU18-h	46.59662	-111.92571	864951.44943	1359130.99841
P2a-DU18-i	46.59652	-111.92571	864917.08132	1359130.99841
P2a-DU18-j	46.59643	-111.92570	864882.71322	1359130.99841
P2a-DU18-k	46.59633	-111.92570	864848.34511	1359130.99841
P2a-DU18-l	46.59624	-111.92569	864813.97701	1359130.99841
P2a-DU18-m	46.59624	-111.92556	864813.97701	1359165.36651
P2a-DU18-n	46.59634	-111.92556	864848.34511	1359165.36651
P2a-DU18-o	46.59643	-111.92557	864882.71322	1359165.36651
P2a-DU18-p	46.59653	-111.92557	864917.08132	1359165.36651
P2a-DU18-q	46.59662	-111.92557	864951.44943	1359165.36651
P2a-DU18-r	46.59671	-111.92558	864983.62468	1359164.30416
P2a-DU18-s	46.59671	-111.92545	864983.76178	1359197.50729
P2a-DU18-t	46.59662	-111.92544	864951.44943	1359199.73462
P2a-DU18-u	46.59653	-111.92543	864917.08132	1359199.73462
P2a-DU18-v	46.59643	-111.92543	864882.71322	1359199.73462
P2a-DU18-w	46.59634	-111.92542	864848.34511	1359199.73462
P2a-DU18-x	46.59625	-111.92542	864813.97701	1359199.73462
P2a-DU18-y	46.59625	-111.92528	864813.97701	1359234.10272
P2a-DU18-z	46.59634	-111.92529	864848.34511	1359234.10272

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU19-a	46.59559	-111.93014	864610.96871	1358005.94779
P2a-DU19-aa	46.59579	-111.92961	864678.93182	1358141.87401
P2a-DU19-b	46.59568	-111.93015	864644.95027	1358005.94779
P2a-DU19-bb	46.59588	-111.92962	864712.91338	1358141.87401
P2a-DU19-c	46.59577	-111.93015	864678.93182	1358005.94779
P2a-DU19-cc	46.59597	-111.92962	864746.89494	1358141.87401
P2a-DU19-d	46.59587	-111.93016	864712.91338	1358005.94779
P2a-DU19-dd	46.59607	-111.92962	864780.87649	1358141.87401
P2a-DU19-e	46.59596	-111.93016	864746.89494	1358005.94779
P2a-DU19-f	46.59605	-111.93017	864780.87649	1358005.94779
P2a-DU19-g	46.59606	-111.93003	864780.87649	1358039.92935
P2a-DU19-h	46.59596	-111.93003	864746.89494	1358039.92935
P2a-DU19-i	46.59587	-111.93002	864712.91338	1358039.92935
P2a-DU19-j	46.59578	-111.93002	864678.93182	1358039.92935
P2a-DU19-k	46.59568	-111.93001	864644.95027	1358039.92935
P2a-DU19-l	46.59559	-111.93001	864610.96871	1358039.92935
P2a-DU19-m	46.59559	-111.92987	864610.96871	1358073.91090
P2a-DU19-n	46.59569	-111.92988	864644.95027	1358073.91090
P2a-DU19-o	46.59578	-111.92988	864678.93182	1358073.91090
P2a-DU19-p	46.59587	-111.92989	864712.91338	1358073.91090
P2a-DU19-q	46.59597	-111.92989	864746.89494	1358073.91090
P2a-DU19-r	46.59606	-111.92990	864780.87649	1358073.91090
P2a-DU19-s	46.59606	-111.92976	864780.87649	1358107.89246
P2a-DU19-t	46.59597	-111.92976	864746.89494	1358107.89246
P2a-DU19-u	46.59588	-111.92975	864712.91338	1358107.89246
P2a-DU19-v	46.59578	-111.92975	864678.93182	1358107.89246
P2a-DU19-w	46.59569	-111.92974	864644.95027	1358107.89246
P2a-DU19-x	46.59560	-111.92974	864610.96871	1358107.89246
P2a-DU19-y	46.59560	-111.92960	864610.96871	1358141.87401
P2a-DU19-z	46.59569	-111.92961	864644.95027	1358141.87401

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU20-a	46.59560	-111.92934	864610.88635	1358208.27191
P2a-DU20-aa	46.59581	-111.92880	864679.62256	1358345.74433
P2a-DU20-b	46.59570	-111.92934	864645.25445	1358208.27191
P2a-DU20-bb	46.59590	-111.92881	864713.99066	1358345.74433
P2a-DU20-c	46.59579	-111.92935	864679.62256	1358208.27191
P2a-DU20-cc	46.59599	-111.92881	864748.35877	1358345.74433
P2a-DU20-d	46.59589	-111.92935	864713.99066	1358208.27191
P2a-DU20-dd	46.59608	-111.92882	864780.33011	1358345.18324
P2a-DU20-e	46.59598	-111.92936	864748.35877	1358208.27191
P2a-DU20-f	46.59607	-111.92936	864780.31527	1358208.43915
P2a-DU20-g	46.59607	-111.92922	864779.39001	1358242.62517
P2a-DU20-h	46.59598	-111.92922	864748.35877	1358242.64001
P2a-DU20-i	46.59589	-111.92922	864713.99066	1358242.64001
P2a-DU20-j	46.59580	-111.92921	864679.62256	1358242.64001
P2a-DU20-k	46.59570	-111.92921	864645.25445	1358242.64001
P2a-DU20-l	46.59561	-111.92920	864610.88635	1358242.64001
P2a-DU20-m	46.59561	-111.92907	864610.88635	1358277.00812
P2a-DU20-n	46.59570	-111.92907	864645.25445	1358277.00812
P2a-DU20-o	46.59580	-111.92907	864679.62256	1358277.00812
P2a-DU20-p	46.59589	-111.92908	864713.99066	1358277.00812
P2a-DU20-q	46.59599	-111.92908	864748.35877	1358277.00812
P2a-DU20-r	46.59608	-111.92909	864780.69428	1358276.81119
P2a-DU20-s	46.59608	-111.92895	864780.51219	1358311.74039
P2a-DU20-t	46.59599	-111.92895	864748.35877	1358311.37622
P2a-DU20-u	46.59590	-111.92894	864713.99066	1358311.37622
P2a-DU20-v	46.59580	-111.92894	864679.62256	1358311.37622
P2a-DU20-w	46.59571	-111.92893	864645.25445	1358311.37622
P2a-DU20-x	46.59561	-111.92893	864610.88635	1358311.37622
P2a-DU20-y	46.59562	-111.92879	864610.88635	1358345.74433
P2a-DU20-z	46.59571	-111.92880	864645.25445	1358345.74433

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU21-a	46.59562	-111.92849	864610.16315	1358420.65740
P2a-DU21-aa	46.59582	-111.92796	864678.89936	1358558.12983
P2a-DU21-b	46.59572	-111.92850	864644.53126	1358420.65740
P2a-DU21-bb	46.59592	-111.92796	864713.26747	1358558.12983
P2a-DU21-c	46.59581	-111.92850	864678.89936	1358420.65740
P2a-DU21-cc	46.59601	-111.92796	864747.63557	1358558.12983
P2a-DU21-d	46.59590	-111.92851	864713.26747	1358420.65740
P2a-DU21-dd	46.59610	-111.92797	864782.00368	1358558.12983
P2a-DU21-e	46.59600	-111.92851	864747.63557	1358420.65740
P2a-DU21-f	46.59609	-111.92852	864782.00368	1358420.65740
P2a-DU21-g	46.59610	-111.92838	864782.00368	1358455.02551
P2a-DU21-h	46.59600	-111.92837	864747.63557	1358455.02551
P2a-DU21-i	46.59591	-111.92837	864713.26747	1358455.02551
P2a-DU21-j	46.59581	-111.92837	864678.89936	1358455.02551
P2a-DU21-k	46.59572	-111.92836	864644.53126	1358455.02551
P2a-DU21-l	46.59562	-111.92836	864610.16315	1358455.02551
P2a-DU21-m	46.59563	-111.92822	864610.16315	1358489.39362
P2a-DU21-n	46.59572	-111.92823	864644.53126	1358489.39362
P2a-DU21-o	46.59582	-111.92823	864678.89936	1358489.39362
P2a-DU21-p	46.59591	-111.92823	864713.26747	1358489.39362
P2a-DU21-q	46.59600	-111.92824	864747.63557	1358489.39362
P2a-DU21-r	46.59610	-111.92824	864782.00368	1358489.39362
P2a-DU21-s	46.59610	-111.92811	864782.00368	1358523.76172
P2a-DU21-t	46.59601	-111.92810	864747.63557	1358523.76172
P2a-DU21-u	46.59591	-111.92810	864713.26747	1358523.76172
P2a-DU21-v	46.59582	-111.92809	864678.89936	1358523.76172
P2a-DU21-w	46.59572	-111.92809	864644.53126	1358523.76172
P2a-DU21-x	46.59563	-111.92808	864610.16315	1358523.76172
P2a-DU21-y	46.59563	-111.92795	864610.16315	1358558.12983
P2a-DU21-z	46.59573	-111.92795	864644.53126	1358558.12983

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU22-a	46.59566	-111.92663	864609.40219	1358889.20770
P2a-DU22-aa	46.59586	-111.92609	864678.13840	1359026.68012
P2a-DU22-b	46.59575	-111.92663	864643.77030	1358889.20770
P2a-DU22-bb	46.59595	-111.92610	864712.50651	1359026.68012
P2a-DU22-c	46.59585	-111.92664	864678.13840	1358889.20770
P2a-DU22-cc	46.59605	-111.92610	864746.87462	1359026.68012
P2a-DU22-d	46.59594	-111.92664	864712.50651	1358889.20770
P2a-DU22-dd	46.59613	-111.92610	864777.96360	1359026.85587
P2a-DU22-e	46.59604	-111.92665	864746.87462	1358889.20770
P2a-DU22-f	46.59612	-111.92665	864778.73711	1358888.78469
P2a-DU22-g	46.59612	-111.92652	864777.57685	1358922.04553
P2a-DU22-h	46.59604	-111.92651	864746.87462	1358923.57581
P2a-DU22-i	46.59594	-111.92651	864712.50651	1358923.57581
P2a-DU22-j	46.59585	-111.92650	864678.13840	1358923.57581
P2a-DU22-k	46.59576	-111.92650	864643.77030	1358923.57581
P2a-DU22-l	46.59566	-111.92649	864609.40219	1358923.57581
P2a-DU22-m	46.59566	-111.92636	864609.40219	1358957.94391
P2a-DU22-n	46.59576	-111.92636	864643.77030	1358957.94391
P2a-DU22-o	46.59585	-111.92637	864678.13840	1358957.94391
P2a-DU22-p	46.59595	-111.92637	864712.50651	1358957.94391
P2a-DU22-q	46.59604	-111.92637	864746.87462	1358957.94391
P2a-DU22-r	46.59613	-111.92639	864777.57685	1358956.07989
P2a-DU22-s	46.59613	-111.92625	864776.41658	1358991.27450
P2a-DU22-t	46.59604	-111.92624	864746.87462	1358992.31202
P2a-DU22-u	46.59595	-111.92623	864712.50651	1358992.31202
P2a-DU22-v	46.59586	-111.92623	864678.13840	1358992.31202
P2a-DU22-w	46.59576	-111.92622	864643.77030	1358992.31202
P2a-DU22-x	46.59567	-111.92622	864609.40219	1358992.31202
P2a-DU22-y	46.59567	-111.92608	864609.40219	1359026.68012
P2a-DU22-z	46.59576	-111.92609	864643.77030	1359026.68012

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU23-a	46.59568	-111.92581	864610.47576	1359096.63030
P2a-DU23-aa	46.59588	-111.92527	864679.21197	1359234.10272
P2a-DU23-b	46.59577	-111.92581	864644.84386	1359096.63030
P2a-DU23-bb	46.59597	-111.92527	864713.58007	1359234.10272
P2a-DU23-c	46.59587	-111.92581	864679.21197	1359096.63030
P2a-DU23-cc	46.59607	-111.92528	864747.94818	1359234.10272
P2a-DU23-d	46.59596	-111.92582	864713.58007	1359096.63030
P2a-DU23-dd	46.59616	-111.92528	864779.93561	1359232.96696
P2a-DU23-e	46.59606	-111.92582	864747.94818	1359096.63030
P2a-DU23-f	46.59614	-111.92583	864779.93561	1359096.72485
P2a-DU23-g	46.59615	-111.92569	864779.93561	1359130.65488
P2a-DU23-h	46.59606	-111.92569	864747.94818	1359130.99841
P2a-DU23-i	46.59596	-111.92568	864713.58007	1359130.99841
P2a-DU23-j	46.59587	-111.92568	864679.21197	1359130.99841
P2a-DU23-k	46.59578	-111.92567	864644.84386	1359130.99841
P2a-DU23-l	46.59568	-111.92567	864610.47576	1359130.99841
P2a-DU23-m	46.59569	-111.92553	864610.47576	1359165.36651
P2a-DU23-n	46.59578	-111.92554	864644.84386	1359165.36651
P2a-DU23-o	46.59587	-111.92554	864679.21197	1359165.36651
P2a-DU23-p	46.59597	-111.92554	864713.58007	1359165.36651
P2a-DU23-q	46.59606	-111.92555	864747.94818	1359165.36651
P2a-DU23-r	46.59615	-111.92555	864779.41361	1359165.10691
P2a-DU23-s	46.59615	-111.92542	864779.93561	1359198.51493
P2a-DU23-t	46.59607	-111.92541	864747.94818	1359199.73462
P2a-DU23-u	46.59597	-111.92541	864713.58007	1359199.73462
P2a-DU23-v	46.59588	-111.92540	864679.21197	1359199.73462
P2a-DU23-w	46.59578	-111.92540	864644.84386	1359199.73462
P2a-DU23-x	46.59569	-111.92540	864610.47576	1359199.73462
P2a-DU23-y	46.59569	-111.92526	864610.47576	1359234.10272
P2a-DU23-z	46.59579	-111.92526	864644.84386	1359234.10272

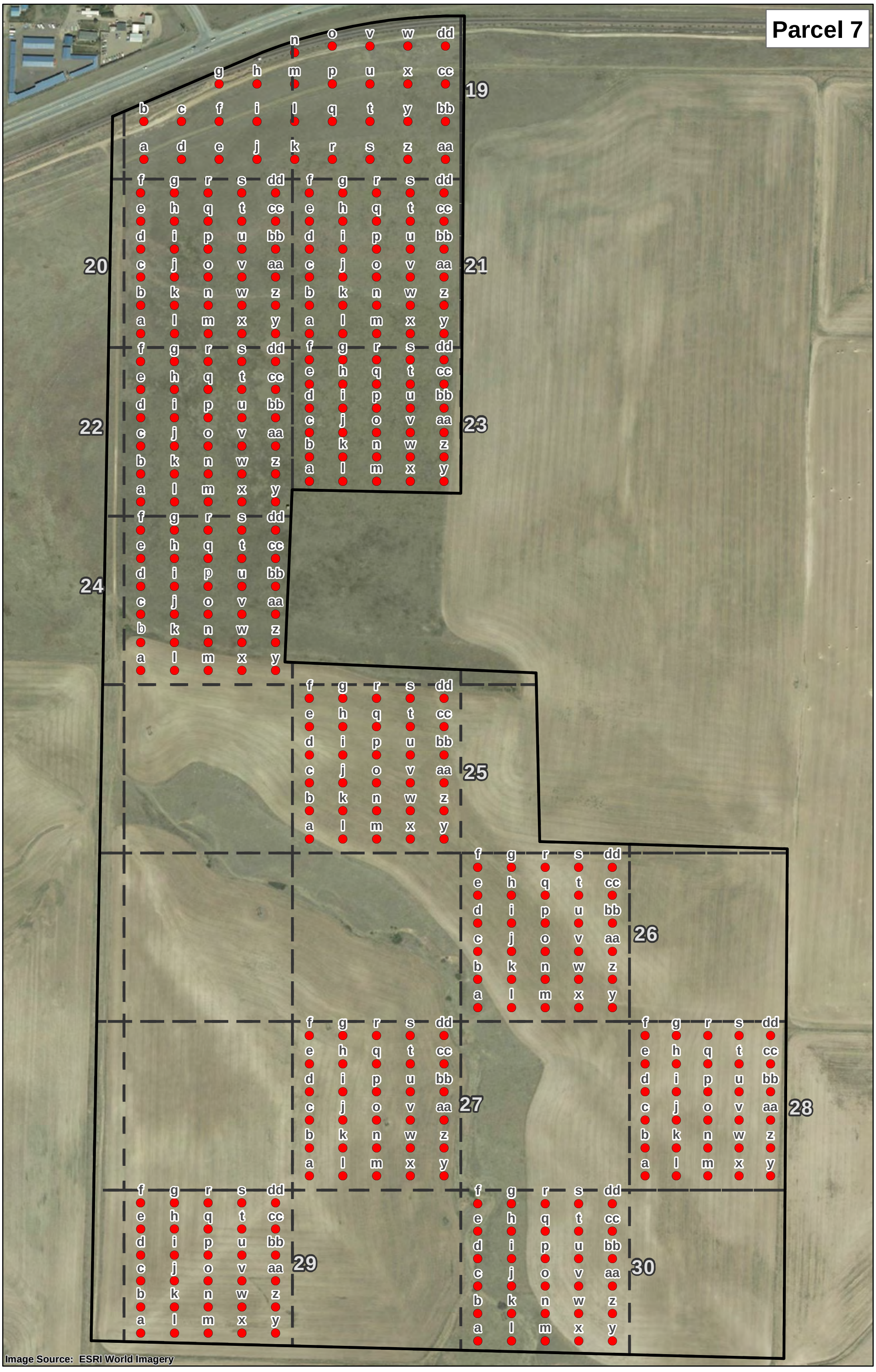
Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU24-a	46.59501	-111.93013	864400.68658	1358004.28471
P2a-DU24-aa	46.59521	-111.92959	864469.42279	1358141.75713
P2a-DU24-b	46.59511	-111.93013	864435.05468	1358004.28471
P2a-DU24-bb	46.59531	-111.92959	864503.79089	1358141.75713
P2a-DU24-c	46.59520	-111.93013	864469.42279	1358004.28471
P2a-DU24-cc	46.59540	-111.92960	864538.15900	1358141.75713
P2a-DU24-d	46.59529	-111.93014	864503.79089	1358004.28471
P2a-DU24-dd	46.59549	-111.92960	864569.73378	1358141.56863
P2a-DU24-e	46.59539	-111.93014	864538.15900	1358004.28471
P2a-DU24-f	46.59548	-111.93015	864569.91372	1358004.27615
P2a-DU24-g	46.59547	-111.93000	864568.23430	1358039.76672
P2a-DU24-h	46.59539	-111.93001	864538.15900	1358038.65281
P2a-DU24-i	46.59530	-111.93000	864503.79089	1358038.65281
P2a-DU24-j	46.59520	-111.93000	864469.42279	1358038.65281
P2a-DU24-k	46.59511	-111.92999	864435.05468	1358038.65281
P2a-DU24-l	46.59501	-111.92999	864400.68658	1358038.65281
P2a-DU24-m	46.59502	-111.92985	864400.68658	1358073.02092
P2a-DU24-n	46.59511	-111.92986	864435.05468	1358073.02092
P2a-DU24-o	46.59521	-111.92986	864469.42279	1358073.02092
P2a-DU24-p	46.59530	-111.92986	864503.79089	1358073.02092
P2a-DU24-q	46.59539	-111.92987	864538.15900	1358073.02092
P2a-DU24-r	46.59548	-111.92987	864568.42281	1358072.45541
P2a-DU24-s	46.59548	-111.92973	864568.61131	1358107.94598
P2a-DU24-t	46.59540	-111.92973	864538.15900	1358107.38903
P2a-DU24-u	46.59530	-111.92973	864503.79089	1358107.38903
P2a-DU24-v	46.59521	-111.92972	864469.42279	1358107.38903
P2a-DU24-w	46.59511	-111.92972	864435.05468	1358107.38903
P2a-DU24-x	46.59502	-111.92971	864400.68658	1358107.38903
P2a-DU24-y	46.59502	-111.92958	864400.68658	1358141.75713
P2a-DU24-z	46.59512	-111.92958	864435.05468	1358141.75713

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU25-a	46.59503	-111.92931	864401.61567	1358208.27191
P2a-DU25-aa	46.59523	-111.92878	864470.35189	1358345.74433
P2a-DU25-b	46.59513	-111.92932	864435.98378	1358208.27191
P2a-DU25-bb	46.59533	-111.92878	864504.71999	1358345.74433
P2a-DU25-c	46.59522	-111.92932	864470.35189	1358208.27191
P2a-DU25-cc	46.59542	-111.92878	864539.08810	1358345.74433
P2a-DU25-d	46.59531	-111.92933	864504.71999	1358208.27191
P2a-DU25-dd	46.59551	-111.92879	864570.31626	1358345.18324
P2a-DU25-e	46.59541	-111.92933	864539.08810	1358208.27191
P2a-DU25-f	46.59549	-111.92933	864570.30142	1358208.43915
P2a-DU25-g	46.59550	-111.92920	864570.11934	1358241.88200
P2a-DU25-h	46.59541	-111.92919	864539.08810	1358242.64001
P2a-DU25-i	46.59532	-111.92919	864504.71999	1358242.64001
P2a-DU25-j	46.59522	-111.92919	864470.35189	1358242.64001
P2a-DU25-k	46.59513	-111.92918	864435.98378	1358242.64001
P2a-DU25-l	46.59503	-111.92918	864401.61567	1358242.64001
P2a-DU25-m	46.59504	-111.92904	864401.61567	1358277.00812
P2a-DU25-n	46.59513	-111.92904	864435.98378	1358277.00812
P2a-DU25-o	46.59523	-111.92905	864470.35189	1358277.00812
P2a-DU25-p	46.59532	-111.92905	864504.71999	1358277.00812
P2a-DU25-q	46.59541	-111.92906	864539.08810	1358277.00812
P2a-DU25-r	46.59550	-111.92906	864569.19408	1358276.06802
P2a-DU25-s	46.59550	-111.92892	864570.49834	1358311.74039
P2a-DU25-t	46.59542	-111.92892	864539.08810	1358311.37622
P2a-DU25-u	46.59532	-111.92892	864504.71999	1358311.37622
P2a-DU25-v	46.59523	-111.92891	864470.35189	1358311.37622
P2a-DU25-w	46.59513	-111.92891	864435.98378	1358311.37622
P2a-DU25-x	46.59504	-111.92890	864401.61567	1358311.37622
P2a-DU25-y	46.59504	-111.92877	864401.61567	1358345.74433
P2a-DU25-z	46.59514	-111.92877	864435.98378	1358345.74433

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU26-a	46.59504	-111.92847	864399.96722	1358421.40058
P2a-DU26-aa	46.59524	-111.92793	864468.70343	1358558.87300
P2a-DU26-b	46.59514	-111.92847	864434.33532	1358421.40058
P2a-DU26-bb	46.59534	-111.92793	864503.07154	1358558.87300
P2a-DU26-c	46.59523	-111.92847	864468.70343	1358421.40058
P2a-DU26-cc	46.59543	-111.92794	864537.43964	1358558.87300
P2a-DU26-d	46.59533	-111.92848	864503.07154	1358421.40058
P2a-DU26-dd	46.59553	-111.92794	864571.80775	1358558.87300
P2a-DU26-e	46.59542	-111.92848	864537.43964	1358421.40058
P2a-DU26-f	46.59552	-111.92849	864571.80775	1358421.40058
P2a-DU26-g	46.59552	-111.92835	864571.80775	1358455.76868
P2a-DU26-h	46.59542	-111.92835	864537.43964	1358455.76868
P2a-DU26-i	46.59533	-111.92834	864503.07154	1358455.76868
P2a-DU26-j	46.59524	-111.92834	864468.70343	1358455.76868
P2a-DU26-k	46.59514	-111.92833	864434.33532	1358455.76868
P2a-DU26-l	46.59505	-111.92833	864399.96722	1358455.76868
P2a-DU26-m	46.59505	-111.92819	864399.96722	1358490.13679
P2a-DU26-n	46.59514	-111.92820	864434.33532	1358490.13679
P2a-DU26-o	46.59524	-111.92820	864468.70343	1358490.13679
P2a-DU26-p	46.59533	-111.92820	864503.07154	1358490.13679
P2a-DU26-q	46.59543	-111.92821	864537.43964	1358490.13679
P2a-DU26-r	46.59552	-111.92821	864571.80775	1358490.13679
P2a-DU26-s	46.59552	-111.92808	864571.80775	1358524.50490
P2a-DU26-t	46.59543	-111.92807	864537.43964	1358524.50490
P2a-DU26-u	46.59534	-111.92807	864503.07154	1358524.50490
P2a-DU26-v	46.59524	-111.92806	864468.70343	1358524.50490
P2a-DU26-w	46.59515	-111.92806	864434.33532	1358524.50490
P2a-DU26-x	46.59505	-111.92806	864399.96722	1358524.50490
P2a-DU26-y	46.59506	-111.92792	864399.96722	1358558.87300
P2a-DU26-z	46.59515	-111.92792	864434.33532	1358558.87300

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU27-a	46.59506	-111.92766	864399.96594	1358624.90666
P2a-DU27-aa	46.59526	-111.92712	864468.69702	1358762.36883
P2a-DU27-b	46.59516	-111.92766	864434.33148	1358624.90666
P2a-DU27-bb	46.59536	-111.92712	864503.06256	1358762.36883
P2a-DU27-c	46.59525	-111.92766	864468.69702	1358624.90666
P2a-DU27-cc	46.59545	-111.92713	864537.42810	1358762.36883
P2a-DU27-d	46.59534	-111.92767	864503.06256	1358624.90666
P2a-DU27-dd	46.59554	-111.92713	864571.79365	1358762.36883
P2a-DU27-e	46.59544	-111.92767	864537.42810	1358624.90666
P2a-DU27-f	46.59553	-111.92768	864571.79365	1358624.90666
P2a-DU27-g	46.59554	-111.92754	864571.79365	1358659.27220
P2a-DU27-h	46.59544	-111.92754	864537.42810	1358659.27220
P2a-DU27-i	46.59535	-111.92753	864503.06256	1358659.27220
P2a-DU27-j	46.59525	-111.92753	864468.69702	1358659.27220
P2a-DU27-k	46.59516	-111.92752	864434.33148	1358659.27220
P2a-DU27-l	46.59506	-111.92752	864399.96594	1358659.27220
P2a-DU27-m	46.59507	-111.92738	864399.96594	1358693.63774
P2a-DU27-n	46.59516	-111.92739	864434.33148	1358693.63774
P2a-DU27-o	46.59526	-111.92739	864468.69702	1358693.63774
P2a-DU27-p	46.59535	-111.92740	864503.06256	1358693.63774
P2a-DU27-q	46.59544	-111.92740	864537.42810	1358693.63774
P2a-DU27-r	46.59554	-111.92740	864571.79365	1358693.63774
P2a-DU27-s	46.59554	-111.92727	864571.79365	1358728.00328
P2a-DU27-t	46.59545	-111.92726	864537.42810	1358728.00328
P2a-DU27-u	46.59535	-111.92726	864503.06256	1358728.00328
P2a-DU27-v	46.59526	-111.92725	864468.69702	1358728.00328
P2a-DU27-w	46.59516	-111.92725	864434.33148	1358728.00328
P2a-DU27-x	46.59507	-111.92725	864399.96594	1358728.00328
P2a-DU27-y	46.59507	-111.92711	864399.96594	1358762.36883
P2a-DU27-z	46.59517	-111.92711	864434.33148	1358762.36883

Station_ID	Latitude	Longitude	Northing	Easting
P2a-DU28-a	46.59511	-111.92578	864401.76617	1359096.63030
P2a-DU28-aa	46.59531	-111.92524	864470.50239	1359234.10272
P2a-DU28-b	46.59520	-111.92578	864436.13428	1359096.63030
P2a-DU28-bb	46.59540	-111.92525	864504.87049	1359234.10272
P2a-DU28-c	46.59530	-111.92579	864470.50239	1359096.63030
P2a-DU28-cc	46.59550	-111.92525	864539.23860	1359234.10272
P2a-DU28-d	46.59539	-111.92579	864504.87049	1359096.63030
P2a-DU28-dd	46.59559	-111.92526	864572.33909	1359233.31458
P2a-DU28-e	46.59548	-111.92580	864539.23860	1359096.63030
P2a-DU28-f	46.59558	-111.92580	864573.74381	1359096.59583
P2a-DU28-g	46.59558	-111.92567	864573.22987	1359130.45000
P2a-DU28-h	46.59549	-111.92566	864539.23860	1359130.99841
P2a-DU28-i	46.59539	-111.92566	864504.87049	1359130.99841
P2a-DU28-j	46.59530	-111.92565	864470.50239	1359130.99841
P2a-DU28-k	46.59520	-111.92565	864436.13428	1359130.99841
P2a-DU28-l	46.59511	-111.92564	864401.76617	1359130.99841
P2a-DU28-m	46.59511	-111.92551	864401.76617	1359165.36651
P2a-DU28-n	46.59521	-111.92551	864436.13428	1359165.36651
P2a-DU28-o	46.59530	-111.92551	864470.50239	1359165.36651
P2a-DU28-p	46.59540	-111.92552	864504.87049	1359165.36651
P2a-DU28-q	46.59549	-111.92552	864539.23860	1359165.36651
P2a-DU28-r	46.59558	-111.92553	864573.36697	1359164.95521
P2a-DU28-s	46.59559	-111.92539	864573.50407	1359199.46041
P2a-DU28-t	46.59549	-111.92539	864539.23860	1359199.73462
P2a-DU28-u	46.59540	-111.92538	864504.87049	1359199.73462
P2a-DU28-v	46.59530	-111.92538	864470.50239	1359199.73462
P2a-DU28-w	46.59521	-111.92537	864436.13428	1359199.73462
P2a-DU28-x	46.59512	-111.92537	864401.76617	1359199.73462
P2a-DU28-y	46.59512	-111.92523	864401.76617	1359234.10272
P2a-DU28-z	46.59521	-111.92524	864436.13428	1359234.10272



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Station_ID	Latitude	Longitude	Northing	Easting
P7-DU19-a	46.58581	-111.89338	860765.57554	1367131.18796
P7-DU19-aa	46.58591	-111.88870	860765.57554	1368306.69843
P7-DU19-b	46.58622	-111.89339	860912.51435	1367131.18796
P7-DU19-bb	46.58632	-111.88872	860912.51435	1368306.69843
P7-DU19-c	46.58623	-111.89281	860912.51435	1367278.12677
P7-DU19-cc	46.58672	-111.88874	861059.45316	1368306.69843
P7-DU19-d	46.58583	-111.89279	860765.57554	1367278.12677
P7-DU19-dd	46.58712	-111.88875	861206.39197	1368306.69843
P7-DU19-e	46.58584	-111.89221	860765.57554	1367425.06558
P7-DU19-f	46.58624	-111.89222	860912.51435	1367425.06558
P7-DU19-g	46.58664	-111.89224	861059.45316	1367425.06558
P7-DU19-h	46.58666	-111.89166	861059.45316	1367572.00439
P7-DU19-i	46.58625	-111.89164	860912.51435	1367572.00439
P7-DU19-j	46.58585	-111.89162	860765.57554	1367572.00439
P7-DU19-k	46.58586	-111.89104	860765.57554	1367718.94320
P7-DU19-l	46.58627	-111.89106	860912.51435	1367718.94320
P7-DU19-m	46.58667	-111.89107	861059.45316	1367718.94320
P7-DU19-n	46.58700	-111.89109	861181.28398	1367718.94320
P7-DU19-o	46.58708	-111.89051	861206.39197	1367865.88201
P7-DU19-p	46.58668	-111.89049	861059.45316	1367865.88201
P7-DU19-q	46.58628	-111.89047	860912.51435	1367865.88201
P7-DU19-r	46.58588	-111.89045	860765.57554	1367865.88201
P7-DU19-s	46.58589	-111.88987	860765.57554	1368012.82081
P7-DU19-t	46.58629	-111.88989	860912.51435	1368012.82081
P7-DU19-u	46.58669	-111.88990	861059.45316	1368012.82081
P7-DU19-v	46.58710	-111.88992	861206.39197	1368012.82081
P7-DU19-w	46.58711	-111.88934	861206.39197	1368159.75962
P7-DU19-x	46.58671	-111.88932	861059.45316	1368159.75962
P7-DU19-y	46.58630	-111.88930	860912.51435	1368159.75962
P7-DU19-z	46.58590	-111.88928	860765.57554	1368159.75962

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU20-a	46.58395	-111.89334	860087.33919	1367120.05439
P7-DU20-aa	46.58460	-111.89128	860306.06142	1367644.98773
P7-DU20-b	46.58425	-111.89335	860196.70030	1367120.05439
P7-DU20-bb	46.58490	-111.89129	860415.42253	1367644.98773
P7-DU20-c	46.58455	-111.89336	860306.06142	1367120.05439
P7-DU20-cc	46.58520	-111.89130	860524.78364	1367644.98773
P7-DU20-d	46.58485	-111.89338	860415.42253	1367120.05439
P7-DU20-dd	46.58550	-111.89132	860634.14475	1367644.98773
P7-DU20-e	46.58515	-111.89339	860524.78364	1367120.05439
P7-DU20-f	46.58545	-111.89340	860634.14475	1367120.05439
P7-DU20-g	46.58546	-111.89288	860634.14475	1367251.28773
P7-DU20-h	46.58516	-111.89287	860524.78364	1367251.28773
P7-DU20-i	46.58486	-111.89286	860415.42253	1367251.28773
P7-DU20-j	46.58456	-111.89284	860306.06142	1367251.28773
P7-DU20-k	46.58426	-111.89283	860196.70030	1367251.28773
P7-DU20-l	46.58396	-111.89282	860087.33919	1367251.28773
P7-DU20-m	46.58397	-111.89229	860087.33919	1367382.52106
P7-DU20-n	46.58427	-111.89231	860196.70030	1367382.52106
P7-DU20-o	46.58457	-111.89232	860306.06142	1367382.52106
P7-DU20-p	46.58487	-111.89233	860415.42253	1367382.52106
P7-DU20-q	46.58517	-111.89235	860524.78364	1367382.52106
P7-DU20-r	46.58547	-111.89236	860634.14475	1367382.52106
P7-DU20-s	46.58549	-111.89184	860634.14475	1367513.75439
P7-DU20-t	46.58519	-111.89182	860524.78364	1367513.75439
P7-DU20-u	46.58489	-111.89181	860415.42253	1367513.75439
P7-DU20-v	46.58459	-111.89180	860306.06142	1367513.75439
P7-DU20-w	46.58429	-111.89178	860196.70030	1367513.75439
P7-DU20-x	46.58399	-111.89177	860087.33919	1367513.75439
P7-DU20-y	46.58400	-111.89125	860087.33919	1367644.98773
P7-DU20-z	46.58430	-111.89126	860196.70030	1367644.98773

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU21-a	46.58401	-111.89073	860087.33919	1367776.22106
P7-DU21-aa	46.58465	-111.88867	860306.06142	1368301.15439
P7-DU21-b	46.58431	-111.89074	860196.70030	1367776.22106
P7-DU21-bb	46.58495	-111.88868	860415.42253	1368301.15439
P7-DU21-c	46.58461	-111.89075	860306.06142	1367776.22106
P7-DU21-cc	46.58525	-111.88869	860524.78364	1368301.15439
P7-DU21-d	46.58491	-111.89077	860415.42253	1367776.22106
P7-DU21-dd	46.58555	-111.88871	860634.14475	1368301.15439
P7-DU21-e	46.58521	-111.89078	860524.78364	1367776.22106
P7-DU21-f	46.58551	-111.89079	860634.14475	1367776.22106
P7-DU21-g	46.58552	-111.89027	860634.14475	1367907.45439
P7-DU21-h	46.58522	-111.89026	860524.78364	1367907.45439
P7-DU21-i	46.58492	-111.89025	860415.42253	1367907.45439
P7-DU21-j	46.58462	-111.89023	860306.06142	1367907.45439
P7-DU21-k	46.58432	-111.89022	860196.70030	1367907.45439
P7-DU21-l	46.58402	-111.89021	860087.33919	1367907.45439
P7-DU21-m	46.58403	-111.88968	860087.33919	1368038.68773
P7-DU21-n	46.58433	-111.88970	860196.70030	1368038.68773
P7-DU21-o	46.58463	-111.88971	860306.06142	1368038.68773
P7-DU21-p	46.58493	-111.88972	860415.42253	1368038.68773
P7-DU21-q	46.58523	-111.88974	860524.78364	1368038.68773
P7-DU21-r	46.58553	-111.88975	860634.14475	1368038.68773
P7-DU21-s	46.58554	-111.88923	860634.14475	1368169.92106
P7-DU21-t	46.58524	-111.88921	860524.78364	1368169.92106
P7-DU21-u	46.58494	-111.88920	860415.42253	1368169.92106
P7-DU21-v	46.58464	-111.88919	860306.06142	1368169.92106
P7-DU21-w	46.58434	-111.88917	860196.70030	1368169.92106
P7-DU21-x	46.58404	-111.88916	860087.33919	1368169.92106
P7-DU21-y	46.58405	-111.88864	860087.33919	1368301.15439
P7-DU21-z	46.58435	-111.88865	860196.70030	1368301.15439

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU22-a	46.58215	-111.89326	859431.17253	1367120.05439
P7-DU22-aa	46.58280	-111.89120	859649.89475	1367644.98773
P7-DU22-b	46.58245	-111.89327	859540.53364	1367120.05439
P7-DU22-bb	46.58310	-111.89121	859759.25586	1367644.98773
P7-DU22-c	46.58275	-111.89328	859649.89475	1367120.05439
P7-DU22-cc	46.58340	-111.89122	859868.61697	1367644.98773
P7-DU22-d	46.58305	-111.89330	859759.25586	1367120.05439
P7-DU22-dd	46.58370	-111.89124	859977.97808	1367644.98773
P7-DU22-e	46.58335	-111.89331	859868.61697	1367120.05439
P7-DU22-f	46.58365	-111.89332	859977.97808	1367120.05439
P7-DU22-g	46.58366	-111.89280	859977.97808	1367251.28773
P7-DU22-h	46.58336	-111.89279	859868.61697	1367251.28773
P7-DU22-i	46.58306	-111.89278	859759.25586	1367251.28773
P7-DU22-j	46.58276	-111.89276	859649.89475	1367251.28773
P7-DU22-k	46.58246	-111.89275	859540.53364	1367251.28773
P7-DU22-l	46.58216	-111.89274	859431.17253	1367251.28773
P7-DU22-m	46.58218	-111.89221	859431.17253	1367382.52106
P7-DU22-n	46.58248	-111.89223	859540.53364	1367382.52106
P7-DU22-o	46.58278	-111.89224	859649.89475	1367382.52106
P7-DU22-p	46.58308	-111.89225	859759.25586	1367382.52106
P7-DU22-q	46.58338	-111.89227	859868.61697	1367382.52106
P7-DU22-r	46.58368	-111.89228	859977.97808	1367382.52106
P7-DU22-s	46.58369	-111.89176	859977.97808	1367513.75439
P7-DU22-t	46.58339	-111.89174	859868.61697	1367513.75439
P7-DU22-u	46.58309	-111.89173	859759.25586	1367513.75439
P7-DU22-v	46.58279	-111.89172	859649.89475	1367513.75439
P7-DU22-w	46.58249	-111.89171	859540.53364	1367513.75439
P7-DU22-x	46.58219	-111.89169	859431.17253	1367513.75439
P7-DU22-y	46.58220	-111.89117	859431.17253	1367644.98773
P7-DU22-z	46.58250	-111.89118	859540.53364	1367644.98773

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU23-a	46.58243	-111.89066	859512.07051	1367776.22106
P7-DU23-aa	46.58299	-111.88859	859701.37528	1368301.15439
P7-DU23-b	46.58269	-111.89067	859606.72290	1367776.22106
P7-DU23-bb	46.58325	-111.88860	859796.02767	1368301.15439
P7-DU23-c	46.58295	-111.89068	859701.37528	1367776.22106
P7-DU23-cc	46.58351	-111.88862	859890.68006	1368301.15439
P7-DU23-d	46.58321	-111.89069	859796.02767	1367776.22106
P7-DU23-dd	46.58377	-111.88863	859985.33244	1368301.15439
P7-DU23-e	46.58347	-111.89070	859890.68006	1367776.22106
P7-DU23-f	46.58373	-111.89072	859985.33244	1367776.22106
P7-DU23-g	46.58374	-111.89019	859985.33244	1367907.45439
P7-DU23-h	46.58348	-111.89018	859890.68006	1367907.45439
P7-DU23-i	46.58322	-111.89017	859796.02767	1367907.45439
P7-DU23-j	46.58296	-111.89016	859701.37528	1367907.45439
P7-DU23-k	46.58270	-111.89015	859606.72290	1367907.45439
P7-DU23-l	46.58244	-111.89014	859512.07051	1367907.45439
P7-DU23-m	46.58245	-111.88961	859512.07051	1368038.68773
P7-DU23-n	46.58271	-111.88963	859606.72290	1368038.68773
P7-DU23-o	46.58297	-111.88964	859701.37528	1368038.68773
P7-DU23-p	46.58323	-111.88965	859796.02767	1368038.68773
P7-DU23-q	46.58349	-111.88966	859890.68006	1368038.68773
P7-DU23-r	46.58375	-111.88967	859985.33244	1368038.68773
P7-DU23-s	46.58376	-111.88915	859985.33244	1368169.92106
P7-DU23-t	46.58350	-111.88914	859890.68006	1368169.92106
P7-DU23-u	46.58324	-111.88913	859796.02767	1368169.92106
P7-DU23-v	46.58298	-111.88911	859701.37528	1368169.92106
P7-DU23-w	46.58272	-111.88910	859606.72290	1368169.92106
P7-DU23-x	46.58246	-111.88909	859512.07051	1368169.92106
P7-DU23-y	46.58247	-111.88857	859512.07051	1368301.15439
P7-DU23-z	46.58273	-111.88858	859606.72290	1368301.15439

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU24-a	46.58035	-111.89318	858775.00586	1367120.05439
P7-DU24-aa	46.58100	-111.89112	858993.72808	1367644.98773
P7-DU24-b	46.58065	-111.89319	858884.36697	1367120.05439
P7-DU24-bb	46.58130	-111.89113	859103.08919	1367644.98773
P7-DU24-c	46.58095	-111.89320	858993.72808	1367120.05439
P7-DU24-cc	46.58160	-111.89114	859212.45030	1367644.98773
P7-DU24-d	46.58125	-111.89322	859103.08919	1367120.05439
P7-DU24-dd	46.58190	-111.89116	859321.81142	1367644.98773
P7-DU24-e	46.58155	-111.89323	859212.45030	1367120.05439
P7-DU24-f	46.58185	-111.89324	859321.81142	1367120.05439
P7-DU24-g	46.58186	-111.89272	859321.81142	1367251.28773
P7-DU24-h	46.58156	-111.89271	859212.45030	1367251.28773
P7-DU24-i	46.58126	-111.89270	859103.08919	1367251.28773
P7-DU24-j	46.58096	-111.89268	858993.72808	1367251.28773
P7-DU24-k	46.58067	-111.89267	858884.36697	1367251.28773
P7-DU24-l	46.58037	-111.89266	858775.00586	1367251.28773
P7-DU24-m	46.58038	-111.89213	858775.00586	1367382.52106
P7-DU24-n	46.58068	-111.89215	858884.36697	1367382.52106
P7-DU24-o	46.58098	-111.89216	858993.72808	1367382.52106
P7-DU24-p	46.58128	-111.89217	859103.08919	1367382.52106
P7-DU24-q	46.58158	-111.89219	859212.45030	1367382.52106
P7-DU24-r	46.58188	-111.89220	859321.81142	1367382.52106
P7-DU24-s	46.58189	-111.89168	859321.81142	1367513.75439
P7-DU24-t	46.58159	-111.89167	859212.45030	1367513.75439
P7-DU24-u	46.58129	-111.89165	859103.08919	1367513.75439
P7-DU24-v	46.58099	-111.89164	858993.72808	1367513.75439
P7-DU24-w	46.58069	-111.89163	858884.36697	1367513.75439
P7-DU24-x	46.58039	-111.89161	858775.00586	1367513.75439
P7-DU24-y	46.58040	-111.89109	858775.00586	1367644.98773
P7-DU24-z	46.58070	-111.89110	858884.36697	1367644.98773

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU25-a	46.57861	-111.89049	858118.83919	1367776.22106
P7-DU25-aa	46.57925	-111.88843	858337.56142	1368301.15439
P7-DU25-b	46.57891	-111.89050	858228.20030	1367776.22106
P7-DU25-bb	46.57955	-111.88844	858446.92253	1368301.15439
P7-DU25-c	46.57921	-111.89052	858337.56142	1367776.22106
P7-DU25-cc	46.57985	-111.88845	858556.28364	1368301.15439
P7-DU25-d	46.57951	-111.89053	858446.92253	1367776.22106
P7-DU25-dd	46.58015	-111.88847	858665.64475	1368301.15439
P7-DU25-e	46.57981	-111.89054	858556.28364	1367776.22106
P7-DU25-f	46.58011	-111.89055	858665.64475	1367776.22106
P7-DU25-g	46.58012	-111.89003	858665.64475	1367907.45439
P7-DU25-h	46.57982	-111.89002	858556.28364	1367907.45439
P7-DU25-i	46.57952	-111.89001	858446.92253	1367907.45439
P7-DU25-j	46.57922	-111.88999	858337.56142	1367907.45439
P7-DU25-k	46.57892	-111.88998	858228.20030	1367907.45439
P7-DU25-l	46.57862	-111.88997	858118.83919	1367907.45439
P7-DU25-m	46.57863	-111.88944	858118.83919	1368038.68773
P7-DU25-n	46.57893	-111.88946	858228.20030	1368038.68773
P7-DU25-o	46.57923	-111.88947	858337.56142	1368038.68773
P7-DU25-p	46.57953	-111.88948	858446.92253	1368038.68773
P7-DU25-q	46.57983	-111.88950	858556.28364	1368038.68773
P7-DU25-r	46.58013	-111.88951	858665.64475	1368038.68773
P7-DU25-s	46.58014	-111.88899	858665.64475	1368169.92106
P7-DU25-t	46.57984	-111.88898	858556.28364	1368169.92106
P7-DU25-u	46.57954	-111.88896	858446.92253	1368169.92106
P7-DU25-v	46.57924	-111.88895	858337.56142	1368169.92106
P7-DU25-w	46.57894	-111.88894	858228.20030	1368169.92106
P7-DU25-x	46.57864	-111.88892	858118.83919	1368169.92106
P7-DU25-y	46.57865	-111.88840	858118.83919	1368301.15439
P7-DU25-z	46.57895	-111.88841	858228.20030	1368301.15439

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU26-a	46.57687	-111.88780	857462.67253	1368432.38773
P7-DU26-aa	46.57751	-111.88574	857681.39475	1368957.32106
P7-DU26-b	46.57717	-111.88781	857572.03364	1368432.38773
P7-DU26-bb	46.57781	-111.88575	857790.75586	1368957.32106
P7-DU26-c	46.57747	-111.88783	857681.39475	1368432.38773
P7-DU26-cc	46.57811	-111.88576	857900.11697	1368957.32106
P7-DU26-d	46.57777	-111.88784	857790.75586	1368432.38773
P7-DU26-dd	46.57841	-111.88578	858009.47808	1368957.32106
P7-DU26-e	46.57806	-111.88785	857900.11697	1368432.38773
P7-DU26-f	46.57836	-111.88787	858009.47808	1368432.38773
P7-DU26-g	46.57838	-111.88734	858009.47808	1368563.62106
P7-DU26-h	46.57808	-111.88733	857900.11697	1368563.62106
P7-DU26-i	46.57778	-111.88732	857790.75586	1368563.62106
P7-DU26-j	46.57748	-111.88730	857681.39475	1368563.62106
P7-DU26-k	46.57718	-111.88729	857572.03364	1368563.62106
P7-DU26-l	46.57688	-111.88728	857462.67253	1368563.62106
P7-DU26-m	46.57689	-111.88676	857462.67253	1368694.85439
P7-DU26-n	46.57719	-111.88677	857572.03364	1368694.85439
P7-DU26-o	46.57749	-111.88678	857681.39475	1368694.85439
P7-DU26-p	46.57779	-111.88680	857790.75586	1368694.85439
P7-DU26-q	46.57809	-111.88681	857900.11697	1368694.85439
P7-DU26-r	46.57839	-111.88682	858009.47808	1368694.85439
P7-DU26-s	46.57840	-111.88630	858009.47808	1368826.08773
P7-DU26-t	46.57810	-111.88629	857900.11697	1368826.08773
P7-DU26-u	46.57780	-111.88627	857790.75586	1368826.08773
P7-DU26-v	46.57750	-111.88626	857681.39475	1368826.08773
P7-DU26-w	46.57720	-111.88625	857572.03364	1368826.08773
P7-DU26-x	46.57690	-111.88623	857462.67253	1368826.08773
P7-DU26-y	46.57691	-111.88571	857462.67253	1368957.32106
P7-DU26-z	46.57721	-111.88573	857572.03364	1368957.32106

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU27-a	46.57501	-111.89033	856806.50586	1367776.22106
P7-DU27-aa	46.57565	-111.88827	857025.22808	1368301.15439
P7-DU27-b	46.57531	-111.89034	856915.86697	1367776.22106
P7-DU27-bb	46.57595	-111.88828	857134.58919	1368301.15439
P7-DU27-c	46.57561	-111.89036	857025.22808	1367776.22106
P7-DU27-cc	46.57625	-111.88829	857243.95030	1368301.15439
P7-DU27-d	46.57591	-111.89037	857134.58919	1367776.22106
P7-DU27-dd	46.57655	-111.88831	857353.31142	1368301.15439
P7-DU27-e	46.57621	-111.89038	857243.95030	1367776.22106
P7-DU27-f	46.57651	-111.89040	857353.31142	1367776.22106
P7-DU27-g	46.57652	-111.88987	857353.31142	1367907.45439
P7-DU27-h	46.57622	-111.88986	857243.95030	1367907.45439
P7-DU27-i	46.57592	-111.88985	857134.58919	1367907.45439
P7-DU27-j	46.57562	-111.88983	857025.22808	1367907.45439
P7-DU27-k	46.57532	-111.88982	856915.86697	1367907.45439
P7-DU27-l	46.57502	-111.88981	856806.50586	1367907.45439
P7-DU27-m	46.57503	-111.88929	856806.50586	1368038.68773
P7-DU27-n	46.57533	-111.88930	856915.86697	1368038.68773
P7-DU27-o	46.57563	-111.88931	857025.22808	1368038.68773
P7-DU27-p	46.57593	-111.88933	857134.58919	1368038.68773
P7-DU27-q	46.57623	-111.88934	857243.95030	1368038.68773
P7-DU27-r	46.57653	-111.88935	857353.31142	1368038.68773
P7-DU27-s	46.57654	-111.88883	857353.31142	1368169.92106
P7-DU27-t	46.57624	-111.88882	857243.95030	1368169.92106
P7-DU27-u	46.57594	-111.88880	857134.58919	1368169.92106
P7-DU27-v	46.57564	-111.88879	857025.22808	1368169.92106
P7-DU27-w	46.57534	-111.88878	856915.86697	1368169.92106
P7-DU27-x	46.57504	-111.88876	856806.50586	1368169.92106
P7-DU27-y	46.57505	-111.88824	856806.50586	1368301.15439
P7-DU27-z	46.57535	-111.88826	856915.86697	1368301.15439

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU28-a	46.57512	-111.88513	856806.50586	1369083.99413
P7-DU28-aa	46.57576	-111.88321	857025.22808	1369572.44539
P7-DU28-b	46.57542	-111.88514	856915.86697	1369083.99413
P7-DU28-bb	46.57606	-111.88323	857134.58919	1369572.44539
P7-DU28-c	46.57572	-111.88516	857025.22808	1369083.99413
P7-DU28-cc	46.57636	-111.88324	857243.95030	1369572.44539
P7-DU28-d	46.57602	-111.88517	857134.58919	1369083.99413
P7-DU28-dd	46.57666	-111.88325	857353.31142	1369572.44539
P7-DU28-e	46.57632	-111.88518	857243.95030	1369083.99413
P7-DU28-f	46.57662	-111.88519	857353.31142	1369083.99413
P7-DU28-g	46.57663	-111.88471	857353.31142	1369206.10695
P7-DU28-h	46.57633	-111.88470	857243.95030	1369206.10695
P7-DU28-i	46.57603	-111.88468	857134.58919	1369206.10695
P7-DU28-j	46.57573	-111.88467	857025.22808	1369206.10695
P7-DU28-k	46.57543	-111.88466	856915.86697	1369206.10695
P7-DU28-l	46.57513	-111.88464	856806.50586	1369206.10695
P7-DU28-m	46.57514	-111.88416	856806.50586	1369328.21976
P7-DU28-n	46.57544	-111.88417	856915.86697	1369328.21976
P7-DU28-o	46.57574	-111.88418	857025.22808	1369328.21976
P7-DU28-p	46.57604	-111.88420	857134.58919	1369328.21976
P7-DU28-q	46.57634	-111.88421	857243.95030	1369328.21976
P7-DU28-r	46.57664	-111.88422	857353.31142	1369328.21976
P7-DU28-s	46.57665	-111.88374	857353.31142	1369450.33258
P7-DU28-t	46.57635	-111.88372	857243.95030	1369450.33258
P7-DU28-u	46.57605	-111.88371	857134.58919	1369450.33258
P7-DU28-v	46.57575	-111.88370	857025.22808	1369450.33258
P7-DU28-w	46.57545	-111.88369	856915.86697	1369450.33258
P7-DU28-x	46.57515	-111.88367	856806.50586	1369450.33258
P7-DU28-y	46.57516	-111.88319	856806.50586	1369572.44539
P7-DU28-z	46.57546	-111.88320	856915.86697	1369572.44539

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU29-a	46.57328	-111.89286	856195.78438	1367120.05439
P7-DU29-aa	46.57388	-111.89080	856397.98108	1367644.98773
P7-DU29-b	46.57356	-111.89288	856296.88273	1367120.05439
P7-DU29-bb	46.57416	-111.89081	856499.07943	1367644.98773
P7-DU29-c	46.57384	-111.89289	856397.98108	1367120.05439
P7-DU29-cc	46.57443	-111.89083	856600.17778	1367644.98773
P7-DU29-d	46.57411	-111.89290	856499.07943	1367120.05439
P7-DU29-dd	46.57471	-111.89084	856701.27613	1367644.98773
P7-DU29-e	46.57439	-111.89291	856600.17778	1367120.05439
P7-DU29-f	46.57467	-111.89293	856701.27613	1367120.05439
P7-DU29-g	46.57468	-111.89240	856701.27613	1367251.28773
P7-DU29-h	46.57440	-111.89239	856600.17778	1367251.28773
P7-DU29-i	46.57412	-111.89238	856499.07943	1367251.28773
P7-DU29-j	46.57385	-111.89237	856397.98108	1367251.28773
P7-DU29-k	46.57357	-111.89235	856296.88273	1367251.28773
P7-DU29-l	46.57329	-111.89234	856195.78438	1367251.28773
P7-DU29-m	46.57330	-111.89182	856195.78438	1367382.52106
P7-DU29-n	46.57358	-111.89183	856296.88273	1367382.52106
P7-DU29-o	46.57386	-111.89185	856397.98108	1367382.52106
P7-DU29-p	46.57414	-111.89186	856499.07943	1367382.52106
P7-DU29-q	46.57441	-111.89187	856600.17778	1367382.52106
P7-DU29-r	46.57469	-111.89188	856701.27613	1367382.52106
P7-DU29-s	46.57470	-111.89136	856701.27613	1367513.75439
P7-DU29-t	46.57442	-111.89135	856600.17778	1367513.75439
P7-DU29-u	46.57415	-111.89134	856499.07943	1367513.75439
P7-DU29-v	46.57387	-111.89132	856397.98108	1367513.75439
P7-DU29-w	46.57359	-111.89131	856296.88273	1367513.75439
P7-DU29-x	46.57331	-111.89130	856195.78438	1367513.75439
P7-DU29-y	46.57333	-111.89078	856195.78438	1367644.98773
P7-DU29-z	46.57360	-111.89079	856296.88273	1367644.98773

Station_ID	Latitude	Longitude	Northing	Easting
P7-DU30-a	46.57331	-111.88764	856164.61930	1368432.38773
P7-DU30-aa	46.57394	-111.88558	856378.14876	1368957.32106
P7-DU30-b	46.57360	-111.88766	856271.38403	1368432.38773
P7-DU30-bb	46.57423	-111.88559	856484.91348	1368957.32106
P7-DU30-c	46.57389	-111.88767	856378.14876	1368432.38773
P7-DU30-cc	46.57452	-111.88561	856591.67821	1368957.32106
P7-DU30-d	46.57418	-111.88768	856484.91348	1368432.38773
P7-DU30-dd	46.57481	-111.88562	856698.44294	1368957.32106
P7-DU30-e	46.57448	-111.88769	856591.67821	1368432.38773
P7-DU30-f	46.57477	-111.88771	856698.44294	1368432.38773
P7-DU30-g	46.57478	-111.88718	856698.44294	1368563.62106
P7-DU30-h	46.57449	-111.88717	856591.67821	1368563.62106
P7-DU30-i	46.57420	-111.88716	856484.91348	1368563.62106
P7-DU30-j	46.57390	-111.88715	856378.14876	1368563.62106
P7-DU30-k	46.57361	-111.88713	856271.38403	1368563.62106
P7-DU30-l	46.57332	-111.88712	856164.61930	1368563.62106
P7-DU30-m	46.57333	-111.88660	856164.61930	1368694.85439
P7-DU30-n	46.57362	-111.88661	856271.38403	1368694.85439
P7-DU30-o	46.57391	-111.88662	856378.14876	1368694.85439
P7-DU30-p	46.57421	-111.88664	856484.91348	1368694.85439
P7-DU30-q	46.57450	-111.88665	856591.67821	1368694.85439
P7-DU30-r	46.57479	-111.88666	856698.44294	1368694.85439
P7-DU30-s	46.57480	-111.88614	856698.44294	1368826.08773
P7-DU30-t	46.57451	-111.88613	856591.67821	1368826.08773
P7-DU30-u	46.57422	-111.88612	856484.91348	1368826.08773
P7-DU30-v	46.57392	-111.88610	856378.14876	1368826.08773
P7-DU30-w	46.57363	-111.88609	856271.38403	1368826.08773
P7-DU30-x	46.57334	-111.88608	856164.61930	1368826.08773
P7-DU30-y	46.57335	-111.88555	856164.61930	1368957.32106
P7-DU30-z	46.57364	-111.88557	856271.38403	1368957.32106

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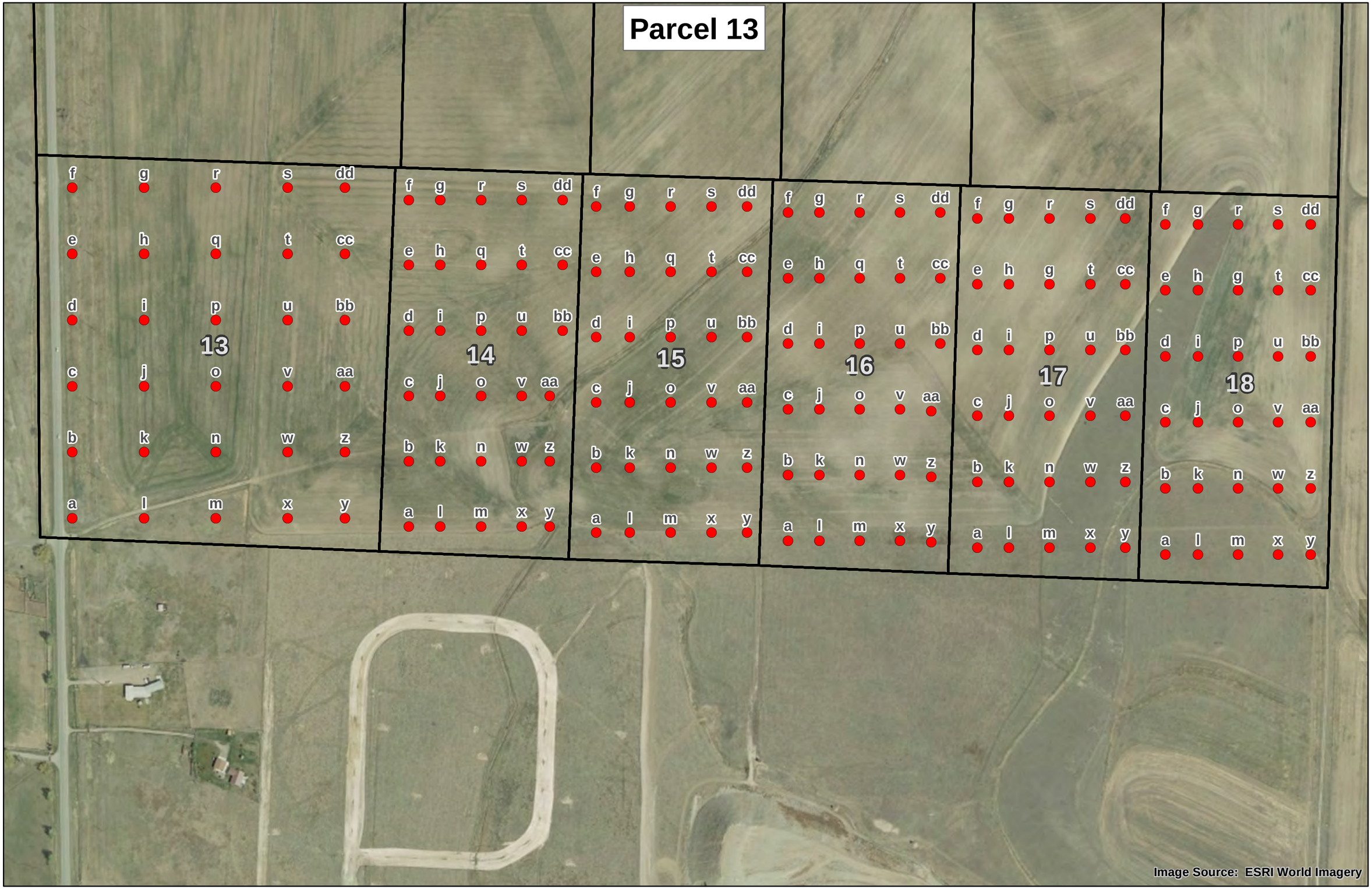
Station_ID	Latitude	Longitude	Northing	Easting
P8E-DU1-a	46.57877968180	-111.91124274700	858340.6019	1362564.29036
P8E-DU1-aa	46.57999741030	-111.90967616200	858772.1324	1362971.49566
P8E-DU1-b	46.57907957430	-111.91125614000	858449.963	1362564.29036
P8E-DU1-bb	46.58030491260	-111.90971342800	858884.4505	1362965.58176
P8E-DU1-c	46.57937946680	-111.91126953300	858559.3241	1362564.29036
P8E-DU1-cc	46.58032139770	-111.90931901200	858887.4075	1363064.84777
P8E-DU1-d	46.57967935930	-111.91128292700	858668.6852	1362564.29036
P8E-DU1-dd	46.58000528770	-111.90930490500	858772.1324	1363064.84777
P8E-DU1-e	46.58028863230	-111.91086284500	858887.4075	1362676.65458
P8E-DU1-f	46.57997041800	-111.91094785900	858772.1324	1362651.72856
P8E-DU1-g	46.57968973860	-111.91079407700	858668.6852	1362687.21199
P8E-DU1-h	46.57938984610	-111.91078068600	858559.3241	1362687.21199
P8E-DU1-i	46.57908995350	-111.91076729600	858449.963	1362687.21199
P8E-DU1-j	46.57879006090	-111.91075390500	858340.6019	1362687.21199
P8E-DU1-k	46.57880043790	-111.91026506300	858340.6019	1362810.13363
P8E-DU1-l	46.57910033050	-111.91027845100	858449.963	1362810.13363
P8E-DU1-m	46.57940022320	-111.91029183900	858559.3241	1362810.13363
P8E-DU1-n	46.57970011580	-111.91030522600	858668.6852	1362810.13363
P8E-DU1-o	46.57999747710	-111.91043786600	858778.0463	1362780.14795
P8E-DU1-p	46.58029726250	-111.91045630700	858887.4075	1362778.87755
P8E-DU1-q	46.58030589120	-111.91004976900	858887.4075	1362881.10051
P8E-DU1-r	46.57999739080	-111.91005954000	858775.0894	1362875.18660
P8E-DU1-s	46.57971049080	-111.90981637600	858668.6852	1362933.05527
P8E-DU1-t	46.57941059820	-111.90980299100	858559.3241	1362933.05527
P8E-DU1-u	46.57911070550	-111.90978960600	858449.963	1362933.05527
P8E-DU1-v	46.57881081280	-111.90977622100	858340.6019	1362933.05527
P8E-DU1-w	46.57882118560	-111.90928737900	858340.6019	1363055.97691
P8E-DU1-x	46.57912107830	-111.90930076100	858449.963	1363055.97691
P8E-DU1-y	46.57942097110	-111.90931414300	858559.3241	1363055.97691
P8E-DU1-z	46.57972086380	-111.90932752600	858668.6852	1363055.97691

Station_ID	Latitude	Longitude	Northing	Easting
P8E-DU2-a	46.57703255000	-111.90870173600	857684.43523	1363183.05439
P8E-DU2-aa	46.57767659830	-111.90664094900	857903.15746	1363707.98773
P8E-DU2-b	46.57733244280	-111.90871511400	857793.79635	1363183.05439
P8E-DU2-bb	46.57797649140	-111.90665431600	858012.51857	1363707.98773
P8E-DU2-c	46.57763233560	-111.90872849300	857903.15746	1363183.05439
P8E-DU2-cc	46.57827638450	-111.90666768300	858121.87968	1363707.98773
P8E-DU2-d	46.57793222840	-111.90874187200	858012.51857	1363183.05439
P8E-DU2-dd	46.57857627750	-111.90668105100	858231.24079	1363707.98773
P8E-DU2-e	46.57823212120	-111.90875525100	858121.87968	1363183.05439
P8E-DU2-f	46.57853201400	-111.90876863000	858231.24079	1363183.05439
P8E-DU2-g	46.57854308350	-111.90824673500	858231.24079	1363314.28773
P8E-DU2-h	46.57824319060	-111.90823335900	858121.87968	1363314.28773
P8E-DU2-i	46.57794329780	-111.90821998300	858012.51857	1363314.28773
P8E-DU2-j	46.57764340490	-111.90820660700	857903.15746	1363314.28773
P8E-DU2-k	46.57734351200	-111.90819323100	857793.79635	1363314.28773
P8E-DU2-l	46.57704361910	-111.90817985600	857684.43523	1363314.28773
P8E-DU2-m	46.57705468590	-111.90765797600	857684.43523	1363445.52106
P8E-DU2-n	46.57735457880	-111.90767134800	857793.79635	1363445.52106
P8E-DU2-o	46.57765447180	-111.90768472100	857903.15746	1363445.52106
P8E-DU2-p	46.57795436470	-111.90769809400	858012.51857	1363445.52106
P8E-DU2-q	46.57825425760	-111.90771146700	858121.87968	1363445.52106
P8E-DU2-r	46.57855415060	-111.90772484100	858231.24079	1363445.52106
P8E-DU2-s	46.57856521520	-111.90720294600	858231.24079	1363576.75439
P8E-DU2-t	46.57826532220	-111.90718957500	858121.87968	1363576.75439
P8E-DU2-u	46.57796542930	-111.90717620500	858012.51857	1363576.75439
P8E-DU2-v	46.57766553630	-111.90716283500	857903.15746	1363576.75439
P8E-DU2-w	46.57736564320	-111.90714946500	857793.79635	1363576.75439
P8E-DU2-x	46.57706575020	-111.90713609500	857684.43523	1363576.75439
P8E-DU2-y	46.57707681220	-111.90661421500	857684.43523	1363707.98773
P8E-DU2-z	46.57737670530	-111.90662758200	857793.79635	1363707.98773



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Station_ID	Latitude	Longitude	Northing	Easting
P13-DU13-a	46.56960	-111.91108	854995.20629	1362501.26879
P13-DU13-aa	46.57095	-111.90735	855456.19859	1363453.22105
P13-DU13-b	46.57023	-111.91111	855225.70244	1362501.26879
P13-DU13-bb	46.57158	-111.90738	855686.69474	1363453.22105
P13-DU13-c	46.57086	-111.91114	855456.19859	1362501.26879
P13-DU13-cc	46.57221	-111.90741	855917.19089	1363453.22105
P13-DU13-d	46.57150	-111.91117	855686.69474	1362501.26879
P13-DU13-dd	46.57284	-111.90744	856147.68703	1363453.22105
P13-DU13-e	46.57213	-111.91120	855917.19089	1362501.26879
P13-DU13-f	46.57276	-111.91122	856147.68703	1362501.26879
P13-DU13-g	46.57278	-111.91023	856147.68703	1362751.92846
P13-DU13-h	46.57215	-111.91020	855917.19089	1362751.92846
P13-DU13-i	46.57152	-111.91017	855686.69474	1362751.92846
P13-DU13-j	46.57089	-111.91014	855456.19859	1362751.92846
P13-DU13-k	46.57025	-111.91012	855225.70244	1362751.92846
P13-DU13-l	46.56962	-111.91009	854995.20629	1362751.92846
P13-DU13-m	46.56964	-111.90909	854995.20629	1363002.58813
P13-DU13-n	46.57027	-111.90912	855225.70244	1363002.58813
P13-DU13-o	46.57091	-111.90915	855456.19859	1363002.58813
P13-DU13-p	46.57154	-111.90917	855686.69474	1363002.58813
P13-DU13-q	46.57217	-111.90920	855917.19089	1363002.58813
P13-DU13-r	46.57280	-111.90923	856147.68703	1363002.58813
P13-DU13-s	46.57282	-111.90823	856147.68703	1363253.24780
P13-DU13-t	46.57219	-111.90821	855917.19089	1363253.24780
P13-DU13-u	46.57156	-111.90818	855686.69474	1363253.24780
P13-DU13-v	46.57093	-111.90815	855456.19859	1363253.24780
P13-DU13-w	46.57030	-111.90812	855225.70244	1363253.24780
P13-DU13-x	46.56966	-111.90809	854995.20629	1363253.24780
P13-DU13-y	46.56968	-111.90730	854995.20629	1363453.22105
P13-DU13-z	46.57031	-111.90733	855225.70244	1363453.22105

Station_ID	Latitude	Longitude	Northing	Easting
P13-DU14-a	46.56962	-111.90641	854966.17600	1363675.76501
P13-DU14-aa	46.57091	-111.90451	855421.89994	1364168.68148
P13-DU14-b	46.57024	-111.90644	855194.03797	1363675.76501
P13-DU14-bb	46.57154	-111.90436	855649.76190	1364213.03210
P13-DU14-c	46.57087	-111.90647	855421.89994	1363675.76501
P13-DU14-cc	46.57216	-111.90439	855877.62387	1364213.03210
P13-DU14-d	46.57149	-111.90649	855649.76190	1363675.76501
P13-DU14-dd	46.57279	-111.90441	856105.48584	1364213.03210
P13-DU14-e	46.57212	-111.90652	855877.62387	1363675.76501
P13-DU14-f	46.57274	-111.90655	856105.48584	1363675.76501
P13-DU14-g	46.57275	-111.90611	856105.48584	1363786.32252
P13-DU14-h	46.57213	-111.90608	855877.62387	1363786.32252
P13-DU14-i	46.57150	-111.90605	855649.76190	1363786.32252
P13-DU14-j	46.57088	-111.90603	855421.89994	1363786.32252
P13-DU14-k	46.57025	-111.90600	855194.03797	1363786.32252
P13-DU14-l	46.56963	-111.90597	854966.17600	1363786.32252
P13-DU14-m	46.56964	-111.90540	854966.17600	1363928.55905
P13-DU14-n	46.57027	-111.90543	855194.03797	1363928.55905
P13-DU14-o	46.57089	-111.90546	855421.89994	1363928.55905
P13-DU14-p	46.57152	-111.90549	855649.76190	1363928.55905
P13-DU14-q	46.57214	-111.90552	855877.62387	1363928.55905
P13-DU14-r	46.57277	-111.90554	856105.48584	1363928.55905
P13-DU14-s	46.57278	-111.90498	856105.48584	1364070.79557
P13-DU14-t	46.57215	-111.90495	855877.62387	1364070.79557
P13-DU14-u	46.57153	-111.90492	855649.76190	1364070.79557
P13-DU14-v	46.57090	-111.90490	855421.89994	1364070.79557
P13-DU14-w	46.57028	-111.90487	855194.03797	1364070.79557
P13-DU14-x	46.56965	-111.90484	854966.17600	1364070.79557
P13-DU14-y	46.56966	-111.90445	854966.17600	1364168.68148
P13-DU14-z	46.57029	-111.90448	855194.03797	1364168.68148

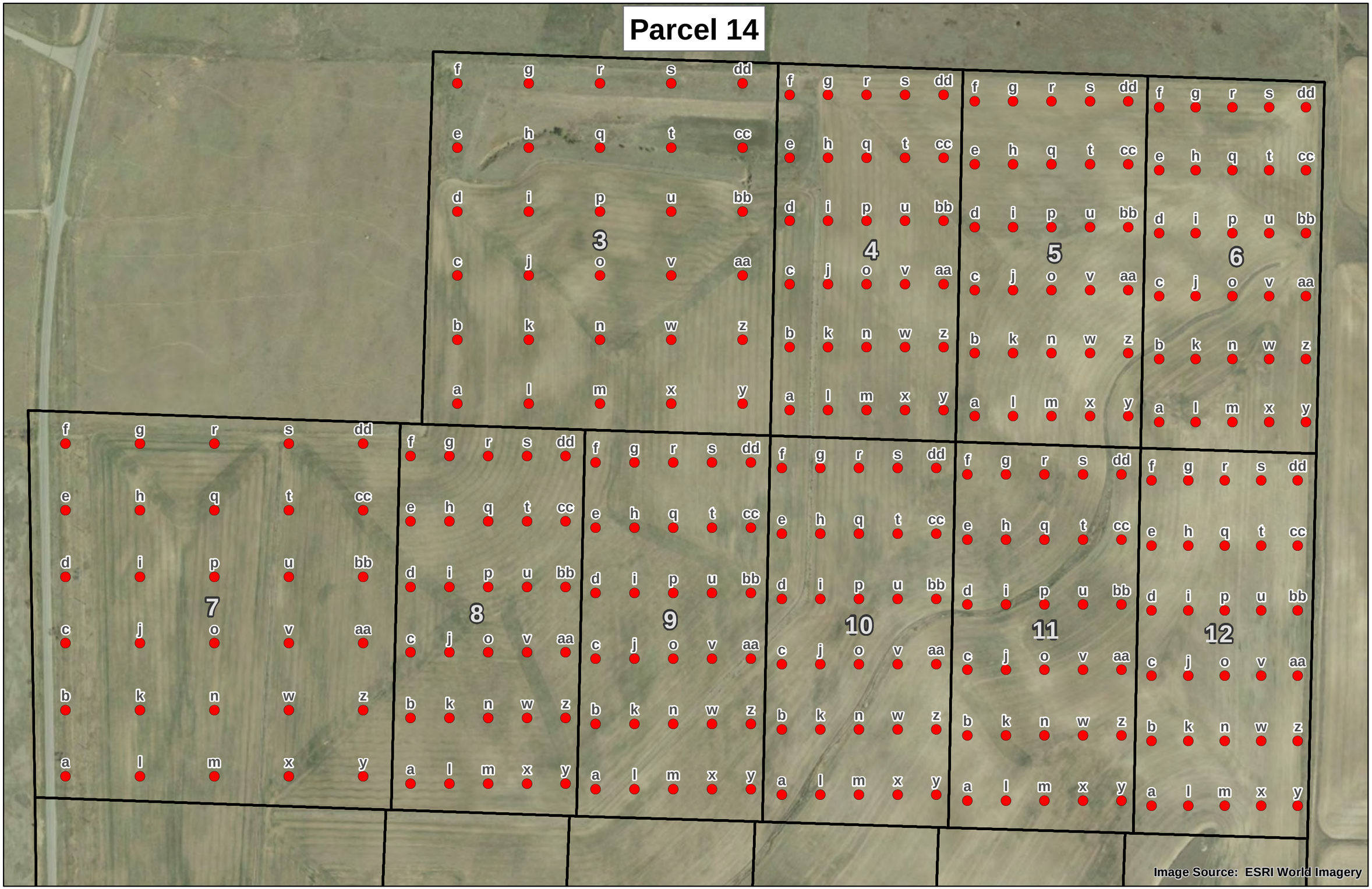
Station_ID	Latitude	Longitude	Northing	Easting
P13-DU15-a	46.56961	-111.90380	854943.90352	1364330.75633
P13-DU15-aa	46.57091	-111.90177	855399.47435	1364857.05811
P13-DU15-b	46.57024	-111.90383	855171.68893	1364330.75633
P13-DU15-bb	46.57153	-111.90179	855627.25976	1364857.05811
P13-DU15-c	46.57086	-111.90386	855399.47435	1364330.75633
P13-DU15-cc	46.57216	-111.90182	855855.04518	1364857.05811
P13-DU15-d	46.57149	-111.90389	855627.25976	1364330.75633
P13-DU15-dd	46.57278	-111.90185	856082.83059	1364857.05811
P13-DU15-e	46.57211	-111.90391	855855.04518	1364330.75633
P13-DU15-f	46.57274	-111.90394	856082.83059	1364330.75633
P13-DU15-g	46.57275	-111.90348	856082.83059	1364448.07622
P13-DU15-h	46.57212	-111.90345	855855.04518	1364448.07622
P13-DU15-i	46.57150	-111.90342	855627.25976	1364448.07622
P13-DU15-j	46.57087	-111.90339	855399.47435	1364448.07622
P13-DU15-k	46.57025	-111.90336	855171.68893	1364448.07622
P13-DU15-l	46.56962	-111.90334	854943.90352	1364448.07622
P13-DU15-m	46.56964	-111.90277	854943.90352	1364590.73932
P13-DU15-n	46.57026	-111.90280	855171.68893	1364590.73932
P13-DU15-o	46.57089	-111.90282	855399.47435	1364590.73932
P13-DU15-p	46.57151	-111.90285	855627.25976	1364590.73932
P13-DU15-q	46.57213	-111.90288	855855.04518	1364590.73932
P13-DU15-r	46.57276	-111.90291	856082.83059	1364590.73932
P13-DU15-s	46.57277	-111.90234	856082.83059	1364733.40242
P13-DU15-t	46.57215	-111.90231	855855.04518	1364733.40242
P13-DU15-u	46.57152	-111.90229	855627.25976	1364733.40242
P13-DU15-v	46.57090	-111.90226	855399.47435	1364733.40242
P13-DU15-w	46.57027	-111.90223	855171.68893	1364733.40242
P13-DU15-x	46.56965	-111.90220	854943.90352	1364733.40242
P13-DU15-y	46.56966	-111.90171	854943.90352	1364857.05811
P13-DU15-z	46.57028	-111.90174	855171.68893	1364857.05811

Station_ID	Latitude	Longitude	Northing	Easting
P13-DU16-a	46.56960	-111.90114	854917.02146	1365000.30898
P13-DU16-aa	46.57088	-111.89920	855368.66243	1365500.54300
P13-DU16-b	46.57022	-111.90117	855146.00985	1365000.30898
P13-DU16-bb	46.57153	-111.89911	855603.98662	1365532.22201
P13-DU16-c	46.57085	-111.90119	855374.99824	1365000.30898
P13-DU16-cc	46.57215	-111.89913	855832.97501	1365532.22201
P13-DU16-d	46.57148	-111.90122	855603.98662	1365000.30898
P13-DU16-dd	46.57278	-111.89916	856061.96340	1365532.22201
P13-DU16-e	46.57211	-111.90125	855832.97501	1365000.30898
P13-DU16-f	46.57274	-111.90128	856061.96340	1365000.30898
P13-DU16-g	46.57275	-111.90084	856061.96340	1365109.52798
P13-DU16-h	46.57212	-111.90081	855832.97501	1365109.52798
P13-DU16-i	46.57149	-111.90079	855603.98662	1365109.52798
P13-DU16-j	46.57086	-111.90076	855374.99824	1365109.52798
P13-DU16-k	46.57023	-111.90073	855146.00985	1365109.52798
P13-DU16-l	46.56961	-111.90070	854917.02146	1365109.52798
P13-DU16-m	46.56962	-111.90014	854917.02146	1365250.42599
P13-DU16-n	46.57025	-111.90017	855146.00985	1365250.42599
P13-DU16-o	46.57087	-111.90020	855374.99824	1365250.42599
P13-DU16-p	46.57150	-111.90023	855603.98662	1365250.42599
P13-DU16-q	46.57213	-111.90025	855832.97501	1365250.42599
P13-DU16-r	46.57276	-111.90028	856061.96340	1365250.42599
P13-DU16-s	46.57277	-111.89972	856061.96340	1365391.32400
P13-DU16-t	46.57214	-111.89969	855832.97501	1365391.32400
P13-DU16-u	46.57151	-111.89967	855603.98662	1365391.32400
P13-DU16-v	46.57089	-111.89964	855374.99824	1365391.32400
P13-DU16-w	46.57026	-111.89961	855146.00985	1365391.32400
P13-DU16-x	46.56963	-111.89958	854917.02146	1365391.32400
P13-DU16-y	46.56962	-111.89915	854910.68566	1365500.54300
P13-DU16-z	46.57025	-111.89918	855139.67405	1365500.54300

Station_ID	Latitude	Longitude	Northing	Easting
P13-DU17-a	46.56958	-111.89851	854892.44417	1365661.50188
P13-DU17-aa	46.57089	-111.89651	855352.07218	1366178.44950
P13-DU17-b	46.57022	-111.89853	855122.25817	1365661.50188
P13-DU17-bb	46.57152	-111.89653	855581.88619	1366178.44950
P13-DU17-c	46.57085	-111.89856	855352.07218	1365661.50188
P13-DU17-cc	46.57215	-111.89656	855811.70020	1366178.44950
P13-DU17-d	46.57148	-111.89859	855581.88619	1365661.50188
P13-DU17-dd	46.57278	-111.89659	856041.51421	1366178.44950
P13-DU17-e	46.57211	-111.89862	855811.70020	1365661.50188
P13-DU17-f	46.57274	-111.89865	856041.51421	1365661.50188
P13-DU17-g	46.57213	-111.89761	855811.70020	1365913.63989
P13-DU17-g	46.57275	-111.89821	856041.51421	1365771.73138
P13-DU17-h	46.57211	-111.89818	855811.70020	1365771.73138
P13-DU17-i	46.57148	-111.89815	855581.88619	1365771.73138
P13-DU17-j	46.57085	-111.89812	855352.07218	1365771.73138
P13-DU17-k	46.57022	-111.89810	855122.25817	1365771.73138
P13-DU17-l	46.56959	-111.89807	854892.44417	1365771.73138
P13-DU17-m	46.56961	-111.89750	854892.44417	1365913.63989
P13-DU17-n	46.57024	-111.89753	855122.25817	1365913.63989
P13-DU17-o	46.57087	-111.89756	855352.07218	1365913.63989
P13-DU17-p	46.57150	-111.89759	855581.88619	1365913.63989
P13-DU17-r	46.57276	-111.89764	856041.51421	1365913.63989
P13-DU17-s	46.57277	-111.89708	856041.51421	1366055.54840
P13-DU17-t	46.57214	-111.89705	855811.70020	1366055.54840
P13-DU17-u	46.57151	-111.89702	855581.88619	1366055.54840
P13-DU17-v	46.57088	-111.89699	855352.07218	1366055.54840
P13-DU17-w	46.57025	-111.89697	855122.25817	1366055.54840
P13-DU17-x	46.56962	-111.89694	854892.44417	1366055.54840
P13-DU17-y	46.56963	-111.89645	854892.44417	1366178.44950
P13-DU17-z	46.57026	-111.89648	855122.25817	1366178.44950

Station_ID	Latitude	Longitude	Northing	Easting
P13-DU18-a	46.56957	-111.89589	854867.99813	1366318.05816
P13-DU18-aa	46.57088	-111.89393	855329.14627	1366825.34726
P13-DU18-b	46.57021	-111.89592	855098.57220	1366318.05816
P13-DU18-bb	46.57151	-111.89396	855559.72034	1366825.34726
P13-DU18-c	46.57084	-111.89595	855329.14627	1366318.05816
P13-DU18-cc	46.57214	-111.89399	855790.29440	1366825.34726
P13-DU18-d	46.57147	-111.89598	855559.72034	1366318.05816
P13-DU18-dd	46.57278	-111.89401	856020.86847	1366825.34726
P13-DU18-e	46.57210	-111.89600	855790.29440	1366318.05816
P13-DU18-f	46.57273	-111.89603	856020.86847	1366318.05816
P13-DU18-g	46.57212	-111.89500	855790.29440	1366571.70271
P13-DU18-g	46.57274	-111.89558	856020.86847	1366432.20883
P13-DU18-h	46.57211	-111.89555	855790.29440	1366432.20883
P13-DU18-i	46.57148	-111.89552	855559.72034	1366432.20883
P13-DU18-j	46.57085	-111.89549	855329.14627	1366432.20883
P13-DU18-k	46.57021	-111.89547	855098.57220	1366432.20883
P13-DU18-l	46.56958	-111.89544	854867.99813	1366432.20883
P13-DU18-m	46.56959	-111.89488	854867.99813	1366571.70271
P13-DU18-n	46.57023	-111.89491	855098.57220	1366571.70271
P13-DU18-o	46.57086	-111.89494	855329.14627	1366571.70271
P13-DU18-p	46.57149	-111.89497	855559.72034	1366571.70271
P13-DU18-r	46.57276	-111.89502	856020.86847	1366571.70271
P13-DU18-s	46.57277	-111.89447	856020.86847	1366711.19659
P13-DU18-t	46.57214	-111.89444	855790.29440	1366711.19659
P13-DU18-u	46.57150	-111.89441	855559.72034	1366711.19659
P13-DU18-v	46.57087	-111.89438	855329.14627	1366711.19659
P13-DU18-w	46.57024	-111.89436	855098.57220	1366711.19659
P13-DU18-x	46.56961	-111.89433	854867.99813	1366711.19659
P13-DU18-y	46.56962	-111.89387	854867.99813	1366825.34726
P13-DU18-z	46.57025	-111.89390	855098.57220	1366825.34726

Parcel 14



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Station_ID	Latitude	Longitude	Northing	Easting
P14-DU3-a	46.57705	-111.90591	857669.01932	1363884.71721
P14-DU3-aa	46.57839	-111.90192	858126.44656	1364903.08079
P14-DU3-b	46.57768	-111.90594	857897.73294	1363884.71721
P14-DU3-bb	46.57902	-111.90194	858355.16017	1364903.08079
P14-DU3-c	46.57830	-111.90597	858126.44656	1363884.71721
P14-DU3-cc	46.57964	-111.90197	858583.87379	1364903.08079
P14-DU3-d	46.57893	-111.90599	858355.16017	1363884.71721
P14-DU3-dd	46.58027	-111.90200	858812.58741	1364903.08079
P14-DU3-e	46.57956	-111.90602	858583.87379	1363884.71721
P14-DU3-f	46.58019	-111.90605	858812.58741	1363884.71721
P14-DU3-g	46.58021	-111.90504	858812.58741	1364139.30810
P14-DU3-h	46.57958	-111.90501	858583.87379	1364139.30810
P14-DU3-i	46.57895	-111.90498	858355.16017	1364139.30810
P14-DU3-j	46.57833	-111.90495	858126.44656	1364139.30810
P14-DU3-k	46.57770	-111.90493	857897.73294	1364139.30810
P14-DU3-l	46.57707	-111.90490	857669.01932	1364139.30810
P14-DU3-m	46.57709	-111.90388	857669.01932	1364393.89900
P14-DU3-n	46.57772	-111.90391	857897.73294	1364393.89900
P14-DU3-o	46.57835	-111.90394	858126.44656	1364393.89900
P14-DU3-p	46.57897	-111.90397	858355.16017	1364393.89900
P14-DU3-q	46.57960	-111.90400	858583.87379	1364393.89900
P14-DU3-r	46.58023	-111.90402	858812.58741	1364393.89900
P14-DU3-s	46.58025	-111.90301	858812.58741	1364648.48989
P14-DU3-t	46.57962	-111.90298	858583.87379	1364648.48989
P14-DU3-u	46.57900	-111.90296	858355.16017	1364648.48989
P14-DU3-v	46.57837	-111.90293	858126.44656	1364648.48989
P14-DU3-w	46.57774	-111.90290	857897.73294	1364648.48989
P14-DU3-x	46.57711	-111.90287	857669.01932	1364648.48989
P14-DU3-y	46.57714	-111.90186	857669.01932	1364903.08079
P14-DU3-z	46.57776	-111.90189	857897.73294	1364903.08079

Station_ID	Latitude	Longitude	Northing	Easting
P14-DU4-a	46.57709	-111.90119	857645.69186	1365070.87422
P14-DU4-aa	46.57837	-111.89906	858096.25395	1365621.13322
P14-DU4-b	46.57770	-111.90122	857870.97290	1365070.87422
P14-DU4-bb	46.57898	-111.89908	858321.53499	1365621.13322
P14-DU4-c	46.57832	-111.90124	858096.25395	1365070.87422
P14-DU4-cc	46.57960	-111.89911	858546.81604	1365621.13322
P14-DU4-d	46.57894	-111.90127	858321.53499	1365070.87422
P14-DU4-dd	46.58022	-111.89914	858772.09709	1365621.13322
P14-DU4-e	46.57956	-111.90130	858546.81604	1365070.87422
P14-DU4-f	46.58017	-111.90133	858772.09709	1365070.87422
P14-DU4-g	46.58019	-111.90078	858772.09709	1365208.43897
P14-DU4-h	46.57957	-111.90075	858546.81604	1365208.43897
P14-DU4-i	46.57895	-111.90072	858321.53499	1365208.43897
P14-DU4-j	46.57833	-111.90070	858096.25395	1365208.43897
P14-DU4-k	46.57771	-111.90067	857870.97290	1365208.43897
P14-DU4-l	46.57710	-111.90064	857645.69186	1365208.43897
P14-DU4-m	46.57711	-111.90010	857645.69186	1365346.00372
P14-DU4-n	46.57773	-111.90012	857870.97290	1365346.00372
P14-DU4-o	46.57834	-111.90015	858096.25395	1365346.00372
P14-DU4-p	46.57896	-111.90018	858321.53499	1365346.00372
P14-DU4-q	46.57958	-111.90021	858546.81604	1365346.00372
P14-DU4-r	46.58020	-111.90023	858772.09709	1365346.00372
P14-DU4-s	46.58021	-111.89969	858772.09709	1365483.56847
P14-DU4-t	46.57959	-111.89966	858546.81604	1365483.56847
P14-DU4-u	46.57897	-111.89963	858321.53499	1365483.56847
P14-DU4-v	46.57836	-111.89960	858096.25395	1365483.56847
P14-DU4-w	46.57774	-111.89958	857870.97290	1365483.56847
P14-DU4-x	46.57712	-111.89955	857645.69186	1365483.56847
P14-DU4-y	46.57713	-111.89900	857645.69186	1365621.13322
P14-DU4-z	46.57775	-111.89903	857870.97290	1365621.13322

Station_ID	Latitude	Longitude	Northing	Easting
P14-DU5-a	46.57708	-111.89856	857624.02903	1365731.97854
P14-DU5-aa	46.57836	-111.89643	858074.25200	1366280.84647
P14-DU5-b	46.57770	-111.89859	857849.14052	1365731.97854
P14-DU5-bb	46.57898	-111.89646	858299.36348	1366280.84647
P14-DU5-c	46.57832	-111.89861	858074.25200	1365731.97854
P14-DU5-cc	46.57960	-111.89648	858524.47496	1366280.84647
P14-DU5-d	46.57893	-111.89864	858299.36348	1365731.97854
P14-DU5-dd	46.58021	-111.89651	858749.58644	1366280.84647
P14-DU5-e	46.57955	-111.89867	858524.47496	1365731.97854
P14-DU5-f	46.58017	-111.89870	858749.58644	1365731.97854
P14-DU5-g	46.58018	-111.89815	858749.58644	1365869.19552
P14-DU5-h	46.57956	-111.89812	858524.47496	1365869.19552
P14-DU5-i	46.57894	-111.89809	858299.36348	1365869.19552
P14-DU5-j	46.57833	-111.89807	858074.25200	1365869.19552
P14-DU5-k	46.57771	-111.89804	857849.14052	1365869.19552
P14-DU5-l	46.57709	-111.89801	857624.02903	1365869.19552
P14-DU5-m	46.57710	-111.89747	857624.02903	1366006.41250
P14-DU5-n	46.57772	-111.89749	857849.14052	1366006.41250
P14-DU5-o	46.57834	-111.89752	858074.25200	1366006.41250
P14-DU5-p	46.57896	-111.89755	858299.36348	1366006.41250
P14-DU5-q	46.57957	-111.89758	858524.47496	1366006.41250
P14-DU5-r	46.58019	-111.89760	858749.58644	1366006.41250
P14-DU5-s	46.58020	-111.89706	858749.58644	1366143.62949
P14-DU5-t	46.57959	-111.89703	858524.47496	1366143.62949
P14-DU5-u	46.57897	-111.89700	858299.36348	1366143.62949
P14-DU5-v	46.57835	-111.89698	858074.25200	1366143.62949
P14-DU5-w	46.57773	-111.89695	857849.14052	1366143.62949
P14-DU5-x	46.57712	-111.89692	857624.02903	1366143.62949
P14-DU5-y	46.57713	-111.89638	857624.02903	1366280.84647
P14-DU5-z	46.57774	-111.89640	857849.14052	1366280.84647

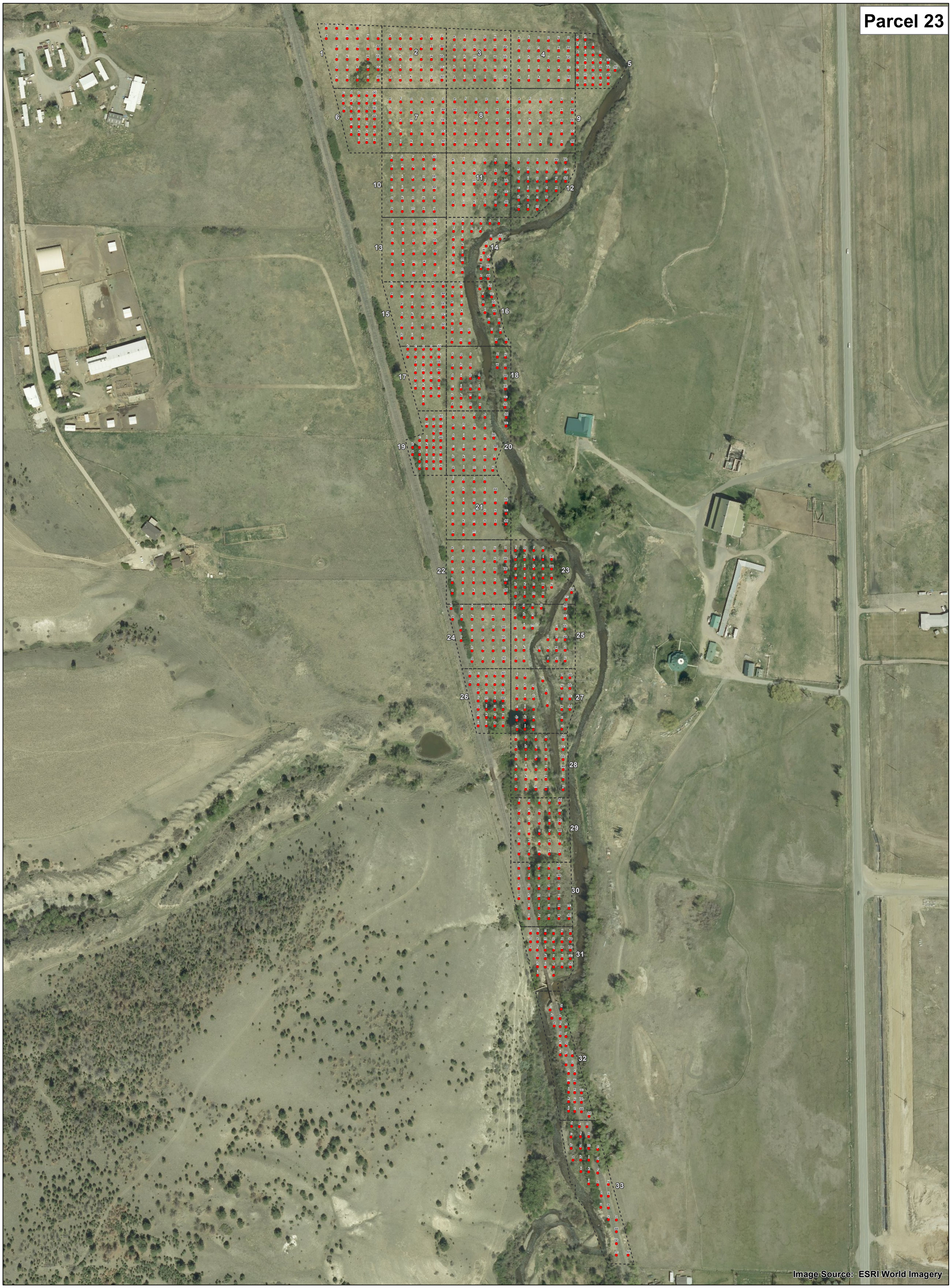
Station_ID	Latitude	Longitude	Northing	Easting
P14-DU6-a	46.57708	-111.89594	857603.39360	1366390.33979
P14-DU6-aa	46.57836	-111.89391	858052.92770	1366915.08729
P14-DU6-b	46.57770	-111.89596	857828.16065	1366390.33979
P14-DU6-bb	46.57897	-111.89393	858277.69475	1366915.08729
P14-DU6-c	46.57831	-111.89599	858052.92770	1366390.33979
P14-DU6-cc	46.57959	-111.89396	858502.46180	1366915.08729
P14-DU6-d	46.57893	-111.89602	858277.69475	1366390.33979
P14-DU6-dd	46.58021	-111.89399	858727.22885	1366915.08729
P14-DU6-e	46.57955	-111.89605	858502.46180	1366390.33979
P14-DU6-f	46.58016	-111.89607	858727.22885	1366390.33979
P14-DU6-g	46.58017	-111.89555	858727.22885	1366521.52666
P14-DU6-h	46.57956	-111.89552	858502.46180	1366521.52666
P14-DU6-i	46.57894	-111.89550	858277.69475	1366521.52666
P14-DU6-j	46.57832	-111.89547	858052.92770	1366521.52666
P14-DU6-k	46.57771	-111.89544	857828.16065	1366521.52666
P14-DU6-l	46.57709	-111.89542	857603.39360	1366521.52666
P14-DU6-m	46.57710	-111.89489	857603.39360	1366652.71354
P14-DU6-n	46.57772	-111.89492	857828.16065	1366652.71354
P14-DU6-o	46.57833	-111.89495	858052.92770	1366652.71354
P14-DU6-p	46.57895	-111.89498	858277.69475	1366652.71354
P14-DU6-q	46.57957	-111.89500	858502.46180	1366652.71354
P14-DU6-r	46.58018	-111.89503	858727.22885	1366652.71354
P14-DU6-s	46.58019	-111.89451	858727.22885	1366783.90042
P14-DU6-t	46.57958	-111.89448	858502.46180	1366783.90042
P14-DU6-u	46.57896	-111.89445	858277.69475	1366783.90042
P14-DU6-v	46.57835	-111.89443	858052.92770	1366783.90042
P14-DU6-w	46.57773	-111.89440	857828.16065	1366783.90042
P14-DU6-x	46.57711	-111.89437	857603.39360	1366783.90042
P14-DU6-y	46.57712	-111.89385	857603.39360	1366915.08729
P14-DU6-z	46.57774	-111.89388	857828.16065	1366915.08729

Station_ID	Latitude	Longitude	Northing	Easting
P14-DU7-a	46.57328	-111.91131	856337.63154	1362485.01613
P14-DU7-aa	46.57467	-111.90714	856813.11374	1363548.15285
P14-DU7-b	46.57393	-111.91134	856575.37264	1362485.01613
P14-DU7-bb	46.57533	-111.90717	857050.85485	1363548.15285
P14-DU7-c	46.57458	-111.91137	856813.11374	1362485.01613
P14-DU7-cc	46.57598	-111.90720	857288.59595	1363548.15285
P14-DU7-d	46.57524	-111.91140	857050.85485	1362485.01613
P14-DU7-dd	46.57663	-111.90723	857526.33706	1363548.15285
P14-DU7-e	46.57589	-111.91143	857288.59595	1362485.01613
P14-DU7-f	46.57654	-111.91146	857526.33706	1362485.01613
P14-DU7-g	46.57656	-111.91040	857526.33706	1362750.80031
P14-DU7-h	46.57591	-111.91037	857288.59595	1362750.80031
P14-DU7-i	46.57526	-111.91034	857050.85485	1362750.80031
P14-DU7-j	46.57461	-111.91031	856813.11374	1362750.80031
P14-DU7-k	46.57395	-111.91028	856575.37264	1362750.80031
P14-DU7-l	46.57330	-111.91026	856337.63154	1362750.80031
P14-DU7-m	46.57333	-111.90920	856337.63154	1363016.58449
P14-DU7-n	46.57398	-111.90923	856575.37264	1363016.58449
P14-DU7-o	46.57463	-111.90926	856813.11374	1363016.58449
P14-DU7-p	46.57528	-111.90929	857050.85485	1363016.58449
P14-DU7-q	46.57593	-111.90932	857288.59595	1363016.58449
P14-DU7-r	46.57658	-111.90934	857526.33706	1363016.58449
P14-DU7-s	46.57661	-111.90829	857526.33706	1363282.36867
P14-DU7-t	46.57596	-111.90826	857288.59595	1363282.36867
P14-DU7-u	46.57530	-111.90823	857050.85485	1363282.36867
P14-DU7-v	46.57465	-111.90820	856813.11374	1363282.36867
P14-DU7-w	46.57400	-111.90817	856575.37264	1363282.36867
P14-DU7-x	46.57335	-111.90814	856337.63154	1363282.36867
P14-DU7-y	46.57337	-111.90709	856337.63154	1363548.15285
P14-DU7-z	46.57402	-111.90711	856575.37264	1363548.15285

Station_ID	Latitude	Longitude	Northing	Easting
P14-DU8-a	46.57332	-111.90641	856312.87188	1363717.44841
P14-DU8-aa	46.57465	-111.90426	856780.61449	1364271.43418
P14-DU8-b	46.57396	-111.90644	856546.74319	1363717.44841
P14-DU8-bb	46.57529	-111.90429	857014.48580	1364271.43418
P14-DU8-c	46.57460	-111.90647	856780.61449	1363717.44841
P14-DU8-cc	46.57593	-111.90432	857248.35710	1364271.43418
P14-DU8-d	46.57524	-111.90649	857014.48580	1363717.44841
P14-DU8-dd	46.57657	-111.90435	857482.22841	1364271.43418
P14-DU8-e	46.57588	-111.90652	857248.35710	1363717.44841
P14-DU8-f	46.57652	-111.90655	857482.22841	1363717.44841
P14-DU8-g	46.57653	-111.90600	857482.22841	1363855.94485
P14-DU8-h	46.57589	-111.90597	857248.35710	1363855.94485
P14-DU8-i	46.57525	-111.90594	857014.48580	1363855.94485
P14-DU8-j	46.57461	-111.90592	856780.61449	1363855.94485
P14-DU8-k	46.57397	-111.90589	856546.74319	1363855.94485
P14-DU8-l	46.57333	-111.90586	856312.87188	1363855.94485
P14-DU8-m	46.57334	-111.90531	856312.87188	1363994.44130
P14-DU8-n	46.57398	-111.90534	856546.74319	1363994.44130
P14-DU8-o	46.57462	-111.90536	856780.61449	1363994.44130
P14-DU8-p	46.57526	-111.90539	857014.48580	1363994.44130
P14-DU8-q	46.57591	-111.90542	857248.35710	1363994.44130
P14-DU8-r	46.57655	-111.90545	857482.22841	1363994.44130
P14-DU8-s	46.57656	-111.90490	857482.22841	1364132.93774
P14-DU8-t	46.57592	-111.90487	857248.35710	1364132.93774
P14-DU8-u	46.57528	-111.90484	857014.48580	1364132.93774
P14-DU8-v	46.57463	-111.90481	856780.61449	1364132.93774
P14-DU8-w	46.57399	-111.90479	856546.74319	1364132.93774
P14-DU8-x	46.57335	-111.90476	856312.87188	1364132.93774
P14-DU8-y	46.57336	-111.90421	856312.87188	1364271.43418
P14-DU8-z	46.57400	-111.90423	856546.74319	1364271.43418

Station_ID	Latitude	Longitude	Northing	Easting
P14-DU9-a	46.57332	-111.90378	856292.36011	1364378.56258
P14-DU9-aa	46.57464	-111.90163	856759.24971	1364932.81081
P14-DU9-b	46.57396	-111.90381	856525.80491	1364378.56258
P14-DU9-bb	46.57528	-111.90166	856992.69450	1364932.81081
P14-DU9-c	46.57460	-111.90383	856759.24971	1364378.56258
P14-DU9-cc	46.57592	-111.90169	857226.13930	1364932.81081
P14-DU9-d	46.57524	-111.90386	856992.69450	1364378.56258
P14-DU9-dd	46.57656	-111.90172	857459.58410	1364932.81081
P14-DU9-e	46.57588	-111.90389	857226.13930	1364378.56258
P14-DU9-f	46.57652	-111.90392	857459.58410	1364378.56258
P14-DU9-g	46.57653	-111.90337	857459.58410	1364517.12463
P14-DU9-h	46.57589	-111.90334	857226.13930	1364517.12463
P14-DU9-i	46.57525	-111.90331	856992.69450	1364517.12463
P14-DU9-j	46.57461	-111.90328	856759.24971	1364517.12463
P14-DU9-k	46.57397	-111.90326	856525.80491	1364517.12463
P14-DU9-l	46.57333	-111.90323	856292.36011	1364517.12463
P14-DU9-m	46.57334	-111.90268	856292.36011	1364655.68669
P14-DU9-n	46.57398	-111.90270	856525.80491	1364655.68669
P14-DU9-o	46.57462	-111.90273	856759.24971	1364655.68669
P14-DU9-p	46.57526	-111.90276	856992.69450	1364655.68669
P14-DU9-q	46.57590	-111.90279	857226.13930	1364655.68669
P14-DU9-r	46.57654	-111.90282	857459.58410	1364655.68669
P14-DU9-s	46.57655	-111.90227	857459.58410	1364794.24875
P14-DU9-t	46.57591	-111.90224	857226.13930	1364794.24875
P14-DU9-u	46.57527	-111.90221	856992.69450	1364794.24875
P14-DU9-v	46.57463	-111.90218	856759.24971	1364794.24875
P14-DU9-w	46.57399	-111.90215	856525.80491	1364794.24875
P14-DU9-x	46.57335	-111.90212	856292.36011	1364794.24875
P14-DU9-y	46.57336	-111.90157	856292.36011	1364932.81081
P14-DU9-z	46.57400	-111.90160	856525.80491	1364932.81081

Station_ID	Latitude	Longitude	Northing	Easting
P14-DU10-a	46.57332	-111.90113	856271.97955	1365042.97040
P14-DU10-aa	46.57464	-111.89900	856738.40972	1365594.43675
P14-DU10-b	46.57396	-111.90116	856505.19463	1365042.97040
P14-DU10-bb	46.57528	-111.89903	856971.62480	1365594.43675
P14-DU10-c	46.57459	-111.90119	856738.40972	1365042.97040
P14-DU10-cc	46.57592	-111.89905	857204.83989	1365594.43675
P14-DU10-d	46.57523	-111.90122	856971.62480	1365042.97040
P14-DU10-dd	46.57656	-111.89908	857438.05497	1365594.43675
P14-DU10-e	46.57587	-111.90125	857204.83989	1365042.97040
P14-DU10-f	46.57651	-111.90128	857438.05497	1365042.97040
P14-DU10-g	46.57653	-111.90073	857438.05497	1365180.83699
P14-DU10-h	46.57589	-111.90070	857204.83989	1365180.83699
P14-DU10-i	46.57525	-111.90067	856971.62480	1365180.83699
P14-DU10-j	46.57461	-111.90064	856738.40972	1365180.83699
P14-DU10-k	46.57397	-111.90061	856505.19463	1365180.83699
P14-DU10-l	46.57333	-111.90058	856271.97955	1365180.83699
P14-DU10-m	46.57334	-111.90004	856271.97955	1365318.70358
P14-DU10-n	46.57398	-111.90007	856505.19463	1365318.70358
P14-DU10-o	46.57462	-111.90009	856738.40972	1365318.70358
P14-DU10-p	46.57526	-111.90012	856971.62480	1365318.70358
P14-DU10-q	46.57590	-111.90015	857204.83989	1365318.70358
P14-DU10-r	46.57654	-111.90018	857438.05497	1365318.70358
P14-DU10-s	46.57655	-111.89963	857438.05497	1365456.57016
P14-DU10-t	46.57591	-111.89960	857204.83989	1365456.57016
P14-DU10-u	46.57527	-111.89957	856971.62480	1365456.57016
P14-DU10-v	46.57463	-111.89955	856738.40972	1365456.57016
P14-DU10-w	46.57399	-111.89952	856505.19463	1365456.57016
P14-DU10-x	46.57335	-111.89949	856271.97955	1365456.57016
P14-DU10-y	46.57336	-111.89894	856271.97955	1365594.43675
P14-DU10-z	46.57400	-111.89897	856505.19463	1365594.43675



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Station_ID	Latitude	Longitude	Northing	Easting
P23-DU1-a	46.57296	-111.91815	856272.45834	1360763.30233
P23-DU1-aa	46.57288	-111.91748	856238.92432	1360930.97239
P23-DU1-b	46.57305	-111.91816	856305.99235	1360763.30233
P23-DU1-bb	46.57279	-111.91748	856205.39031	1360930.97239
P23-DU1-c	46.57305	-111.91802	856305.99235	1360796.83634
P23-DU1-cc	46.57269	-111.91747	856171.85630	1360930.97239
P23-DU1-d	46.57296	-111.91802	856272.45834	1360796.83634
P23-DU1-dd	46.57260	-111.91747	856138.32229	1360930.97239
P23-DU1-e	46.57287	-111.91801	856238.92432	1360796.83634
P23-DU1-f	46.57278	-111.91801	856205.39031	1360796.83634
P23-DU1-g	46.57268	-111.91801	856171.85630	1360796.83634
P23-DU1-h	46.57259	-111.91800	856138.32229	1360796.83634
P23-DU1-i	46.57259	-111.91787	856138.32229	1360830.37035
P23-DU1-j	46.57269	-111.91787	856171.85630	1360830.37035
P23-DU1-k	46.57278	-111.91788	856205.39031	1360830.37035
P23-DU1-l	46.57287	-111.91788	856238.92432	1360830.37035
P23-DU1-m	46.57296	-111.91788	856272.45834	1360830.37035
P23-DU1-n	46.57305	-111.91789	856305.99235	1360830.37035
P23-DU1-o	46.57306	-111.91776	856305.99235	1360863.90437
P23-DU1-p	46.57296	-111.91775	856272.45834	1360863.90437
P23-DU1-q	46.57287	-111.91775	856238.92432	1360863.90437
P23-DU1-r	46.57278	-111.91774	856205.39031	1360863.90437
P23-DU1-s	46.57269	-111.91774	856171.85630	1360863.90437
P23-DU1-t	46.57260	-111.91773	856138.32229	1360863.90437
P23-DU1-u	46.57260	-111.91760	856138.32229	1360897.43838
P23-DU1-v	46.57269	-111.91761	856171.85630	1360897.43838
P23-DU1-w	46.57278	-111.91761	856205.39031	1360897.43838
P23-DU1-x	46.57288	-111.91761	856238.92432	1360897.43838
P23-DU1-y	46.57297	-111.91762	856272.45834	1360897.43838
P23-DU1-z	46.57297	-111.91748	856272.45834	1360930.97239

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU2-a	46.57261	-111.91732	856138.33113	1360969.15803
P23-DU2-aa	46.57290	-111.91666	856238.98626	1361136.91657
P23-DU2-b	46.57270	-111.91732	856171.88284	1360969.15803
P23-DU2-bb	46.57280	-111.91666	856205.43455	1361136.91657
P23-DU2-c	46.57279	-111.91732	856205.43455	1360969.15803
P23-DU2-cc	46.57271	-111.91665	856171.88284	1361136.91657
P23-DU2-d	46.57288	-111.91733	856238.98626	1360969.15803
P23-DU2-dd	46.57262	-111.91665	856138.33113	1361136.91657
P23-DU2-e	46.57297	-111.91733	856272.53796	1360969.15803
P23-DU2-f	46.57298	-111.91720	856272.53796	1361002.70974
P23-DU2-g	46.57288	-111.91719	856238.98626	1361002.70974
P23-DU2-h	46.57279	-111.91719	856205.43455	1361002.70974
P23-DU2-i	46.57270	-111.91719	856171.88284	1361002.70974
P23-DU2-j	46.57261	-111.91718	856138.33113	1361002.70974
P23-DU2-k	46.57261	-111.91705	856138.33113	1361036.26145
P23-DU2-l	46.57270	-111.91705	856171.88284	1361036.26145
P23-DU2-m	46.57280	-111.91706	856205.43455	1361036.26145
P23-DU2-n	46.57289	-111.91706	856238.98626	1361036.26145
P23-DU2-o	46.57298	-111.91707	856272.53796	1361036.26145
P23-DU2-p	46.57298	-111.91693	856272.53796	1361069.81315
P23-DU2-q	46.57289	-111.91693	856238.98626	1361069.81315
P23-DU2-r	46.57280	-111.91692	856205.43455	1361069.81315
P23-DU2-s	46.57271	-111.91692	856171.88284	1361069.81315
P23-DU2-t	46.57261	-111.91692	856138.33113	1361069.81315
P23-DU2-u	46.57262	-111.91678	856138.33113	1361103.36486
P23-DU2-v	46.57271	-111.91679	856171.88284	1361103.36486
P23-DU2-w	46.57280	-111.91679	856205.43455	1361103.36486
P23-DU2-x	46.57289	-111.91679	856238.98626	1361103.36486
P23-DU2-y	46.57299	-111.91680	856272.53796	1361103.36486
P23-DU2-z	46.57299	-111.91667	856272.53796	1361136.91657

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU3-a	46.57262	-111.91649	856137.96959	1361177.49029
P23-DU3-aa	46.57291	-111.91585	856236.45545	1361341.63339
P23-DU3-b	46.57271	-111.91649	856170.79821	1361177.49029
P23-DU3-bb	46.57282	-111.91584	856203.62683	1361341.63339
P23-DU3-c	46.57280	-111.91650	856203.62683	1361177.49029
P23-DU3-cc	46.57273	-111.91584	856170.79821	1361341.63339
P23-DU3-d	46.57289	-111.91650	856236.45545	1361177.49029
P23-DU3-dd	46.57264	-111.91583	856137.96959	1361341.63339
P23-DU3-e	46.57298	-111.91650	856269.28407	1361177.49029
P23-DU3-f	46.57299	-111.91637	856269.28407	1361210.31891
P23-DU3-g	46.57290	-111.91637	856236.45545	1361210.31891
P23-DU3-h	46.57281	-111.91637	856203.62683	1361210.31891
P23-DU3-i	46.57272	-111.91636	856170.79821	1361210.31891
P23-DU3-j	46.57263	-111.91636	856137.96959	1361210.31891
P23-DU3-k	46.57263	-111.91623	856137.96959	1361243.14753
P23-DU3-l	46.57272	-111.91623	856170.79821	1361243.14753
P23-DU3-m	46.57281	-111.91623	856203.62683	1361243.14753
P23-DU3-n	46.57290	-111.91624	856236.45545	1361243.14753
P23-DU3-o	46.57299	-111.91624	856269.28407	1361243.14753
P23-DU3-p	46.57299	-111.91611	856269.28407	1361275.97615
P23-DU3-q	46.57290	-111.91611	856236.45545	1361275.97615
P23-DU3-r	46.57281	-111.91610	856203.62683	1361275.97615
P23-DU3-s	46.57272	-111.91610	856170.79821	1361275.97615
P23-DU3-t	46.57263	-111.91610	856137.96959	1361275.97615
P23-DU3-u	46.57263	-111.91597	856137.96959	1361308.80477
P23-DU3-v	46.57272	-111.91597	856170.79821	1361308.80477
P23-DU3-w	46.57281	-111.91597	856203.62683	1361308.80477
P23-DU3-x	46.57290	-111.91598	856236.45545	1361308.80477
P23-DU3-y	46.57299	-111.91598	856269.28407	1361308.80477
P23-DU3-z	46.57300	-111.91585	856269.28407	1361341.63339

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU4-a	46.57264	-111.91566	856137.59990	1361385.81441
P23-DU4-aa	46.57292	-111.91503	856233.86762	1361546.26062
P23-DU4-b	46.57273	-111.91566	856169.68914	1361385.81441
P23-DU4-bb	46.57283	-111.91503	856201.77838	1361546.26062
P23-DU4-c	46.57281	-111.91567	856201.77838	1361385.81441
P23-DU4-cc	46.57274	-111.91503	856169.68914	1361546.26062
P23-DU4-d	46.57290	-111.91567	856233.86762	1361385.81441
P23-DU4-dd	46.57265	-111.91502	856137.59990	1361546.26062
P23-DU4-e	46.57299	-111.91567	856265.95687	1361385.81441
P23-DU4-f	46.57299	-111.91555	856265.95687	1361417.90365
P23-DU4-g	46.57291	-111.91554	856233.86762	1361417.90365
P23-DU4-h	46.57282	-111.91554	856201.77838	1361417.90365
P23-DU4-i	46.57273	-111.91554	856169.68914	1361417.90365
P23-DU4-j	46.57264	-111.91553	856137.59990	1361417.90365
P23-DU4-k	46.57264	-111.91540	856137.59990	1361449.99290
P23-DU4-l	46.57273	-111.91541	856169.68914	1361449.99290
P23-DU4-m	46.57282	-111.91541	856201.77838	1361449.99290
P23-DU4-n	46.57291	-111.91542	856233.86762	1361449.99290
P23-DU4-o	46.57300	-111.91542	856265.95687	1361449.99290
P23-DU4-p	46.57300	-111.91529	856265.95687	1361482.08214
P23-DU4-q	46.57291	-111.91529	856233.86762	1361482.08214
P23-DU4-r	46.57282	-111.91528	856201.77838	1361482.08214
P23-DU4-s	46.57274	-111.91528	856169.68914	1361482.08214
P23-DU4-t	46.57265	-111.91528	856137.59990	1361482.08214
P23-DU4-u	46.57265	-111.91515	856137.59990	1361514.17138
P23-DU4-v	46.57274	-111.91515	856169.68914	1361514.17138
P23-DU4-w	46.57283	-111.91516	856201.77838	1361514.17138
P23-DU4-x	46.57291	-111.91516	856233.86762	1361514.17138
P23-DU4-y	46.57300	-111.91516	856265.95687	1361514.17138
P23-DU4-z	46.57300	-111.91504	856265.95687	1361546.26062

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU5-a	46.57261	-111.91490	856122.75829	1361575.90410
P23-DU5-aa	46.57269	-111.91451	856145.69737	1361674.80447
P23-DU5-b	46.57268	-111.91490	856145.69737	1361576.26809
P23-DU5-bb	46.57275	-111.91451	856170.33147	1361674.80447
P23-DU5-c	46.57274	-111.91491	856170.33147	1361576.26809
P23-DU5-cc	46.57282	-111.91452	856194.96556	1361674.80447
P23-DU5-d	46.57281	-111.91491	856194.96556	1361576.26809
P23-DU5-dd	46.57275	-111.91442	856169.70296	1361697.28855
P23-DU5-e	46.57288	-111.91491	856219.59965	1361576.26809
P23-DU5-f	46.57295	-111.91491	856244.23375	1361576.26809
P23-DU5-g	46.57302	-111.91492	856268.86784	1361576.26809
P23-DU5-h	46.57302	-111.91482	856268.86784	1361600.90219
P23-DU5-i	46.57295	-111.91482	856244.23375	1361600.90219
P23-DU5-j	46.57288	-111.91481	856219.59965	1361600.90219
P23-DU5-k	46.57281	-111.91481	856194.96556	1361600.90219
P23-DU5-l	46.57275	-111.91481	856170.33147	1361600.90219
P23-DU5-m	46.57268	-111.91480	856145.69737	1361600.90219
P23-DU5-n	46.57262	-111.91480	856123.20479	1361600.18269
P23-DU5-o	46.57262	-111.91470	856123.29579	1361625.44528
P23-DU5-p	46.57268	-111.91471	856145.69737	1361625.53628
P23-DU5-q	46.57275	-111.91471	856170.33147	1361625.53628
P23-DU5-r	46.57282	-111.91471	856194.96556	1361625.53628
P23-DU5-s	46.57288	-111.91472	856219.59965	1361625.53628
P23-DU5-t	46.57295	-111.91472	856244.23375	1361625.53628
P23-DU5-u	46.57288	-111.91462	856218.88015	1361649.18637
P23-DU5-v	46.57282	-111.91461	856194.96556	1361650.17038
P23-DU5-w	46.57275	-111.91461	856170.33147	1361650.17038
P23-DU5-x	46.57268	-111.91461	856145.69737	1361650.17038
P23-DU5-y	46.57262	-111.91461	856123.92429	1361650.07938
P23-DU5-z	46.57263	-111.91451	856126.07430	1361674.89547

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU6-a	46.57232	-111.91790	856038.28225	1360820.17668
P23-DU6-aa	46.57226	-111.91750	856012.46042	1360919.06307
P23-DU6-b	46.57239	-111.91791	856062.86277	1360818.25837
P23-DU6-bb	46.57233	-111.91750	856037.66159	1360919.06307
P23-DU6-c	46.57246	-111.91791	856088.06394	1360818.25837
P23-DU6-cc	46.57239	-111.91751	856062.86277	1360919.06307
P23-DU6-d	46.57246	-111.91781	856088.06394	1360843.45955
P23-DU6-dd	46.57246	-111.91751	856088.06394	1360919.06307
P23-DU6-e	46.57239	-111.91781	856062.86277	1360843.45955
P23-DU6-f	46.57232	-111.91780	856037.66159	1360843.45955
P23-DU6-g	46.57225	-111.91780	856012.46042	1360843.45955
P23-DU6-h	46.57218	-111.91780	855987.25924	1360843.45955
P23-DU6-i	46.57211	-111.91779	855962.05807	1360843.45955
P23-DU6-j	46.57204	-111.91769	855936.85690	1360868.66072
P23-DU6-k	46.57211	-111.91769	855962.05807	1360868.66072
P23-DU6-l	46.57218	-111.91770	855987.25924	1360868.66072
P23-DU6-m	46.57225	-111.91770	856012.46042	1360868.66072
P23-DU6-n	46.57232	-111.91770	856037.66159	1360868.66072
P23-DU6-o	46.57239	-111.91771	856062.86277	1360868.66072
P23-DU6-p	46.57246	-111.91771	856088.06394	1360868.66072
P23-DU6-q	46.57246	-111.91761	856088.06394	1360893.86190
P23-DU6-r	46.57239	-111.91761	856062.86277	1360893.86190
P23-DU6-s	46.57232	-111.91760	856037.66159	1360893.86190
P23-DU6-t	46.57225	-111.91760	856012.46042	1360893.86190
P23-DU6-u	46.57219	-111.91760	855987.25924	1360893.86190
P23-DU6-v	46.57212	-111.91759	855962.05807	1360893.86190
P23-DU6-w	46.57205	-111.91759	855936.85690	1360893.86190
P23-DU6-x	46.57205	-111.91749	855936.85690	1360919.06307
P23-DU6-y	46.57212	-111.91749	855962.05807	1360919.06307
P23-DU6-z	46.57219	-111.91750	855987.25924	1360919.06307

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU7-a	46.57203	-111.91729	855930.04409	1360969.56480
P23-DU7-aa	46.57233	-111.91662	856033.13980	1361141.39098
P23-DU7-b	46.57213	-111.91729	855964.40933	1360969.56480
P23-DU7-bb	46.57224	-111.91661	855998.77457	1361141.39098
P23-DU7-c	46.57222	-111.91730	855998.77457	1360969.56480
P23-DU7-cc	46.57214	-111.91661	855964.40933	1361141.39098
P23-DU7-d	46.57232	-111.91730	856033.13980	1360969.56480
P23-DU7-dd	46.57205	-111.91661	855930.04409	1361141.39098
P23-DU7-e	46.57241	-111.91731	856067.50504	1360969.56480
P23-DU7-f	46.57241	-111.91717	856067.50504	1361003.93003
P23-DU7-g	46.57232	-111.91716	856033.13980	1361003.93003
P23-DU7-h	46.57223	-111.91716	855998.77457	1361003.93003
P23-DU7-i	46.57213	-111.91716	855964.40933	1361003.93003
P23-DU7-j	46.57204	-111.91715	855930.04409	1361003.93003
P23-DU7-k	46.57204	-111.91702	855930.04409	1361038.29527
P23-DU7-l	46.57213	-111.91702	855964.40933	1361038.29527
P23-DU7-m	46.57223	-111.91702	855998.77457	1361038.29527
P23-DU7-n	46.57232	-111.91703	856033.13980	1361038.29527
P23-DU7-o	46.57242	-111.91703	856067.50504	1361038.29527
P23-DU7-p	46.57242	-111.91690	856067.50504	1361072.66051
P23-DU7-q	46.57233	-111.91689	856033.13980	1361072.66051
P23-DU7-r	46.57223	-111.91689	855998.77457	1361072.66051
P23-DU7-s	46.57214	-111.91688	855964.40933	1361072.66051
P23-DU7-t	46.57204	-111.91688	855930.04409	1361072.66051
P23-DU7-u	46.57205	-111.91674	855930.04409	1361107.02575
P23-DU7-v	46.57214	-111.91675	855964.40933	1361107.02575
P23-DU7-w	46.57223	-111.91675	855998.77457	1361107.02575
P23-DU7-x	46.57233	-111.91675	856033.13980	1361107.02575
P23-DU7-y	46.57242	-111.91676	856067.50504	1361107.02575
P23-DU7-z	46.57243	-111.91662	856067.50504	1361141.39098

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU8-a	46.57205	-111.91646	855930.04409	1361178.25860
P23-DU8-aa	46.57233	-111.91647	856033.13980	1361178.25860
P23-DU8-aa	46.57235	-111.91579	856033.13980	1361350.08479
P23-DU8-b	46.57215	-111.91646	855964.40933	1361178.25860
P23-DU8-bb	46.57226	-111.91578	855998.77457	1361350.08479
P23-DU8-c	46.57224	-111.91647	855998.77457	1361178.25860
P23-DU8-cc	46.57216	-111.91578	855964.40933	1361350.08479
P23-DU8-dd	46.57207	-111.91578	855930.04409	1361350.08479
P23-DU8-e	46.57243	-111.91648	856067.50504	1361178.25860
P23-DU8-f	46.57243	-111.91634	856067.50504	1361212.62384
P23-DU8-g	46.57234	-111.91633	856033.13980	1361212.62384
P23-DU8-h	46.57224	-111.91633	855998.77457	1361212.62384
P23-DU8-i	46.57215	-111.91633	855964.40933	1361212.62384
P23-DU8-j	46.57206	-111.91632	855930.04409	1361212.62384
P23-DU8-k	46.57206	-111.91619	855930.04409	1361246.98908
P23-DU8-l	46.57215	-111.91619	855964.40933	1361246.98908
P23-DU8-m	46.57225	-111.91619	855998.77457	1361246.98908
P23-DU8-n	46.57234	-111.91620	856033.13980	1361246.98908
P23-DU8-o	46.57243	-111.91620	856067.50504	1361246.98908
P23-DU8-p	46.57244	-111.91607	856067.50504	1361281.35432
P23-DU8-q	46.57234	-111.91606	856033.13980	1361281.35432
P23-DU8-r	46.57225	-111.91606	855998.77457	1361281.35432
P23-DU8-s	46.57216	-111.91605	855964.40933	1361281.35432
P23-DU8-t	46.57206	-111.91605	855930.04409	1361281.35432
P23-DU8-u	46.57206	-111.91591	855930.04409	1361315.71956
P23-DU8-v	46.57216	-111.91592	855964.40933	1361315.71956
P23-DU8-w	46.57225	-111.91592	855998.77457	1361315.71956
P23-DU8-x	46.57235	-111.91592	856033.13980	1361315.71956
P23-DU8-y	46.57244	-111.91593	856067.50504	1361315.71956
P23-DU8-z	46.57244	-111.91579	856067.50504	1361350.08479

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU9-a	46.57207	-111.91563	855930.04409	1361386.95241
P23-DU9-aa	46.57237	-111.91496	856033.13980	1361558.77860
P23-DU9-b	46.57216	-111.91563	855964.40933	1361386.95241
P23-DU9-bb	46.57227	-111.91495	855998.77457	1361558.77860
P23-DU9-c	46.57226	-111.91564	855998.77457	1361386.95241
P23-DU9-cc	46.57218	-111.91495	855964.40933	1361558.77860
P23-DU9-d	46.57235	-111.91564	856033.13980	1361386.95241
P23-DU9-dd	46.57208	-111.91495	855930.04409	1361558.77860
P23-DU9-e	46.57245	-111.91565	856067.50504	1361386.95241
P23-DU9-f	46.57245	-111.91551	856067.50504	1361421.31765
P23-DU9-g	46.57236	-111.91551	856033.13980	1361421.31765
P23-DU9-h	46.57226	-111.91550	855998.77457	1361421.31765
P23-DU9-i	46.57217	-111.91550	855964.40933	1361421.31765
P23-DU9-j	46.57207	-111.91549	855930.04409	1361421.31765
P23-DU9-k	46.57208	-111.91536	855930.04409	1361455.68289
P23-DU9-l	46.57217	-111.91536	855964.40933	1361455.68289
P23-DU9-m	46.57226	-111.91536	855998.77457	1361455.68289
P23-DU9-n	46.57236	-111.91537	856033.13980	1361455.68289
P23-DU9-o	46.57245	-111.91537	856067.50504	1361455.68289
P23-DU9-p	46.57246	-111.91524	856067.50504	1361490.04813
P23-DU9-q	46.57236	-111.91523	856033.13980	1361490.04813
P23-DU9-r	46.57227	-111.91523	855998.77457	1361490.04813
P23-DU9-s	46.57217	-111.91522	855964.40933	1361490.04813
P23-DU9-t	46.57208	-111.91522	855930.04409	1361490.04813
P23-DU9-u	46.57208	-111.91508	855930.04409	1361524.41336
P23-DU9-v	46.57218	-111.91509	855964.40933	1361524.41336
P23-DU9-w	46.57227	-111.91509	855998.77457	1361524.41336
P23-DU9-x	46.57236	-111.91510	856033.13980	1361524.41336
P23-DU9-y	46.57246	-111.91510	856067.50504	1361524.41336
P23-DU9-z	46.57246	-111.91496	856067.50504	1361558.77860

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU10-a	46.57144	-111.91724	855713.10108	1360974.51432
P23-DU10-aa	46.57164	-111.91670	855781.83156	1361111.97527
P23-DU10-bb	46.57173	-111.91671	855816.19679	1361111.97527
P23-DU10-c	46.57163	-111.91725	855781.83156	1360974.51432
P23-DU10-cc	46.57183	-111.91671	855850.56203	1361111.97527
P23-DU10-d	46.57172	-111.91726	855816.19679	1360974.51432
P23-DU10-dd	46.57191	-111.91672	855880.87653	1361111.67603
P23-DU10-e	46.57182	-111.91726	855850.56203	1360974.51432
P23-DU10-f	46.57190	-111.91727	855879.22669	1360973.91435
P23-DU10-g	46.57190	-111.91713	855880.87653	1361007.73608
P23-DU10-h	46.57182	-111.91712	855850.56203	1361008.87955
P23-DU10-i	46.57173	-111.91712	855816.19679	1361008.87955
P23-DU10-j	46.57163	-111.91711	855781.83156	1361008.87955
P23-DU10-k	46.57154	-111.91711	855747.46632	1361008.87955
P23-DU10-l	46.57144	-111.91711	855713.10108	1361008.87955
P23-DU10-m	46.57145	-111.91697	855713.10108	1361043.24479
P23-DU10-n	46.57154	-111.91697	855747.46632	1361043.24479
P23-DU10-o	46.57163	-111.91698	855781.83156	1361043.24479
P23-DU10-p	46.57173	-111.91698	855816.19679	1361043.24479
P23-DU10-q	46.57182	-111.91699	855850.56203	1361043.24479
P23-DU10-q	46.57153	-111.91725	855747.46632	1360974.51432
P23-DU10-r	46.57191	-111.91699	855881.70145	1361043.20765
P23-DU10-s	46.57191	-111.91686	855881.70145	1361077.02938
P23-DU10-t	46.57183	-111.91685	855850.56203	1361077.61003
P23-DU10-u	46.57173	-111.91685	855816.19679	1361077.61003
P23-DU10-v	46.57164	-111.91684	855781.83156	1361077.61003
P23-DU10-w	46.57154	-111.91684	855747.46632	1361077.61003
P23-DU10-x	46.57145	-111.91683	855713.10108	1361077.61003
P23-DU10-y	46.57145	-111.91670	855713.10108	1361111.97527
P23-DU10-z	46.57155	-111.91670	855747.46632	1361111.97527

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU11-a	46.57151	-111.91645	855733.72409	1361173.30908
P23-DU11-aa	46.57181	-111.91578	855836.81980	1361345.13527
P23-DU11-b	46.57161	-111.91646	855768.08932	1361173.30908
P23-DU11-bb	46.57172	-111.91578	855802.45456	1361345.13527
P23-DU11-c	46.57170	-111.91646	855802.45456	1361173.30908
P23-DU11-cc	46.57162	-111.91578	855768.08932	1361345.13527
P23-DU11-d	46.57180	-111.91647	855836.81980	1361173.30908
P23-DU11-dd	46.57153	-111.91577	855733.72409	1361345.13527
P23-DU11-e	46.57189	-111.91647	855871.18504	1361173.30908
P23-DU11-f	46.57189	-111.91633	855871.18504	1361207.67432
P23-DU11-g	46.57180	-111.91633	855836.81980	1361207.67432
P23-DU11-h	46.57170	-111.91633	855802.45456	1361207.67432
P23-DU11-i	46.57161	-111.91632	855768.08932	1361207.67432
P23-DU11-j	46.57152	-111.91632	855733.72409	1361207.67432
P23-DU11-k	46.57152	-111.91618	855733.72409	1361242.03956
P23-DU11-l	46.57161	-111.91619	855768.08932	1361242.03956
P23-DU11-m	46.57171	-111.91619	855802.45456	1361242.03956
P23-DU11-n	46.57180	-111.91619	855836.81980	1361242.03956
P23-DU11-o	46.57190	-111.91620	855871.18504	1361242.03956
P23-DU11-p	46.57190	-111.91606	855871.18504	1361276.40480
P23-DU11-q	46.57180	-111.91606	855836.81980	1361276.40480
P23-DU11-r	46.57171	-111.91605	855802.45456	1361276.40480
P23-DU11-s	46.57162	-111.91605	855768.08932	1361276.40480
P23-DU11-t	46.57152	-111.91604	855733.72409	1361276.40480
P23-DU11-u	46.57153	-111.91591	855733.72409	1361310.77003
P23-DU11-v	46.57162	-111.91591	855768.08932	1361310.77003
P23-DU11-w	46.57171	-111.91592	855802.45456	1361310.77003
P23-DU11-x	46.57181	-111.91592	855836.81980	1361310.77003
P23-DU11-y	46.57190	-111.91592	855871.18504	1361310.77003
P23-DU11-z	46.57190	-111.91579	855871.18504	1361345.13527

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU12-a	46.57149	-111.91561	855719.36420	1361384.96633
P23-DU12-aa	46.57192	-111.91515	855871.32955	1361506.53861
P23-DU12-b	46.57158	-111.91561	855749.75727	1361384.96633
P23-DU12-bb	46.57192	-111.91503	855871.32955	1361536.93168
P23-DU12-c	46.57166	-111.91562	855780.15034	1361384.96633
P23-DU12-cc	46.57184	-111.91502	855840.93648	1361536.93168
P23-DU12-d	46.57174	-111.91562	855810.54341	1361384.96633
P23-DU12-dd	46.57175	-111.91502	855810.54341	1361536.93168
P23-DU12-e	46.57183	-111.91563	855840.93648	1361384.96633
P23-DU12-f	46.57191	-111.91563	855871.32955	1361384.96633
P23-DU12-g	46.57191	-111.91551	855871.32955	1361415.35940
P23-DU12-h	46.57183	-111.91551	855840.93648	1361415.35940
P23-DU12-i	46.57174	-111.91550	855810.54341	1361415.35940
P23-DU12-j	46.57166	-111.91550	855780.15034	1361415.35940
P23-DU12-k	46.57158	-111.91549	855749.75727	1361415.35940
P23-DU12-l	46.57149	-111.91549	855719.36420	1361415.35940
P23-DU12-m	46.57150	-111.91537	855719.36420	1361445.75247
P23-DU12-n	46.57158	-111.91537	855749.75727	1361445.75247
P23-DU12-o	46.57166	-111.91538	855780.15034	1361445.75247
P23-DU12-p	46.57175	-111.91538	855810.54341	1361445.75247
P23-DU12-q	46.57183	-111.91538	855840.93648	1361445.75247
P23-DU12-r	46.57191	-111.91539	855871.32955	1361445.75247
P23-DU12-s	46.57192	-111.91527	855871.32955	1361476.14554
P23-DU12-t	46.57183	-111.91526	855840.93648	1361476.14554
P23-DU12-u	46.57175	-111.91526	855810.54341	1361476.14554
P23-DU12-v	46.57167	-111.91526	855780.15034	1361476.14554
P23-DU12-w	46.57158	-111.91525	855749.75727	1361476.14554
P23-DU12-x	46.57167	-111.91514	855780.15034	1361506.53861
P23-DU12-y	46.57175	-111.91514	855810.54341	1361506.53861
P23-DU12-z	46.57184	-111.91514	855840.93648	1361506.53861

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU13-a	46.57087	-111.91721	855506.88203	1360976.98908
P23-DU13-aa	46.57107	-111.91667	855575.61251	1361114.45003
P23-DU13-b	46.57097	-111.91721	855541.24727	1360976.98908
P23-DU13-bb	46.57117	-111.91667	855609.97775	1361114.45003
P23-DU13-c	46.57106	-111.91722	855575.61251	1360976.98908
P23-DU13-cc	46.57126	-111.91668	855644.34298	1361114.45003
P23-DU13-d	46.57116	-111.91722	855609.97775	1360976.98908
P23-DU13-dd	46.57134	-111.91669	855672.99664	1361113.32587
P23-DU13-e	46.57125	-111.91722	855644.34298	1360976.98908
P23-DU13-f	46.57133	-111.91723	855672.99664	1360976.38911
P23-DU13-g	46.57133	-111.91710	855672.99664	1361009.38592
P23-DU13-h	46.57125	-111.91709	855644.34298	1361011.35432
P23-DU13-i	46.57116	-111.91708	855609.97775	1361011.35432
P23-DU13-j	46.57107	-111.91708	855575.61251	1361011.35432
P23-DU13-k	46.57097	-111.91707	855541.24727	1361011.35432
P23-DU13-l	46.57088	-111.91707	855506.88203	1361011.35432
P23-DU13-m	46.57088	-111.91693	855506.88203	1361045.71955
P23-DU13-n	46.57097	-111.91694	855541.24727	1361045.71955
P23-DU13-o	46.57107	-111.91694	855575.61251	1361045.71955
P23-DU13-p	46.57116	-111.91695	855609.97775	1361045.71955
P23-DU13-q	46.57126	-111.91695	855644.34298	1361045.71955
P23-DU13-r	46.57133	-111.91696	855672.17172	1361044.85749
P23-DU13-s	46.57134	-111.91682	855672.17172	1361080.32906
P23-DU13-t	46.57126	-111.91681	855644.34298	1361080.08479
P23-DU13-u	46.57117	-111.91681	855609.97775	1361080.08479
P23-DU13-v	46.57107	-111.91681	855575.61251	1361080.08479
P23-DU13-w	46.57098	-111.91680	855541.24727	1361080.08479
P23-DU13-x	46.57088	-111.91680	855506.88203	1361080.08479
P23-DU13-y	46.57089	-111.91666	855506.88203	1361114.45003
P23-DU13-z	46.57098	-111.91666	855541.24727	1361114.45003

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU14-a	46.57092	-111.91643	855515.99351	1361173.96528
P23-DU14-aa	46.57087	-111.91597	855495.43523	1361286.86270
P23-DU14-b	46.57100	-111.91643	855545.97216	1361173.59771
P23-DU14-bb	46.57095	-111.91598	855526.25392	1361287.02872
P23-DU14-c	46.57107	-111.91643	855572.08292	1361174.86565
P23-DU14-cc	46.57104	-111.91598	855557.26420	1361287.65273
P23-DU14-d	46.57114	-111.91644	855596.65934	1361173.96528
P23-DU14-dd	46.57123	-111.91584	855624.20328	1361324.75890
P23-DU14-e	46.57121	-111.91644	855622.13614	1361173.96528
P23-DU14-f	46.57128	-111.91644	855648.51330	1361174.86565
P23-DU14-g	46.57135	-111.91644	855673.99009	1361175.76603
P23-DU14-h	46.57135	-111.91632	855673.99009	1361204.84430
P23-DU14-i	46.57128	-111.91632	855648.51330	1361203.94393
P23-DU14-j	46.57121	-111.91632	855622.13614	1361203.04356
P23-DU14-k	46.57114	-111.91632	855596.65934	1361203.04356
P23-DU14-l	46.57107	-111.91631	855572.08292	1361203.94393
P23-DU14-m	46.57101	-111.91631	855547.50650	1361204.21033
P23-DU14-n	46.57092	-111.91631	855515.99351	1361203.04356
P23-DU14-o	46.57128	-111.91621	855648.51330	1361233.02221
P23-DU14-p	46.57135	-111.91621	855673.99009	1361233.92258
P23-DU14-q	46.57136	-111.91609	855673.99009	1361263.00086
P23-DU14-r	46.57129	-111.91609	855648.51330	1361262.10049
P23-DU14-s	46.57136	-111.91597	855673.99009	1361292.07914
P23-DU14-t	46.57136	-111.91586	855673.99009	1361321.15742
P23-DU14-u	46.57122	-111.91595	855624.20328	1361295.68062
P23-DU14-v	46.57116	-111.91601	855601.42760	1361280.10791
P23-DU14-w	46.57110	-111.91604	855579.55229	1361272.90494
P23-DU14-x	46.57103	-111.91607	855556.40904	1361263.63483
P23-DU14-y	46.57096	-111.91607	855527.33076	1361263.63483
P23-DU14-z	46.57087	-111.91607	855496.45174	1361263.90123

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU15-a	46.57068	-111.91721	855437.62980	1360973.78015
P23-DU15-aa	46.57070	-111.91655	855437.62980	1361141.39098
P23-DU15-b	46.57078	-111.91722	855471.15196	1360973.78015
P23-DU15-bb	46.57061	-111.91654	855404.10763	1361141.39098
P23-DU15-c	46.57078	-111.91708	855471.15196	1361007.30232
P23-DU15-cc	46.57051	-111.91654	855370.58546	1361141.39098
P23-DU15-d	46.57069	-111.91708	855437.62980	1361007.30232
P23-DU15-dd	46.57042	-111.91653	855337.06330	1361141.39098
P23-DU15-e	46.57060	-111.91707	855404.10763	1361007.30232
P23-DU15-f	46.57050	-111.91707	855370.58546	1361007.30232
P23-DU15-g	46.57041	-111.91707	855337.06330	1361007.30232
P23-DU15-h	46.57032	-111.91706	855303.54113	1361007.30232
P23-DU15-i	46.57032	-111.91693	855303.54113	1361040.82448
P23-DU15-j	46.57041	-111.91693	855337.06330	1361040.82448
P23-DU15-k	46.57051	-111.91694	855370.58546	1361040.82448
P23-DU15-l	46.57060	-111.91694	855404.10763	1361040.82448
P23-DU15-m	46.57069	-111.91694	855437.62980	1361040.82448
P23-DU15-n	46.57078	-111.91695	855471.15196	1361040.82448
P23-DU15-o	46.57079	-111.91682	855471.15196	1361074.34665
P23-DU15-p	46.57069	-111.91681	855437.62980	1361074.34665
P23-DU15-q	46.57060	-111.91681	855404.10763	1361074.34665
P23-DU15-r	46.57051	-111.91680	855370.58546	1361074.34665
P23-DU15-s	46.57042	-111.91680	855337.06330	1361074.34665
P23-DU15-t	46.57033	-111.91680	855303.54113	1361074.34665
P23-DU15-u	46.57042	-111.91667	855337.06330	1361107.86882
P23-DU15-v	46.57051	-111.91667	855370.58546	1361107.86882
P23-DU15-w	46.57060	-111.91667	855404.10763	1361107.86882
P23-DU15-x	46.57070	-111.91668	855437.62980	1361107.86882
P23-DU15-y	46.57079	-111.91668	855471.15196	1361107.86882
P23-DU15-z	46.57079	-111.91655	855471.15196	1361141.39098

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU16-a	46.57030	-111.91641	855289.80222	1361169.65782
P23-DU16-aa	46.57056	-111.91588	855382.69789	1361307.25719
P23-DU16-b	46.57039	-111.91641	855322.53045	1361170.71562
P23-DU16-bb	46.57063	-111.91589	855409.18012	1361304.55607
P23-DU16-c	46.57046	-111.91642	855349.91305	1361170.71562
P23-DU16-cc	46.57071	-111.91592	855436.56273	1361298.25347
P23-DU16-d	46.57055	-111.91642	855380.89715	1361170.71562
P23-DU16-dd	46.57078	-111.91595	855463.04497	1361291.57940
P23-DU16-e	46.57063	-111.91643	855410.98087	1361169.81525
P23-DU16-f	46.57071	-111.91643	855440.16422	1361170.71562
P23-DU16-g	46.57079	-111.91643	855469.34757	1361172.51636
P23-DU16-h	46.57079	-111.91632	855469.34757	1361198.99860
P23-DU16-i	46.57071	-111.91631	855439.26385	1361200.79934
P23-DU16-j	46.57063	-111.91631	855410.98087	1361200.79934
P23-DU16-k	46.57055	-111.91630	855381.79752	1361200.79934
P23-DU16-l	46.57047	-111.91631	855350.81342	1361198.09823
P23-DU16-m	46.57039	-111.91630	855321.63007	1361199.89897
P23-DU16-n	46.57029	-111.91630	855288.53038	1361198.46970
P23-DU16-o	46.57029	-111.91619	855287.25854	1361226.38120
P23-DU16-p	46.57039	-111.91620	855321.63007	1361225.48083
P23-DU16-q	46.57078	-111.91608	855462.14460	1361259.69494
P23-DU16-r	46.57071	-111.91604	855438.36347	1361269.07012
P23-DU16-s	46.57064	-111.91603	855410.98087	1361270.87087
P23-DU16-t	46.57057	-111.91600	855385.39900	1361276.27309
P23-DU16-u	46.57048	-111.91595	855354.41491	1361289.40719
P23-DU16-v	46.57040	-111.91591	855322.53045	1361298.25347
P23-DU16-w	46.57031	-111.91584	855289.58818	1361313.18831
P23-DU16-x	46.57031	-111.91572	855290.11708	1361344.70131
P23-DU16-y	46.57040	-111.91579	855321.63007	1361326.53645
P23-DU16-z	46.57048	-111.91582	855352.61417	1361321.66313

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU17-a	46.57015	-111.91698	855241.89387	1361026.62654
P23-DU17-aa	46.57002	-111.91657	855191.49152	1361127.43123
P23-DU17-b	46.57022	-111.91698	855267.09504	1361026.62654
P23-DU17-bb	46.57009	-111.91657	855216.69269	1361127.43123
P23-DU17-c	46.57022	-111.91688	855267.09504	1361051.82771
P23-DU17-cc	46.57016	-111.91658	855241.89387	1361127.43123
P23-DU17-d	46.57015	-111.91688	855241.89387	1361051.82771
P23-DU17-dd	46.57023	-111.91658	855267.09504	1361127.43123
P23-DU17-e	46.57009	-111.91687	855216.69269	1361051.82771
P23-DU17-f	46.57002	-111.91687	855191.49152	1361051.82771
P23-DU17-g	46.56995	-111.91687	855166.29035	1361051.82771
P23-DU17-h	46.56988	-111.91686	855141.08917	1361051.82771
P23-DU17-i	46.56974	-111.91676	855090.68683	1361077.02889
P23-DU17-j	46.56981	-111.91676	855115.88800	1361077.02889
P23-DU17-k	46.56988	-111.91676	855141.08917	1361077.02889
P23-DU17-l	46.56995	-111.91677	855166.29035	1361077.02889
P23-DU17-m	46.57002	-111.91677	855191.49152	1361077.02889
P23-DU17-n	46.57009	-111.91677	855216.69269	1361077.02889
P23-DU17-o	46.57016	-111.91678	855241.89387	1361077.02889
P23-DU17-p	46.57023	-111.91678	855267.09504	1361077.02889
P23-DU17-q	46.57023	-111.91668	855267.09504	1361102.23006
P23-DU17-r	46.57016	-111.91668	855241.89387	1361102.23006
P23-DU17-s	46.57009	-111.91667	855216.69269	1361102.23006
P23-DU17-t	46.57002	-111.91667	855191.49152	1361102.23006
P23-DU17-u	46.56995	-111.91667	855166.29035	1361102.23006
P23-DU17-v	46.56988	-111.91666	855141.08917	1361102.23006
P23-DU17-w	46.56981	-111.91666	855115.88800	1361102.23006
P23-DU17-x	46.56982	-111.91656	855115.88800	1361127.43123
P23-DU17-y	46.56988	-111.91656	855141.08917	1361127.43123
P23-DU17-z	46.56995	-111.91657	855166.29035	1361127.43123

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU18-a	46.56972	-111.91639	855080.71293	1361170.38734
P23-DU18-aa	46.56999	-111.91571	855172.24854	1361342.66051
P23-DU18-b	46.56980	-111.91639	855108.92029	1361170.83432
P23-DU18-bb	46.56989	-111.91571	855137.88330	1361342.66051
P23-DU18-c	46.56988	-111.91639	855137.88330	1361170.83432
P23-DU18-cc	46.56980	-111.91570	855103.51806	1361342.66051
P23-DU18-d	46.56997	-111.91640	855172.24854	1361170.83432
P23-DU18-dd	46.56973	-111.91571	855078.45880	1361341.45788
P23-DU18-e	46.57007	-111.91640	855206.61377	1361170.83432
P23-DU18-f	46.57016	-111.91640	855240.97901	1361170.83432
P23-DU18-g	46.57016	-111.91629	855240.97901	1361198.89696
P23-DU18-h	46.57007	-111.91629	855206.61377	1361198.89696
P23-DU18-i	46.56998	-111.91628	855172.24854	1361198.89696
P23-DU18-j	46.56988	-111.91628	855137.88330	1361198.89696
P23-DU18-k	46.56980	-111.91628	855108.92029	1361198.89696
P23-DU18-l	46.56972	-111.91627	855080.56180	1361199.19922
P23-DU18-m	46.56972	-111.91615	855079.51030	1361229.81184
P23-DU18-n	46.56981	-111.91615	855109.82066	1361229.66071
P23-DU18-o	46.56989	-111.91616	855138.78367	1361229.66071
P23-DU18-p	46.56998	-111.91616	855173.14891	1361229.66071
P23-DU18-q	46.57008	-111.91617	855207.51414	1361229.66071
P23-DU18-r	46.57017	-111.91617	855241.87938	1361229.66071
P23-DU18-s	46.56999	-111.91605	855173.89815	1361256.97411
P23-DU18-t	46.56989	-111.91605	855138.63254	1361257.72335
P23-DU18-u	46.56981	-111.91604	855109.82066	1361258.77485
P23-DU18-v	46.56972	-111.91603	855078.60993	1361259.67523
P23-DU18-w	46.57008	-111.91582	855207.51414	1361316.39861
P23-DU18-x	46.57018	-111.91583	855241.87938	1361316.39861
P23-DU18-y	46.57018	-111.91572	855240.97901	1361342.66051
P23-DU18-z	46.57008	-111.91572	855206.61377	1361342.66051

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU19-a	46.56929	-111.91688	854926.48862	1361042.02003
P23-DU19-aa	46.56942	-111.91652	854972.16557	1361133.37393
P23-DU19-b	46.56935	-111.91688	854949.32709	1361042.02003
P23-DU19-bb	46.56948	-111.91652	854995.00404	1361133.37393
P23-DU19-c	46.56942	-111.91679	854972.16557	1361064.85851
P23-DU19-cc	46.56955	-111.91653	855017.84252	1361133.37393
P23-DU19-d	46.56935	-111.91679	854949.32709	1361064.85851
P23-DU19-dd	46.56961	-111.91653	855040.68099	1361133.37393
P23-DU19-e	46.56929	-111.91679	854926.48862	1361064.85851
P23-DU19-f	46.56923	-111.91678	854903.65014	1361064.85851
P23-DU19-g	46.56917	-111.91678	854880.81167	1361064.85851
P23-DU19-h	46.56917	-111.91669	854880.81167	1361087.69698
P23-DU19-i	46.56923	-111.91669	854903.65014	1361087.69698
P23-DU19-j	46.56929	-111.91670	854926.48862	1361087.69698
P23-DU19-k	46.56936	-111.91670	854949.32709	1361087.69698
P23-DU19-l	46.56942	-111.91670	854972.16557	1361087.69698
P23-DU19-m	46.56954	-111.91671	855017.84252	1361087.69698
P23-DU19-n	46.56961	-111.91671	855040.68099	1361087.69698
P23-DU19-o	46.56961	-111.91662	855040.68099	1361110.53546
P23-DU19-p	46.56955	-111.91662	855017.84252	1361110.53546
P23-DU19-q	46.56948	-111.91661	854995.00404	1361110.53546
P23-DU19-r	46.56942	-111.91661	854972.16557	1361110.53546
P23-DU19-s	46.56936	-111.91661	854949.32709	1361110.53546
P23-DU19-t	46.56929	-111.91661	854926.48862	1361110.53546
P23-DU19-u	46.56923	-111.91660	854903.65014	1361110.53546
P23-DU19-v	46.56917	-111.91660	854880.81167	1361110.53546
P23-DU19-w	46.56917	-111.91651	854880.81167	1361133.37393
P23-DU19-x	46.56923	-111.91651	854903.65014	1361133.37393
P23-DU19-y	46.56930	-111.91651	854926.48862	1361133.37393
P23-DU19-z	46.56936	-111.91652	854949.32709	1361133.37393

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU20-a	46.56916	-111.91635	854875.02617	1361173.30908
P23-DU20-aa	46.56936	-111.91581	854943.75664	1361310.77003
P23-DU20-b	46.56925	-111.91635	854909.39140	1361173.30908
P23-DU20-bb	46.56946	-111.91584	854979.92262	1361304.46744
P23-DU20-c	46.56935	-111.91636	854943.75664	1361173.30908
P23-DU20-cc	46.56957	-111.91569	855018.78972	1361344.23490
P23-DU20-d	46.56944	-111.91636	854978.12188	1361173.30908
P23-DU20-dd	46.56964	-111.91569	855046.85236	1361345.13527
P23-DU20-e	46.56954	-111.91637	855012.48712	1361173.30908
P23-DU20-f	46.56963	-111.91637	855046.85236	1361173.30908
P23-DU20-g	46.56963	-111.91623	855046.85236	1361207.67432
P23-DU20-h	46.56954	-111.91623	855012.48712	1361207.67432
P23-DU20-i	46.56944	-111.91623	854978.12188	1361207.67432
P23-DU20-j	46.56935	-111.91622	854943.75664	1361207.67432
P23-DU20-k	46.56926	-111.91622	854909.39140	1361207.67432
P23-DU20-l	46.56916	-111.91621	854875.02617	1361207.67432
P23-DU20-m	46.56916	-111.91608	854875.02617	1361242.03956
P23-DU20-n	46.56926	-111.91608	854909.39140	1361242.03956
P23-DU20-o	46.56935	-111.91608	854943.75664	1361242.03956
P23-DU20-p	46.56945	-111.91609	854978.12188	1361242.03956
P23-DU20-q	46.56954	-111.91609	855012.48712	1361242.03956
P23-DU20-r	46.56964	-111.91610	855046.85236	1361242.03956
P23-DU20-s	46.56964	-111.91596	855046.85236	1361276.40480
P23-DU20-t	46.56954	-111.91596	855012.48712	1361276.40480
P23-DU20-u	46.56945	-111.91595	854978.12188	1361276.40480
P23-DU20-v	46.56936	-111.91595	854943.75664	1361276.40480
P23-DU20-w	46.56926	-111.91594	854909.39140	1361276.40480
P23-DU20-x	46.56917	-111.91595	854875.78182	1361274.75518
P23-DU20-y	46.56917	-111.91584	854875.63069	1361301.76632
P23-DU20-z	46.56927	-111.91582	854912.39478	1361306.41931

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU21-a	46.56859	-111.91633	854667.15728	1361172.48416
P23-DU21-aa	46.56898	-111.91580	854804.61823	1361309.94511
P23-DU21-b	46.56868	-111.91633	854701.52252	1361172.48416
P23-DU21-bb	46.56889	-111.91566	854770.25299	1361344.31035
P23-DU21-c	46.56878	-111.91634	854735.88775	1361172.48416
P23-DU21-cc	46.56879	-111.91565	854735.88775	1361344.31035
P23-DU21-d	46.56887	-111.91634	854770.25299	1361172.48416
P23-DU21-dd	46.56870	-111.91565	854701.52252	1361344.31035
P23-DU21-e	46.56897	-111.91634	854804.61823	1361172.48416
P23-DU21-f	46.56906	-111.91635	854838.98347	1361172.48416
P23-DU21-g	46.56906	-111.91621	854838.98347	1361206.84940
P23-DU21-h	46.56897	-111.91621	854804.61823	1361206.84940
P23-DU21-i	46.56887	-111.91620	854770.25299	1361206.84940
P23-DU21-j	46.56878	-111.91620	854735.88775	1361206.84940
P23-DU21-k	46.56869	-111.91619	854701.52252	1361206.84940
P23-DU21-l	46.56859	-111.91619	854667.15728	1361206.84940
P23-DU21-m	46.56859	-111.91605	854667.15728	1361241.21464
P23-DU21-n	46.56869	-111.91606	854701.52252	1361241.21464
P23-DU21-o	46.56878	-111.91606	854735.88775	1361241.21464
P23-DU21-p	46.56888	-111.91607	854770.25299	1361241.21464
P23-DU21-q	46.56897	-111.91607	854804.61823	1361241.21464
P23-DU21-r	46.56907	-111.91607	854838.98347	1361241.21464
P23-DU21-s	46.56907	-111.91594	854838.98347	1361275.57987
P23-DU21-t	46.56897	-111.91593	854804.61823	1361275.57987
P23-DU21-u	46.56888	-111.91593	854770.25299	1361275.57987
P23-DU21-v	46.56879	-111.91593	854735.88775	1361275.57987
P23-DU21-w	46.56869	-111.91592	854701.52252	1361275.57987
P23-DU21-x	46.56869	-111.91578	854701.52252	1361309.94511
P23-DU21-y	46.56879	-111.91579	854735.88775	1361309.94511
P23-DU21-z	46.56888	-111.91579	854770.25299	1361309.94511

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU22-a	46.56807	-111.91631	854477.43663	1361170.83432
P23-DU22-aa	46.56837	-111.91564	854580.53235	1361342.66051
P23-DU22-b	46.56816	-111.91631	854511.80187	1361170.83432
P23-DU22-bb	46.56827	-111.91564	854546.16711	1361342.66051
P23-DU22-c	46.56826	-111.91632	854546.16711	1361170.83432
P23-DU22-cc	46.56818	-111.91563	854511.80187	1361342.66051
P23-DU22-d	46.56835	-111.91632	854580.53235	1361170.83432
P23-DU22-dd	46.56808	-111.91563	854477.43663	1361342.66051
P23-DU22-e	46.56845	-111.91633	854614.89759	1361170.83432
P23-DU22-f	46.56845	-111.91619	854614.89759	1361205.19956
P23-DU22-g	46.56835	-111.91619	854580.53235	1361205.19956
P23-DU22-h	46.56826	-111.91618	854546.16711	1361205.19956
P23-DU22-i	46.56817	-111.91618	854511.80187	1361205.19956
P23-DU22-j	46.56807	-111.91617	854477.43663	1361205.19956
P23-DU22-k	46.56807	-111.91604	854477.43663	1361239.56480
P23-DU22-l	46.56817	-111.91604	854511.80187	1361239.56480
P23-DU22-m	46.56826	-111.91605	854546.16711	1361239.56480
P23-DU22-n	46.56836	-111.91605	854580.53235	1361239.56480
P23-DU22-o	46.56845	-111.91605	854614.89759	1361239.56480
P23-DU22-p	46.56845	-111.91592	854614.89759	1361273.93004
P23-DU22-q	46.56836	-111.91591	854580.53235	1361273.93004
P23-DU22-r	46.56827	-111.91591	854546.16711	1361273.93004
P23-DU22-s	46.56817	-111.91590	854511.80187	1361273.93004
P23-DU22-t	46.56808	-111.91590	854477.43663	1361273.93004
P23-DU22-u	46.56808	-111.91576	854477.43663	1361308.29527
P23-DU22-v	46.56817	-111.91577	854511.80187	1361308.29527
P23-DU22-w	46.56827	-111.91577	854546.16711	1361308.29527
P23-DU22-x	46.56836	-111.91578	854580.53235	1361308.29527
P23-DU22-y	46.56846	-111.91578	854614.89759	1361308.29527
P23-DU22-z	46.56846	-111.91564	854614.89759	1361342.66051

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU23-a	46.56806	-111.91550	854467.39839	1361374.95083
P23-DU23-aa	46.56831	-111.91504	854555.99734	1361492.18693
P23-DU23-b	46.56814	-111.91550	854497.11054	1361374.95083
P23-DU23-bb	46.56840	-111.91505	854586.87338	1361491.79897
P23-DU23-c	46.56822	-111.91550	854526.82269	1361374.95083
P23-DU23-cc	46.56804	-111.91484	854456.64835	1361540.17415
P23-DU23-d	46.56830	-111.91551	854556.53484	1361374.95083
P23-DU23-dd	46.56811	-111.91478	854479.76094	1361556.68717
P23-DU23-e	46.56838	-111.91551	854586.24700	1361374.95083
P23-DU23-f	46.56847	-111.91552	854615.95915	1361374.95083
P23-DU23-g	46.56847	-111.91540	854615.95915	1361404.66298
P23-DU23-h	46.56839	-111.91539	854586.24700	1361404.66298
P23-DU23-i	46.56830	-111.91539	854556.53484	1361404.66298
P23-DU23-j	46.56822	-111.91539	854526.82269	1361404.66298
P23-DU23-k	46.56814	-111.91538	854497.11054	1361404.66298
P23-DU23-l	46.56806	-111.91538	854467.39839	1361404.66298
P23-DU23-m	46.56806	-111.91526	854467.39839	1361434.37513
P23-DU23-n	46.56814	-111.91526	854497.11054	1361434.37513
P23-DU23-o	46.56823	-111.91527	854526.82269	1361434.37513
P23-DU23-p	46.56831	-111.91527	854556.53484	1361434.37513
P23-DU23-q	46.56839	-111.91528	854586.24700	1361434.37513
P23-DU23-r	46.56847	-111.91528	854615.95915	1361434.37513
P23-DU23-s	46.56847	-111.91516	854615.95915	1361464.08729
P23-DU23-t	46.56839	-111.91516	854586.24700	1361464.08729
P23-DU23-u	46.56831	-111.91515	854556.53484	1361464.08729
P23-DU23-v	46.56823	-111.91515	854526.82269	1361464.08729
P23-DU23-w	46.56815	-111.91515	854497.11054	1361464.08729
P23-DU23-x	46.56807	-111.91514	854467.39839	1361464.08729
P23-DU23-y	46.56815	-111.91503	854496.57304	1361492.18693
P23-DU23-z	46.56823	-111.91504	854526.28519	1361492.18693

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU24-a	46.56784	-111.91630	854392.72043	1361171.07029
P23-DU24-aa	46.56776	-111.91564	854358.86561	1361336.74943
P23-DU24-b	46.56793	-111.91632	854428.19200	1361166.94569
P23-DU24-bb	46.56766	-111.91563	854324.90724	1361336.74943
P23-DU24-c	46.56793	-111.91618	854426.78234	1361200.91597
P23-DU24-cc	46.56757	-111.91563	854290.94887	1361336.74943
P23-DU24-d	46.56784	-111.91618	854392.82397	1361200.91597
P23-DU24-dd	46.56748	-111.91562	854256.99051	1361336.74943
P23-DU24-e	46.56774	-111.91619	854358.07378	1361198.29266
P23-DU24-f	46.56765	-111.91618	854324.25205	1361199.11758
P23-DU24-g	46.56747	-111.91603	854256.99051	1361234.87433
P23-DU24-h	46.56756	-111.91603	854290.94887	1361234.87433
P23-DU24-i	46.56766	-111.91604	854324.90724	1361234.87433
P23-DU24-j	46.56775	-111.91604	854358.86561	1361234.87433
P23-DU24-k	46.56784	-111.91605	854392.82397	1361234.87433
P23-DU24-l	46.56793	-111.91605	854426.78234	1361234.87433
P23-DU24-m	46.56794	-111.91591	854426.78234	1361268.83270
P23-DU24-n	46.56784	-111.91591	854392.82397	1361268.83270
P23-DU24-o	46.56775	-111.91591	854358.86561	1361268.83270
P23-DU24-p	46.56766	-111.91590	854324.90724	1361268.83270
P23-DU24-q	46.56757	-111.91590	854290.94887	1361268.83270
P23-DU24-r	46.56747	-111.91589	854256.99051	1361268.83270
P23-DU24-s	46.56747	-111.91576	854256.99051	1361302.79107
P23-DU24-t	46.56757	-111.91576	854290.94887	1361302.79107
P23-DU24-u	46.56766	-111.91577	854324.90724	1361302.79107
P23-DU24-v	46.56775	-111.91577	854358.86561	1361302.79107
P23-DU24-w	46.56785	-111.91578	854392.82397	1361302.79107
P23-DU24-x	46.56794	-111.91578	854426.78234	1361302.79107
P23-DU24-y	46.56794	-111.91564	854426.78234	1361336.74943
P23-DU24-z	46.56785	-111.91564	854392.82397	1361336.74943

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU25-a	46.56749	-111.91547	854258.55637	1361376.35171
P23-DU25-aa	46.56769	-111.91484	854327.28684	1361535.85024
P23-DU25-b	46.56758	-111.91547	854292.92160	1361376.35171
P23-DU25-bb	46.56778	-111.91484	854361.65208	1361535.85024
P23-DU25-c	46.56767	-111.91547	854327.28684	1361376.35171
P23-DU25-cc	46.56788	-111.91485	854396.01732	1361535.85024
P23-DU25-d	46.56778	-111.91549	854364.33959	1361374.20170
P23-DU25-dd	46.56796	-111.91485	854427.07966	1361535.57303
P23-DU25-e	46.56787	-111.91549	854398.70483	1361374.20170
P23-DU25-f	46.56796	-111.91550	854430.59210	1361372.79884
P23-DU25-g	46.56796	-111.91539	854430.30468	1361402.07047
P23-DU25-h	46.56787	-111.91538	854399.24233	1361403.19192
P23-DU25-i	46.56778	-111.91537	854364.87709	1361403.19192
P23-DU25-j	46.56768	-111.91537	854327.28684	1361402.65442
P23-DU25-k	46.56758	-111.91537	854292.92160	1361402.65442
P23-DU25-l	46.56749	-111.91536	854258.55637	1361402.65442
P23-DU25-m	46.56778	-111.91526	854364.33959	1361430.56963
P23-DU25-n	46.56787	-111.91527	854398.70483	1361430.56963
P23-DU25-o	46.56796	-111.91527	854430.59210	1361430.55451
P23-DU25-p	46.56796	-111.91516	854429.51709	1361458.75114
P23-DU25-q	46.56758	-111.91517	854292.27943	1361452.03482
P23-DU25-r	46.56749	-111.91505	854258.01886	1361480.01982
P23-DU25-s	46.56759	-111.91506	854292.38410	1361480.01982
P23-DU25-t	46.56768	-111.91506	854326.74934	1361480.01982
P23-DU25-u	46.56778	-111.91496	854361.11458	1361507.93503
P23-DU25-v	46.56768	-111.91495	854326.74934	1361507.93503
P23-DU25-w	46.56759	-111.91495	854292.38410	1361507.93503
P23-DU25-x	46.56750	-111.91494	854258.01886	1361507.93503
P23-DU25-y	46.56750	-111.91483	854258.55637	1361535.85024
P23-DU25-z	46.56759	-111.91484	854292.92160	1361535.85024

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU26-a	46.56726	-111.91605	854182.42981	1361227.38787
P23-DU26-aa	46.56713	-111.91562	854128.67977	1361334.88796
P23-DU26-b	46.56734	-111.91605	854209.30483	1361227.38787
P23-DU26-bb	46.56720	-111.91562	854155.55479	1361334.88796
P23-DU26-c	46.56734	-111.91595	854209.30483	1361254.26289
P23-DU26-cc	46.56727	-111.91562	854182.42981	1361334.88796
P23-DU26-d	46.56727	-111.91594	854182.42981	1361254.26289
P23-DU26-dd	46.56735	-111.91563	854209.30483	1361334.88796
P23-DU26-e	46.56719	-111.91594	854155.55479	1361254.26289
P23-DU26-f	46.56712	-111.91594	854128.67977	1361254.26289
P23-DU26-g	46.56705	-111.91593	854101.80475	1361254.26289
P23-DU26-h	46.56697	-111.91593	854074.92973	1361254.26289
P23-DU26-i	46.56690	-111.91593	854048.05471	1361254.26289
P23-DU26-j	46.56690	-111.91582	854048.05471	1361281.13791
P23-DU26-k	46.56697	-111.91582	854074.92973	1361281.13791
P23-DU26-l	46.56705	-111.91583	854101.80475	1361281.13791
P23-DU26-m	46.56712	-111.91583	854128.67977	1361281.13791
P23-DU26-n	46.56719	-111.91583	854155.55479	1361281.13791
P23-DU26-o	46.56727	-111.91584	854182.42981	1361281.13791
P23-DU26-p	46.56734	-111.91584	854209.30483	1361281.13791
P23-DU26-q	46.56734	-111.91573	854209.30483	1361308.01293
P23-DU26-r	46.56727	-111.91573	854182.42981	1361308.01293
P23-DU26-s	46.56720	-111.91573	854155.55479	1361308.01293
P23-DU26-t	46.56712	-111.91572	854128.67977	1361308.01293
P23-DU26-u	46.56705	-111.91572	854101.80475	1361308.01293
P23-DU26-v	46.56698	-111.91572	854074.92973	1361308.01293
P23-DU26-w	46.56690	-111.91571	854048.05471	1361308.01293
P23-DU26-x	46.56690	-111.91561	854048.05471	1361334.88796
P23-DU26-y	46.56698	-111.91561	854074.92973	1361334.88796
P23-DU26-z	46.56705	-111.91561	854101.80475	1361334.88796

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU27-a	46.56688	-111.91542	854036.30250	1361380.06573
P23-DU27-aa	46.56735	-111.91476	854203.82792	1361551.35432
P23-DU27-b	46.56696	-111.91543	854066.36697	1361379.52813
P23-DU27-bb	46.56726	-111.91476	854169.46268	1361551.35432
P23-DU27-c	46.56705	-111.91543	854100.73221	1361379.52813
P23-DU27-cc	46.56716	-111.91476	854135.09744	1361551.35432
P23-DU27-d	46.56715	-111.91544	854135.09744	1361379.52813
P23-DU27-dd	46.56707	-111.91475	854100.73221	1361551.35432
P23-DU27-e	46.56724	-111.91544	854169.46268	1361379.52813
P23-DU27-f	46.56734	-111.91545	854203.82792	1361379.52813
P23-DU27-g	46.56734	-111.91534	854204.36552	1361405.82942
P23-DU27-h	46.56725	-111.91534	854170.00028	1361405.82942
P23-DU27-i	46.56715	-111.91533	854135.63504	1361405.82942
P23-DU27-j	46.56706	-111.91533	854101.26980	1361405.82942
P23-DU27-k	46.56696	-111.91533	854066.90456	1361405.82942
P23-DU27-l	46.56688	-111.91532	854037.17302	1361405.78849
P23-DU27-m	46.56688	-111.91522	854036.67636	1361432.66831
P23-DU27-n	46.56697	-111.91521	854067.44216	1361433.74350
P23-DU27-o	46.56706	-111.91522	854101.80740	1361433.74350
P23-DU27-p	46.56715	-111.91522	854136.17264	1361433.74350
P23-DU27-q	46.56725	-111.91524	854169.95934	1361431.55218
P23-DU27-r	46.56731	-111.91511	854193.65452	1361463.27037
P23-DU27-s	46.56721	-111.91507	854153.91332	1361474.02230
P23-DU27-t	46.56710	-111.91504	854114.17212	1361478.32307
P23-DU27-u	46.56689	-111.91485	854037.87436	1361525.09396
P23-DU27-v	46.56697	-111.91485	854066.36697	1361525.05303
P23-DU27-w	46.56707	-111.91486	854100.73221	1361525.05303
P23-DU27-x	46.56716	-111.91486	854135.09744	1361525.05303
P23-DU27-y	46.56725	-111.91486	854169.46268	1361525.05303
P23-DU27-z	46.56735	-111.91487	854203.82792	1361525.05303

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU28-a	46.56634	-111.91542	853842.63347	1361376.26554
P23-DU28-aa	46.56653	-111.91481	853906.78583	1361529.29969
P23-DU28-b	46.56643	-111.91542	853874.97845	1361376.26554
P23-DU28-bb	46.56662	-111.91482	853939.13080	1361529.29969
P23-DU28-c	46.56652	-111.91542	853907.32342	1361376.26554
P23-DU28-cc	46.56671	-111.91482	853971.47577	1361529.29969
P23-DU28-d	46.56661	-111.91543	853939.66840	1361376.26554
P23-DU28-dd	46.56680	-111.91483	854003.82075	1361529.29969
P23-DU28-e	46.56670	-111.91543	853972.01337	1361376.26554
P23-DU28-f	46.56679	-111.91544	854004.35835	1361376.26554
P23-DU28-g	46.56679	-111.91531	854004.35835	1361408.61052
P23-DU28-h	46.56670	-111.91530	853972.01337	1361408.61052
P23-DU28-i	46.56661	-111.91530	853939.66840	1361408.61052
P23-DU28-j	46.56652	-111.91529	853907.32342	1361408.61052
P23-DU28-k	46.56644	-111.91529	853874.97845	1361408.61052
P23-DU28-l	46.56635	-111.91529	853842.63347	1361408.61052
P23-DU28-m	46.56635	-111.91516	853842.63347	1361440.95549
P23-DU28-n	46.56644	-111.91516	853874.97845	1361440.95549
P23-DU28-o	46.56653	-111.91517	853907.32342	1361440.95549
P23-DU28-p	46.56662	-111.91517	853939.66840	1361440.95549
P23-DU28-q	46.56671	-111.91517	853972.01337	1361440.95549
P23-DU28-r	46.56679	-111.91518	854004.35835	1361440.95549
P23-DU28-s	46.56680	-111.91505	854004.35835	1361473.30047
P23-DU28-t	46.56671	-111.91505	853972.01337	1361473.30047
P23-DU28-u	46.56662	-111.91504	853939.66840	1361473.30047
P23-DU28-v	46.56653	-111.91504	853907.32342	1361473.30047
P23-DU28-w	46.56644	-111.91503	853874.97845	1361473.30047
P23-DU28-x	46.56635	-111.91503	853842.63347	1361473.30047
P23-DU28-y	46.56636	-111.91481	853842.09588	1361529.29969
P23-DU28-z	46.56645	-111.91481	853874.44085	1361529.29969

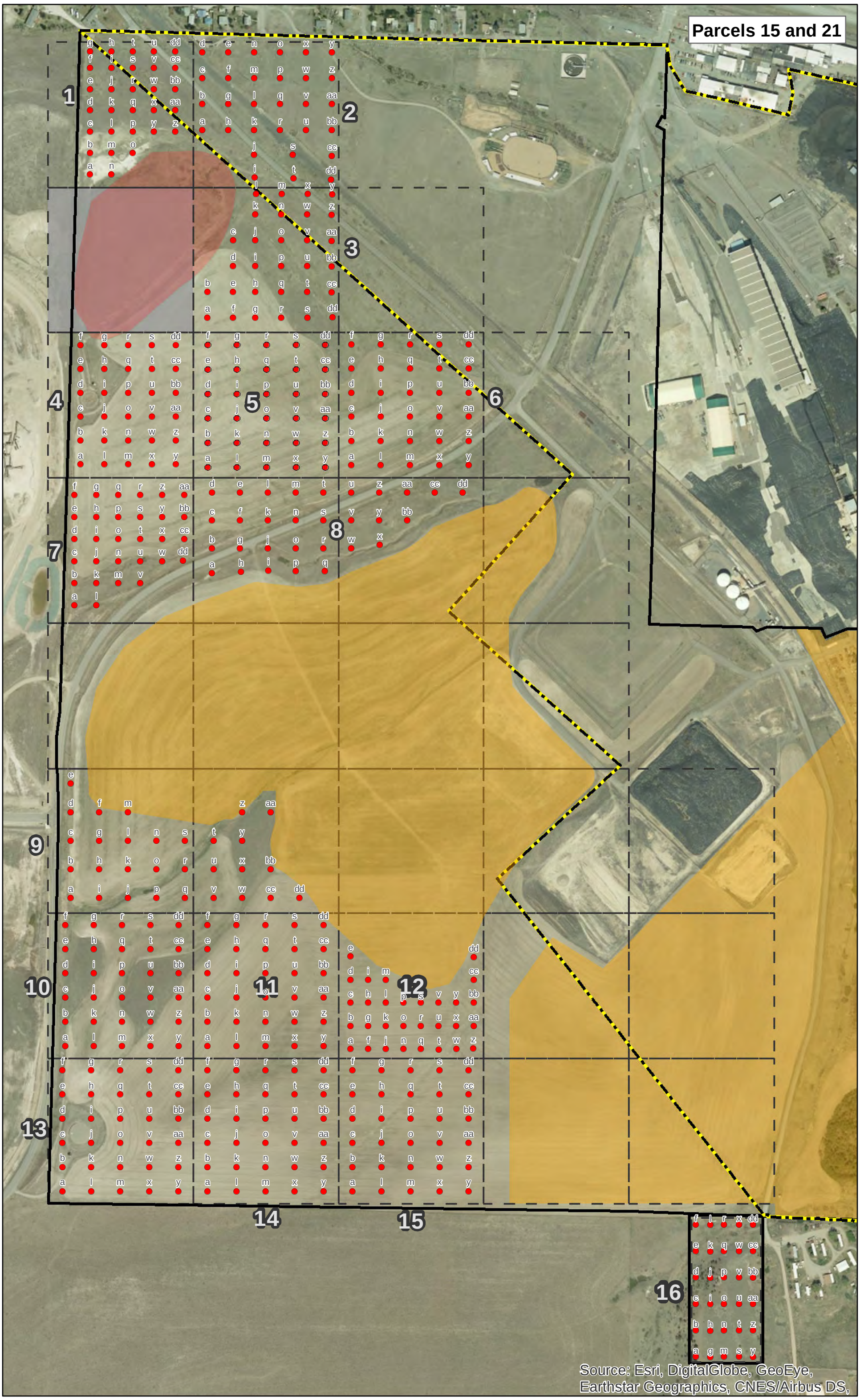
Station_ID	Latitude	Longitude	Northing	Easting
P23-DU29-a	46.56577	-111.91535	853633.67579	1361386.21600
P23-DU29-aa	46.56596	-111.91484	853699.46064	1361517.78570
P23-DU29-b	46.56586	-111.91535	853666.56821	1361386.21600
P23-DU29-bb	46.56605	-111.91484	853732.35306	1361517.78570
P23-DU29-c	46.56595	-111.91536	853699.46064	1361386.21600
P23-DU29-cc	46.56614	-111.91484	853765.24548	1361517.78570
P23-DU29-d	46.56604	-111.91536	853732.35306	1361386.21600
P23-DU29-dd	46.56623	-111.91485	853798.13791	1361517.78570
P23-DU29-e	46.56613	-111.91537	853765.24548	1361386.21600
P23-DU29-f	46.56622	-111.91537	853798.13791	1361386.21600
P23-DU29-g	46.56623	-111.91524	853798.13791	1361419.10843
P23-DU29-h	46.56614	-111.91524	853765.24548	1361419.10843
P23-DU29-i	46.56605	-111.91523	853732.35306	1361419.10843
P23-DU29-j	46.56596	-111.91523	853699.46064	1361419.10843
P23-DU29-k	46.56587	-111.91522	853666.56821	1361419.10843
P23-DU29-l	46.56578	-111.91522	853633.67579	1361419.10843
P23-DU29-m	46.56578	-111.91509	853633.67579	1361452.00085
P23-DU29-n	46.56587	-111.91509	853666.56821	1361452.00085
P23-DU29-o	46.56596	-111.91510	853699.46064	1361452.00085
P23-DU29-p	46.56605	-111.91510	853732.35306	1361452.00085
P23-DU29-q	46.56614	-111.91510	853765.24548	1361452.00085
P23-DU29-r	46.56623	-111.91511	853798.13791	1361452.00085
P23-DU29-s	46.56623	-111.91498	853798.13791	1361484.89327
P23-DU29-t	46.56614	-111.91497	853765.24548	1361484.89327
P23-DU29-u	46.56605	-111.91497	853732.35306	1361484.89327
P23-DU29-v	46.56596	-111.91497	853699.46064	1361484.89327
P23-DU29-w	46.56587	-111.91496	853666.56821	1361484.89327
P23-DU29-x	46.56578	-111.91496	853633.67579	1361484.89327
P23-DU29-y	46.56578	-111.91483	853633.67579	1361517.78570
P23-DU29-z	46.56587	-111.91483	853666.56821	1361517.78570

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU30-a	46.56538	-111.91533	853489.63942	1361385.99052
P23-DU30-aa	46.56557	-111.91483	853554.52233	1361515.75636
P23-DU30-b	46.56547	-111.91534	853522.08088	1361385.99052
P23-DU30-bb	46.56566	-111.91483	853586.96379	1361515.75636
P23-DU30-c	46.56556	-111.91534	853554.52233	1361385.99052
P23-DU30-cc	46.56530	-111.91468	853457.19796	1361548.19781
P23-DU30-d	46.56564	-111.91535	853586.96379	1361385.99052
P23-DU30-dd	46.56521	-111.91468	853424.75650	1361548.19781
P23-DU30-e	46.56565	-111.91522	853586.96379	1361418.43198
P23-DU30-f	46.56556	-111.91521	853554.52233	1361418.43198
P23-DU30-g	46.56547	-111.91521	853522.08088	1361418.43198
P23-DU30-h	46.56538	-111.91520	853489.63942	1361418.43198
P23-DU30-i	46.56529	-111.91520	853457.19796	1361418.43198
P23-DU30-j	46.56520	-111.91520	853424.75650	1361418.43198
P23-DU30-k	46.56521	-111.91507	853424.75650	1361450.87344
P23-DU30-l	46.56529	-111.91507	853457.19796	1361450.87344
P23-DU30-m	46.56538	-111.91508	853489.63942	1361450.87344
P23-DU30-n	46.56547	-111.91508	853522.08088	1361450.87344
P23-DU30-o	46.56556	-111.91508	853554.52233	1361450.87344
P23-DU30-p	46.56565	-111.91509	853586.96379	1361450.87344
P23-DU30-q	46.56565	-111.91496	853586.96379	1361483.31490
P23-DU30-r	46.56556	-111.91495	853554.52233	1361483.31490
P23-DU30-s	46.56547	-111.91495	853522.08088	1361483.31490
P23-DU30-t	46.56539	-111.91495	853489.63942	1361483.31490
P23-DU30-u	46.56530	-111.91494	853457.19796	1361483.31490
P23-DU30-v	46.56521	-111.91494	853424.75650	1361483.31490
P23-DU30-w	46.56521	-111.91481	853424.75650	1361515.75636
P23-DU30-x	46.56530	-111.91481	853457.19796	1361515.75636
P23-DU30-y	46.56539	-111.91482	853489.63942	1361515.75636
P23-DU30-z	46.56548	-111.91482	853522.08088	1361515.75636

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU31-a	46.56493	-111.91517	853323.79786	1361422.55325
P23-DU31-aa	46.56501	-111.91465	853349.35052	1361552.85740
P23-DU31-b	46.56500	-111.91517	853349.88811	1361423.54863
P23-DU31-bb	46.56493	-111.91465	853322.26489	1361552.85740
P23-DU31-c	46.56507	-111.91517	853376.97374	1361423.54863
P23-DU31-cc	46.56486	-111.91465	853295.17926	1361552.85740
P23-DU31-d	46.56507	-111.91508	853376.68812	1361446.61911
P23-DU31-dd	46.56478	-111.91464	853268.09363	1361552.85740
P23-DU31-e	46.56500	-111.91508	853349.60249	1361446.41330
P23-DU31-f	46.56492	-111.91508	853322.51686	1361445.66990
P23-DU31-g	46.56486	-111.91507	853297.24983	1361446.00169
P23-DU31-h	46.56478	-111.91507	853269.29481	1361446.33348
P23-DU31-i	46.56470	-111.91506	853241.00800	1361446.33348
P23-DU31-j	46.56478	-111.91497	853268.09363	1361471.60052
P23-DU31-k	46.56485	-111.91497	853295.17926	1361471.60052
P23-DU31-l	46.56493	-111.91497	853322.26489	1361471.60052
P23-DU31-m	46.56500	-111.91498	853349.35052	1361471.60052
P23-DU31-n	46.56507	-111.91498	853376.43614	1361471.60052
P23-DU31-o	46.56508	-111.91487	853376.43614	1361498.68614
P23-DU31-p	46.56500	-111.91487	853349.35052	1361498.68614
P23-DU31-q	46.56493	-111.91487	853322.26489	1361498.68614
P23-DU31-r	46.56485	-111.91486	853295.17926	1361498.68614
P23-DU31-s	46.56478	-111.91486	853268.09363	1361498.68614
P23-DU31-t	46.56471	-111.91486	853241.00800	1361498.68614
P23-DU31-u	46.56478	-111.91475	853268.09363	1361525.77177
P23-DU31-v	46.56486	-111.91475	853295.17926	1361525.77177
P23-DU31-w	46.56493	-111.91476	853322.26489	1361525.77177
P23-DU31-x	46.56500	-111.91476	853349.35052	1361525.77177
P23-DU31-y	46.56508	-111.91476	853376.43614	1361525.77177
P23-DU31-z	46.56508	-111.91466	853376.43614	1361552.85740

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU32-a	46.56426	-111.91483	853076.95238	1361500.27784
P23-DU32-aa	46.56350	-111.91444	852799.35219	1361588.76256
P23-DU32-b	46.56432	-111.91486	853102.29231	1361493.36198
P23-DU32-bb	46.56359	-111.91445	852829.92229	1361588.76256
P23-DU32-c	46.56440	-111.91489	853129.09923	1361486.91083
P23-DU32-cc	46.56367	-111.91445	852860.49239	1361588.76256
P23-DU32-d	46.56441	-111.91474	853131.86012	1361523.39449
P23-DU32-dd	46.56346	-111.91434	852784.10810	1361613.10020
P23-DU32-e	46.56432	-111.91475	853101.29001	1361519.63131
P23-DU32-f	46.56425	-111.91475	853075.55828	1361519.63131
P23-DU32-g	46.56417	-111.91475	853044.98818	1361519.63131
P23-DU32-h	46.56409	-111.91474	853014.41808	1361519.63131
P23-DU32-i	46.56400	-111.91474	852983.84798	1361519.63131
P23-DU32-j	46.56350	-111.91461	852801.50257	1361546.97583
P23-DU32-k	46.56359	-111.91461	852832.07267	1361546.97583
P23-DU32-l	46.56367	-111.91462	852862.64277	1361546.97583
P23-DU32-m	46.56376	-111.91462	852893.21287	1361546.97583
P23-DU32-n	46.56384	-111.91462	852923.78297	1361546.97583
P23-DU32-o	46.56392	-111.91466	852951.66509	1361538.91189
P23-DU32-p	46.56400	-111.91466	852982.23519	1361538.91189
P23-DU32-q	46.56408	-111.91467	853012.80529	1361538.91189
P23-DU32-r	46.56417	-111.91467	853043.37539	1361538.91189
P23-DU32-s	46.56425	-111.91467	853073.94549	1361538.91189
P23-DU32-t	46.56400	-111.91458	852981.16000	1361558.73006
P23-DU32-u	46.56391	-111.91458	852950.58990	1361558.73006
P23-DU32-v	46.56384	-111.91455	852922.70778	1361566.79401
P23-DU32-w	46.56375	-111.91454	852892.13768	1361566.79401
P23-DU32-x	46.56367	-111.91454	852861.56758	1361566.79401
P23-DU32-y	46.56359	-111.91453	852830.99748	1361566.79401
P23-DU32-z	46.56350	-111.91453	852800.42738	1361566.79401

Station_ID	Latitude	Longitude	Northing	Easting
P23-DU33-a	46.56307	-111.91453	852643.46235	1361561.39141
P23-DU33-aa	46.56245	-111.91395	852411.36609	1361701.60715
P23-DU33-b	46.56317	-111.91456	852681.14257	1361555.47785
P23-DU33-bb	46.56234	-111.91394	852373.24521	1361701.60715
P23-DU33-c	46.56328	-111.91457	852718.18826	1361554.98872
P23-DU33-cc	46.56224	-111.91394	852335.12433	1361701.60715
P23-DU33-d	46.56337	-111.91456	852752.30362	1361556.64998
P23-DU33-dd	46.56224	-111.91379	852335.12433	1361739.72803
P23-DU33-e	46.56337	-111.91446	852751.76602	1361581.86854
P23-DU33-f	46.56328	-111.91445	852718.48351	1361585.68019
P23-DU33-g	46.56318	-111.91444	852680.36263	1361585.68019
P23-DU33-h	46.56307	-111.91443	852643.11863	1361586.07238
P23-DU33-i	46.56297	-111.91443	852605.73366	1361586.60997
P23-DU33-j	46.56287	-111.91432	852566.53759	1361611.97395
P23-DU33-k	46.56297	-111.91433	852604.65847	1361611.97395
P23-DU33-l	46.56307	-111.91433	852642.77935	1361611.97395
P23-DU33-m	46.56318	-111.91434	852680.90023	1361611.97395
P23-DU33-n	46.56328	-111.91434	852719.02111	1361611.97395
P23-DU33-o	46.56337	-111.91437	852751.22843	1361606.54951
P23-DU33-p	46.56317	-111.91422	852677.67465	1361640.95569
P23-DU33-q	46.56307	-111.91422	852639.55377	1361640.95569
P23-DU33-r	46.56296	-111.91421	852601.43289	1361640.95569
P23-DU33-s	46.56286	-111.91421	852563.31201	1361640.95569
P23-DU33-t	46.56276	-111.91416	852526.94933	1361652.73434
P23-DU33-u	46.56266	-111.91416	852490.00501	1361651.17002
P23-DU33-v	46.56255	-111.91406	852450.02456	1361675.31339
P23-DU33-w	46.56266	-111.91406	852488.14544	1361675.31339
P23-DU33-x	46.56276	-111.91407	852526.26632	1361675.31339
P23-DU33-y	46.56286	-111.91407	852564.38720	1361675.31339
P23-DU33-z	46.56255	-111.91395	852449.48697	1361701.60715


Parcels 15 and 21
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS,

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU1-a	46.58582	-111.93540	861094.97273	1356574.30654
P15-DU1-aa	46.58666	-111.93390	861386.28329	1356962.72062
P15-DU1-b	46.58609	-111.93542	861192.07625	1356574.30654
P15-DU1-bb	46.58692	-111.93391	861483.38681	1356962.72062
P15-DU1-c	46.58636	-111.93543	861289.17977	1356574.30654
P15-DU1-cc	46.58719	-111.93392	861580.49033	1356962.72062
P15-DU1-d	46.58662	-111.93544	861386.28329	1356574.30654
P15-DU1-dd	46.58740	-111.93393	861655.69928	1356962.72062
P15-DU1-e	46.58689	-111.93545	861483.38681	1356574.30654
P15-DU1-f	46.58716	-111.93546	861580.49033	1356574.30654
P15-DU1-g	46.58736	-111.93547	861655.69928	1356574.30654
P15-DU1-h	46.58737	-111.93509	861655.69928	1356671.41006
P15-DU1-i	46.58716	-111.93508	861580.49033	1356671.41006
P15-DU1-j	46.58690	-111.93507	861483.38681	1356671.41006
P15-DU1-k	46.58663	-111.93505	861386.28329	1356671.41006
P15-DU1-l	46.58637	-111.93504	861289.17977	1356671.41006
P15-DU1-m	46.58610	-111.93503	861192.07625	1356671.41006
P15-DU1-n	46.58583	-111.93502	861094.97273	1356671.41006
P15-DU1-o	46.58611	-111.93464	861192.07625	1356768.51358
P15-DU1-p	46.58637	-111.93466	861289.17977	1356768.51358
P15-DU1-q	46.58664	-111.93467	861386.28329	1356768.51358
P15-DU1-r	46.58691	-111.93468	861483.38681	1356768.51358
P15-DU1-s	46.58717	-111.93469	861580.49033	1356768.51358
P15-DU1-t	46.58738	-111.93470	861655.69928	1356768.51358
P15-DU1-u	46.58739	-111.93432	861655.69928	1356865.61710
P15-DU1-v	46.58718	-111.93431	861580.49033	1356865.61710
P15-DU1-w	46.58691	-111.93429	861483.38681	1356865.61710
P15-DU1-x	46.58665	-111.93428	861386.28329	1356865.61710
P15-DU1-y	46.58638	-111.93427	861289.17977	1356865.61710
P15-DU1-z	46.58639	-111.93388	861289.17977	1356962.72062

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU2-a	46.58642	-111.93340	861297.37962	1357084.69580
P15-DU2-aa	46.58680	-111.93107	861415.42260	1357674.91072
P15-DU2-b	46.58675	-111.93341	861415.42260	1357084.69580
P15-DU2-bb	46.58647	-111.93105	861297.37962	1357674.91072
P15-DU2-c	46.58707	-111.93343	861533.46559	1357084.69580
P15-DU2-cc	46.58615	-111.93104	861179.33663	1357674.91072
P15-DU2-d	46.58739	-111.93344	861651.50857	1357084.69580
P15-DU2-dd	46.58586	-111.93104	861072.60060	1357670.73522
P15-DU2-e	46.58740	-111.93297	861651.50857	1357202.73878
P15-DU2-f	46.58708	-111.93296	861533.46559	1357202.73878
P15-DU2-g	46.58676	-111.93294	861415.42260	1357202.73878
P15-DU2-h	46.58643	-111.93293	861297.37962	1357202.73878
P15-DU2-i	46.58585	-111.93242	861080.81107	1357323.51859
P15-DU2-j	46.58613	-111.93245	861184.81028	1357321.14143
P15-DU2-k	46.58644	-111.93246	861297.37962	1357320.78176
P15-DU2-l	46.58677	-111.93248	861415.42260	1357320.78176
P15-DU2-m	46.58709	-111.93249	861533.46559	1357320.78176
P15-DU2-n	46.58741	-111.93250	861651.50857	1357320.78176
P15-DU2-o	46.58742	-111.93203	861651.50857	1357438.82475
P15-DU2-p	46.58710	-111.93202	861533.46559	1357438.82475
P15-DU2-q	46.58678	-111.93201	861415.42260	1357438.82475
P15-DU2-r	46.58645	-111.93199	861297.37962	1357438.82475
P15-DU2-s	46.58615	-111.93175	861184.81028	1357496.65766
P15-DU2-t	46.58585	-111.93172	861077.13576	1357499.75415
P15-DU2-u	46.58646	-111.93152	861297.37962	1357556.86773
P15-DU2-v	46.58679	-111.93154	861415.42260	1357556.86773
P15-DU2-w	46.58711	-111.93155	861533.46559	1357556.86773
P15-DU2-x	46.58743	-111.93157	861651.50857	1357556.86773
P15-DU2-y	46.58744	-111.93110	861651.50857	1357674.91072
P15-DU2-z	46.58712	-111.93108	861533.46559	1357674.91072

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU3-a	46.58409	-111.93320	860444.41232	1357108.29606
P15-DU3-aa	46.58509	-111.93099	860794.03859	1357673.67331
P15-DU3-b	46.58441	-111.93321	860561.86668	1357108.29606
P15-DU3-bb	46.58477	-111.93098	860676.58423	1357673.67331
P15-DU3-c	46.58506	-111.93278	860796.77541	1357225.75042
P15-DU3-cc	46.58445	-111.93097	860559.12986	1357673.67331
P15-DU3-d	46.58474	-111.93276	860679.32105	1357225.75042
P15-DU3-dd	46.58414	-111.93094	860446.23333	1357677.32594
P15-DU3-e	46.58442	-111.93275	860561.86668	1357225.75042
P15-DU3-f	46.58410	-111.93273	860444.41232	1357225.75042
P15-DU3-g	46.58410	-111.93233	860444.41232	1357326.78386
P15-DU3-h	46.58443	-111.93235	860561.86668	1357326.78386
P15-DU3-i	46.58475	-111.93236	860679.32105	1357326.78386
P15-DU3-j	46.58507	-111.93237	860796.77541	1357326.78386
P15-DU3-k	46.58539	-111.93239	860914.22978	1357326.78386
P15-DU3-l	46.58565	-111.93239	861007.05275	1357329.52068
P15-DU3-m	46.58566	-111.93192	861007.05275	1357446.97504
P15-DU3-n	46.58540	-111.93192	860914.22978	1357444.23822
P15-DU3-o	46.58508	-111.93191	860796.77541	1357444.23822
P15-DU3-p	46.58476	-111.93189	860679.32105	1357444.23822
P15-DU3-q	46.58444	-111.93188	860561.86668	1357444.23822
P15-DU3-r	46.58411	-111.93186	860444.41232	1357444.23822
P15-DU3-s	46.58412	-111.93139	860443.95442	1357562.60839
P15-DU3-t	46.58445	-111.93141	860561.86668	1357561.69259
P15-DU3-u	46.58477	-111.93143	860679.32105	1357561.69259
P15-DU3-v	46.58509	-111.93144	860796.77541	1357561.69259
P15-DU3-w	46.58541	-111.93146	860914.22978	1357561.69259
P15-DU3-x	46.58567	-111.93146	861007.05275	1357564.42941
P15-DU3-y	46.58567	-111.93101	861004.31593	1357676.41013
P15-DU3-z	46.58541	-111.93101	860911.49296	1357673.67331

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU4-a	46.58221	-111.93541	859777.94689	1356531.28204
P15-DU4-aa	46.58284	-111.93372	859994.67234	1356964.73293
P15-DU4-b	46.58251	-111.93543	859886.30962	1356531.28204
P15-DU4-bb	46.58314	-111.93373	860103.03506	1356964.73293
P15-DU4-c	46.58280	-111.93544	859994.67234	1356531.28204
P15-DU4-cc	46.58343	-111.93374	860211.39778	1356964.73293
P15-DU4-d	46.58310	-111.93545	860103.03506	1356531.28204
P15-DU4-dd	46.58373	-111.93376	860319.76051	1356964.73293
P15-DU4-e	46.58340	-111.93547	860211.39778	1356531.28204
P15-DU4-f	46.58369	-111.93548	860319.76051	1356531.28204
P15-DU4-g	46.58370	-111.93505	860319.76051	1356639.64476
P15-DU4-h	46.58341	-111.93504	860211.39778	1356639.64476
P15-DU4-i	46.58311	-111.93502	860103.03506	1356639.64476
P15-DU4-j	46.58281	-111.93501	859994.67234	1356639.64476
P15-DU4-k	46.58252	-111.93500	859886.30962	1356639.64476
P15-DU4-l	46.58222	-111.93498	859777.94689	1356639.64476
P15-DU4-m	46.58223	-111.93455	859777.94689	1356748.00748
P15-DU4-n	46.58252	-111.93456	859886.30962	1356748.00748
P15-DU4-o	46.58282	-111.93458	859994.67234	1356748.00748
P15-DU4-p	46.58312	-111.93459	860103.03506	1356748.00748
P15-DU4-q	46.58342	-111.93460	860211.39778	1356748.00748
P15-DU4-r	46.58371	-111.93462	860319.76051	1356748.00748
P15-DU4-s	46.58372	-111.93419	860319.76051	1356856.37021
P15-DU4-t	46.58343	-111.93417	860211.39778	1356856.37021
P15-DU4-u	46.58313	-111.93416	860103.03506	1356856.37021
P15-DU4-v	46.58283	-111.93415	859994.67234	1356856.37021
P15-DU4-w	46.58253	-111.93413	859886.30962	1356856.37021
P15-DU4-x	46.58224	-111.93412	859777.94689	1356856.37021
P15-DU4-y	46.58225	-111.93369	859777.94689	1356964.73293
P15-DU4-z	46.58254	-111.93370	859886.30962	1356964.73293

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU5-a	46.58223	-111.93311	859765.95500	1357109.43178
P15-DU5-aa	46.58288	-111.93101	859988.76596	1357644.33498
P15-DU5-b	46.58253	-111.93313	859877.36048	1357109.43178
P15-DU5-bb	46.58319	-111.93103	860100.17144	1357644.33498
P15-DU5-c	46.58284	-111.93314	859988.76596	1357109.43178
P15-DU5-cc	46.58349	-111.93104	860211.57692	1357644.33498
P15-DU5-d	46.58314	-111.93315	860100.17144	1357109.43178
P15-DU5-dd	46.58380	-111.93105	860322.98240	1357644.33498
P15-DU5-e	46.58345	-111.93317	860211.57692	1357109.43178
P15-DU5-f	46.58375	-111.93318	860322.98240	1357109.43178
P15-DU5-g	46.58376	-111.93265	860322.98240	1357243.15758
P15-DU5-h	46.58346	-111.93264	860211.57692	1357243.15758
P15-DU5-i	46.58315	-111.93262	860100.17144	1357243.15758
P15-DU5-j	46.58285	-111.93261	859988.76596	1357243.15758
P15-DU5-k	46.58254	-111.93259	859877.36048	1357243.15758
P15-DU5-l	46.58224	-111.93258	859765.95500	1357243.15758
P15-DU5-m	46.58225	-111.93205	859765.95500	1357376.88338
P15-DU5-n	46.58255	-111.93206	859877.36048	1357376.88338
P15-DU5-o	46.58286	-111.93208	859988.76596	1357376.88338
P15-DU5-p	46.58316	-111.93209	860100.17144	1357376.88338
P15-DU5-q	46.58347	-111.93210	860211.57692	1357376.88338
P15-DU5-r	46.58378	-111.93212	860322.98240	1357376.88338
P15-DU5-s	46.58379	-111.93159	860322.98240	1357510.60918
P15-DU5-t	46.58348	-111.93157	860211.57692	1357510.60918
P15-DU5-u	46.58318	-111.93156	860100.17144	1357510.60918
P15-DU5-v	46.58287	-111.93154	859988.76596	1357510.60918
P15-DU5-w	46.58257	-111.93153	859877.36048	1357510.60918
P15-DU5-x	46.58226	-111.93152	859765.95500	1357510.60918
P15-DU5-y	46.58227	-111.93098	859765.95500	1357644.33498
P15-DU5-z	46.58258	-111.93100	859877.36048	1357644.33498

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU6-a	46.58230	-111.93051	859773.68605	1357762.65480
P15-DU6-aa	46.58295	-111.92842	859993.68572	1358295.90999
P15-DU6-b	46.58260	-111.93053	859883.68588	1357762.65480
P15-DU6-bb	46.58325	-111.92843	860103.68555	1358295.90999
P15-DU6-c	46.58291	-111.93054	859993.68572	1357762.65480
P15-DU6-cc	46.58355	-111.92845	860213.68539	1358295.90999
P15-DU6-d	46.58321	-111.93056	860103.68555	1357762.65480
P15-DU6-dd	46.58386	-111.92846	860323.68522	1358295.90999
P15-DU6-e	46.58351	-111.93057	860213.68539	1357762.65480
P15-DU6-f	46.58381	-111.93058	860323.68522	1357762.65480
P15-DU6-g	46.58382	-111.93005	860323.68522	1357895.96860
P15-DU6-h	46.58352	-111.93004	860213.68539	1357895.96860
P15-DU6-i	46.58322	-111.93003	860103.68555	1357895.96860
P15-DU6-j	46.58292	-111.93001	859993.68572	1357895.96860
P15-DU6-k	46.58262	-111.93000	859883.68588	1357895.96860
P15-DU6-l	46.58231	-111.92998	859773.68605	1357895.96860
P15-DU6-m	46.58233	-111.92945	859773.68605	1358029.28240
P15-DU6-n	46.58263	-111.92947	859883.68588	1358029.28240
P15-DU6-o	46.58293	-111.92948	859993.68572	1358029.28240
P15-DU6-p	46.58323	-111.92950	860103.68555	1358029.28240
P15-DU6-q	46.58353	-111.92951	860213.68539	1358029.28240
P15-DU6-r	46.58383	-111.92952	860323.68522	1358029.28240
P15-DU6-s	46.58384	-111.92899	860323.68522	1358162.59619
P15-DU6-t	46.58354	-111.92898	860213.68539	1358162.59619
P15-DU6-u	46.58324	-111.92897	860103.68555	1358162.59619
P15-DU6-v	46.58294	-111.92895	859993.68572	1358162.59619
P15-DU6-w	46.58264	-111.92894	859883.68588	1358162.59619
P15-DU6-x	46.58234	-111.92892	859773.68605	1358162.59619
P15-DU6-y	46.58235	-111.92839	859773.68605	1358295.90999
P15-DU6-z	46.58265	-111.92841	859883.68588	1358295.90999

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU7-a	46.58045	-111.93545	859137.96442	1356503.20229
P15-DU7-aa	46.58187	-111.93352	859637.96366	1357003.20153
P15-DU7-b	46.58073	-111.93546	859237.96427	1356503.20229
P15-DU7-bb	46.58159	-111.93351	859537.96381	1357003.20153
P15-DU7-c	46.58100	-111.93547	859337.96412	1356503.20229
P15-DU7-cc	46.58132	-111.93349	859437.96397	1357003.20153
P15-DU7-d	46.58127	-111.93548	859437.96397	1356503.20229
P15-DU7-dd	46.58105	-111.93351	859340.57445	1356997.17518
P15-DU7-e	46.58155	-111.93549	859537.96381	1356503.20229
P15-DU7-f	46.58182	-111.93551	859637.96366	1356503.20229
P15-DU7-g	46.58183	-111.93511	859637.96366	1356603.20214
P15-DU7-h	46.58156	-111.93510	859537.96381	1356603.20214
P15-DU7-i	46.58128	-111.93508	859437.96397	1356603.20214
P15-DU7-j	46.58101	-111.93507	859337.96412	1356603.20214
P15-DU7-k	46.58073	-111.93506	859237.96427	1356603.20214
P15-DU7-l	46.58046	-111.93505	859137.96442	1356603.20214
P15-DU7-m	46.58074	-111.93466	859237.96427	1356703.20198
P15-DU7-n	46.58102	-111.93467	859337.96412	1356703.20198
P15-DU7-o	46.58129	-111.93469	859437.96397	1356703.20198
P15-DU7-p	46.58157	-111.93470	859537.96381	1356703.20198
P15-DU7-q	46.58184	-111.93471	859637.96366	1356703.20198
P15-DU7-r	46.58185	-111.93431	859637.96366	1356803.20183
P15-DU7-s	46.58157	-111.93430	859537.96381	1356803.20183
P15-DU7-t	46.58130	-111.93429	859437.96397	1356803.20183
P15-DU7-u	46.58103	-111.93428	859337.96412	1356803.20183
P15-DU7-v	46.58075	-111.93426	859237.96427	1356803.20183
P15-DU7-w	46.58103	-111.93388	859337.96412	1356903.20168
P15-DU7-x	46.58131	-111.93389	859437.96397	1356903.20168
P15-DU7-y	46.58158	-111.93390	859537.96381	1356903.20168
P15-DU7-z	46.58186	-111.93392	859637.96366	1356903.20168

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU8-a	46.58090	-111.93297	859282.65455	1357129.77143
P15-DU8-aa	46.58198	-111.92949	859649.08802	1358016.25352
P15-DU8-b	46.58121	-111.93299	859395.80742	1357129.77143
P15-DU8-bb	46.58164	-111.92948	859522.44772	1358016.25352
P15-DU8-c	46.58156	-111.93300	859522.44772	1357129.77143
P15-DU8-cc	46.58199	-111.92899	859649.08802	1358142.89382
P15-DU8-d	46.58191	-111.93302	859649.08802	1357129.77143
P15-DU8-dd	46.58200	-111.92848	859649.08802	1358269.53412
P15-DU8-e	46.58192	-111.93251	859649.08802	1357256.41173
P15-DU8-f	46.58157	-111.93250	859522.44772	1357256.41173
P15-DU8-g	46.58122	-111.93248	859395.80742	1357256.41173
P15-DU8-h	46.58093	-111.93245	859289.32221	1357261.52885
P15-DU8-i	46.58096	-111.93196	859294.71718	1357385.61323
P15-DU8-j	46.58123	-111.93198	859395.80742	1357383.05203
P15-DU8-k	46.58158	-111.93199	859522.44772	1357383.05203
P15-DU8-l	46.58193	-111.93201	859649.08802	1357383.05203
P15-DU8-m	46.58194	-111.93151	859649.08802	1357509.69233
P15-DU8-n	46.58159	-111.93149	859522.44772	1357509.69233
P15-DU8-o	46.58124	-111.93147	859395.80742	1357509.69233
P15-DU8-p	46.58096	-111.93146	859292.01970	1357509.69760
P15-DU8-q	46.58097	-111.93094	859292.01970	1357641.87444
P15-DU8-r	46.58126	-111.93097	859395.80742	1357636.33262
P15-DU8-s	46.58160	-111.93099	859522.44772	1357636.33262
P15-DU8-t	46.58195	-111.93100	859649.08802	1357636.33262
P15-DU8-u	46.58196	-111.93050	859649.08802	1357762.97292
P15-DU8-v	46.58161	-111.93048	859522.44772	1357762.97292
P15-DU8-w	46.58127	-111.93047	859395.80742	1357762.97292
P15-DU8-x	46.58132	-111.92995	859410.70910	1357892.74068
P15-DU8-y	46.58162	-111.92998	859522.44772	1357889.61322
P15-DU8-z	46.58197	-111.92999	859649.08802	1357889.61322

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU9-a	46.57680	-111.93535	857806.66911	1356486.71056
P15-DU9-aa	46.57795	-111.93178	858196.54911	1357396.43057
P15-DU9-b	46.57716	-111.93536	857936.62911	1356486.71056
P15-DU9-bb	46.57723	-111.93174	857936.62911	1357396.43057
P15-DU9-c	46.57751	-111.93538	858066.58911	1356486.71056
P15-DU9-cc	46.57688	-111.93173	857806.66911	1357396.43057
P15-DU9-d	46.57787	-111.93539	858196.54911	1356486.71056
P15-DU9-dd	46.57689	-111.93121	857806.66911	1357526.39057
P15-DU9-e	46.57823	-111.93541	858326.50911	1356486.71056
P15-DU9-f	46.57788	-111.93488	858196.54911	1356616.67056
P15-DU9-g	46.57752	-111.93486	858066.58911	1356616.67056
P15-DU9-h	46.57717	-111.93485	857936.62911	1356616.67056
P15-DU9-i	46.57681	-111.93483	857806.66911	1356616.67056
P15-DU9-j	46.57682	-111.93431	857806.66911	1356746.63056
P15-DU9-k	46.57718	-111.93433	857936.62911	1356746.63056
P15-DU9-l	46.57753	-111.93434	858066.58911	1356746.63056
P15-DU9-m	46.57789	-111.93436	858196.54911	1356746.63056
P15-DU9-n	46.57755	-111.93383	858066.58911	1356876.59057
P15-DU9-o	46.57719	-111.93381	857936.62911	1356876.59057
P15-DU9-p	46.57683	-111.93380	857806.66911	1356876.59057
P15-DU9-q	46.57684	-111.93328	857806.66911	1357006.55057
P15-DU9-r	46.57720	-111.93329	857936.62911	1357006.55057
P15-DU9-s	46.57756	-111.93331	858066.58911	1357006.55057
P15-DU9-t	46.57757	-111.93279	858066.58911	1357136.51057
P15-DU9-u	46.57721	-111.93278	857936.62911	1357136.51057
P15-DU9-v	46.57686	-111.93276	857806.66911	1357136.51057
P15-DU9-w	46.57687	-111.93225	857806.66911	1357266.47057
P15-DU9-x	46.57722	-111.93226	857936.62911	1357266.47057
P15-DU9-y	46.57758	-111.93228	858066.58911	1357266.47057
P15-DU9-z	46.57794	-111.93229	858196.54911	1357266.47057

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU10-a	46.57495	-111.93536	857133.69001	1356462.46404
P15-DU10-aa	46.57560	-111.93334	857353.68968	1356978.11278
P15-DU10-b	46.57525	-111.93537	857243.68985	1356462.46404
P15-DU10-bb	46.57590	-111.93335	857463.68952	1356978.11278
P15-DU10-c	46.57556	-111.93539	857353.68968	1356462.46404
P15-DU10-cc	46.57620	-111.93336	857573.68935	1356978.11278
P15-DU10-d	46.57586	-111.93540	857463.68952	1356462.46404
P15-DU10-dd	46.57650	-111.93338	857683.68919	1356978.11278
P15-DU10-e	46.57616	-111.93541	857573.68935	1356462.46404
P15-DU10-f	46.57646	-111.93543	857683.68919	1356462.46404
P15-DU10-g	46.57647	-111.93491	857683.68919	1356591.37623
P15-DU10-h	46.57617	-111.93490	857573.68935	1356591.37623
P15-DU10-i	46.57587	-111.93489	857463.68952	1356591.37623
P15-DU10-j	46.57557	-111.93487	857353.68968	1356591.37623
P15-DU10-k	46.57526	-111.93486	857243.68985	1356591.37623
P15-DU10-l	46.57496	-111.93485	857133.69001	1356591.37623
P15-DU10-m	46.57497	-111.93433	857133.69001	1356720.28841
P15-DU10-n	46.57528	-111.93435	857243.68985	1356720.28841
P15-DU10-o	46.57558	-111.93436	857353.68968	1356720.28841
P15-DU10-p	46.57588	-111.93437	857463.68952	1356720.28841
P15-DU10-q	46.57618	-111.93439	857573.68935	1356720.28841
P15-DU10-r	46.57648	-111.93440	857683.68919	1356720.28841
P15-DU10-s	46.57649	-111.93389	857683.68919	1356849.20060
P15-DU10-t	46.57619	-111.93388	857573.68935	1356849.20060
P15-DU10-u	46.57589	-111.93386	857463.68952	1356849.20060
P15-DU10-v	46.57559	-111.93385	857353.68968	1356849.20060
P15-DU10-w	46.57529	-111.93384	857243.68985	1356849.20060
P15-DU10-x	46.57499	-111.93382	857133.69001	1356849.20060
P15-DU10-y	46.57500	-111.93331	857133.69001	1356978.11278
P15-DU10-z	46.57530	-111.93332	857243.68985	1356978.11278

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU11-a	46.57501	-111.93279	857133.69001	1357108.56878
P15-DU11-aa	46.57566	-111.93072	857353.68968	1357636.56798
P15-DU11-b	46.57531	-111.93280	857243.68985	1357108.56878
P15-DU11-bb	46.57596	-111.93073	857463.68952	1357636.56798
P15-DU11-c	46.57561	-111.93282	857353.68968	1357108.56878
P15-DU11-cc	46.57626	-111.93074	857573.68935	1357636.56798
P15-DU11-d	46.57591	-111.93283	857463.68952	1357108.56878
P15-DU11-dd	46.57656	-111.93076	857683.68919	1357636.56798
P15-DU11-e	46.57621	-111.93284	857573.68935	1357108.56878
P15-DU11-f	46.57652	-111.93286	857683.68919	1357108.56878
P15-DU11-g	46.57653	-111.93233	857683.68919	1357240.56858
P15-DU11-h	46.57623	-111.93232	857573.68935	1357240.56858
P15-DU11-i	46.57592	-111.93231	857463.68952	1357240.56858
P15-DU11-j	46.57562	-111.93229	857353.68968	1357240.56858
P15-DU11-k	46.57532	-111.93228	857243.68985	1357240.56858
P15-DU11-l	46.57502	-111.93227	857133.69001	1357240.56858
P15-DU11-m	46.57503	-111.93174	857133.69001	1357372.56838
P15-DU11-n	46.57533	-111.93175	857243.68985	1357372.56838
P15-DU11-o	46.57563	-111.93177	857353.68968	1357372.56838
P15-DU11-p	46.57593	-111.93178	857463.68952	1357372.56838
P15-DU11-q	46.57624	-111.93179	857573.68935	1357372.56838
P15-DU11-r	46.57654	-111.93181	857683.68919	1357372.56838
P15-DU11-s	46.57655	-111.93128	857683.68919	1357504.56818
P15-DU11-t	46.57625	-111.93127	857573.68935	1357504.56818
P15-DU11-u	46.57595	-111.93126	857463.68952	1357504.56818
P15-DU11-v	46.57564	-111.93124	857353.68968	1357504.56818
P15-DU11-w	46.57534	-111.93123	857243.68985	1357504.56818
P15-DU11-x	46.57504	-111.93122	857133.69001	1357504.56818
P15-DU11-y	46.57505	-111.93069	857133.69001	1357636.56798
P15-DU11-z	46.57535	-111.93070	857243.68985	1357636.56798

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU12-a	46.57502	-111.93020	857119.18462	1357759.39621
P15-DU12-aa	46.57536	-111.92799	857224.56983	1358319.39621
P15-DU12-b	46.57531	-111.93021	857224.56983	1357759.39621
P15-DU12-bb	46.57565	-111.92800	857330.72335	1358319.39621
P15-DU12-c	46.57560	-111.93023	857330.72335	1357759.39621
P15-DU12-cc	46.57594	-111.92801	857434.56913	1358319.39621
P15-DU12-d	46.57589	-111.93024	857434.56913	1357759.39621
P15-DU12-dd	46.57621	-111.92802	857536.10996	1358320.16733
P15-DU12-e	46.57618	-111.93025	857539.95433	1357759.39621
P15-DU12-f	46.57503	-111.92988	857119.18462	1357839.39621
P15-DU12-g	46.57532	-111.92990	857224.56983	1357839.39621
P15-DU12-h	46.57561	-111.92991	857330.72335	1357839.39621
P15-DU12-i	46.57590	-111.92992	857434.56913	1357839.39621
P15-DU12-j	46.57504	-111.92956	857119.18462	1357919.39621
P15-DU12-k	46.57533	-111.92958	857224.56983	1357919.39621
P15-DU12-l	46.57562	-111.92959	857330.72335	1357919.39621
P15-DU12-m	46.57590	-111.92960	857434.56913	1357919.39621
P15-DU12-n	46.57504	-111.92925	857119.18462	1357999.39621
P15-DU12-o	46.57533	-111.92926	857224.56983	1357999.39621
P15-DU12-p	46.57562	-111.92927	857330.72335	1357999.39621
P15-DU12-q	46.57505	-111.92893	857119.18462	1358079.39621
P15-DU12-r	46.57534	-111.92894	857224.56983	1358079.39621
P15-DU12-s	46.57563	-111.92895	857330.72335	1358079.39621
P15-DU12-t	46.57505	-111.92860	857116.86567	1358160.94404
P15-DU12-u	46.57535	-111.92862	857224.56983	1358159.39621
P15-DU12-v	46.57564	-111.92864	857330.72335	1358159.39621
P15-DU12-w	46.57507	-111.92829	857119.94453	1358240.94404
P15-DU12-x	46.57535	-111.92830	857224.56983	1358239.39621
P15-DU12-y	46.57564	-111.92832	857330.72335	1358239.39621
P15-DU12-z	46.57508	-111.92798	857122.25228	1358317.08847

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU13-a	46.57314	-111.93533	856473.69101	1356448.56977
P15-DU13-aa	46.57379	-111.93326	856693.69068	1356976.56897
P15-DU13-b	46.57344	-111.93535	856583.69084	1356448.56977
P15-DU13-bb	46.57409	-111.93327	856803.69051	1356976.56897
P15-DU13-c	46.57374	-111.93536	856693.69068	1356448.56977
P15-DU13-cc	46.57439	-111.93329	856913.69035	1356976.56897
P15-DU13-d	46.57405	-111.93537	856803.69051	1356448.56977
P15-DU13-dd	46.57469	-111.93330	857023.69018	1356976.56897
P15-DU13-e	46.57435	-111.93539	856913.69035	1356448.56977
P15-DU13-f	46.57465	-111.93540	857023.69018	1356448.56977
P15-DU13-g	46.57466	-111.93488	857023.69018	1356580.56957
P15-DU13-h	46.57436	-111.93486	856913.69035	1356580.56957
P15-DU13-i	46.57406	-111.93485	856803.69051	1356580.56957
P15-DU13-j	46.57376	-111.93484	856693.69068	1356580.56957
P15-DU13-k	46.57345	-111.93482	856583.69084	1356580.56957
P15-DU13-l	46.57315	-111.93481	856473.69101	1356580.56957
P15-DU13-m	46.57316	-111.93428	856473.69101	1356712.56937
P15-DU13-n	46.57347	-111.93430	856583.69084	1356712.56937
P15-DU13-o	46.57377	-111.93431	856693.69068	1356712.56937
P15-DU13-p	46.57407	-111.93432	856803.69051	1356712.56937
P15-DU13-q	46.57437	-111.93434	856913.69035	1356712.56937
P15-DU13-r	46.57467	-111.93435	857023.69018	1356712.56937
P15-DU13-s	46.57468	-111.93383	857023.69018	1356844.56917
P15-DU13-t	46.57438	-111.93381	856913.69035	1356844.56917
P15-DU13-u	46.57408	-111.93380	856803.69051	1356844.56917
P15-DU13-v	46.57378	-111.93379	856693.69068	1356844.56917
P15-DU13-w	46.57348	-111.93377	856583.69084	1356844.56917
P15-DU13-x	46.57317	-111.93376	856473.69101	1356844.56917
P15-DU13-y	46.57319	-111.93323	856473.69101	1356976.56897
P15-DU13-z	46.57349	-111.93325	856583.69084	1356976.56897

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU14-a	46.57320	-111.93271	856473.69101	1357108.56878
P15-DU14-aa	46.57385	-111.93064	856693.69068	1357636.56798
P15-DU14-b	46.57350	-111.93272	856583.69084	1357108.56878
P15-DU14-bb	46.57415	-111.93065	856803.69051	1357636.56798
P15-DU14-c	46.57380	-111.93274	856693.69068	1357108.56878
P15-DU14-cc	46.57445	-111.93066	856913.69035	1357636.56798
P15-DU14-d	46.57410	-111.93275	856803.69051	1357108.56878
P15-DU14-dd	46.57475	-111.93068	857023.69018	1357636.56798
P15-DU14-e	46.57440	-111.93276	856913.69035	1357108.56878
P15-DU14-f	46.57471	-111.93278	857023.69018	1357108.56878
P15-DU14-g	46.57472	-111.93225	857023.69018	1357240.56858
P15-DU14-h	46.57442	-111.93224	856913.69035	1357240.56858
P15-DU14-i	46.57411	-111.93222	856803.69051	1357240.56858
P15-DU14-j	46.57381	-111.93221	856693.69068	1357240.56858
P15-DU14-k	46.57351	-111.93220	856583.69084	1357240.56858
P15-DU14-l	46.57321	-111.93218	856473.69101	1357240.56858
P15-DU14-m	46.57322	-111.93166	856473.69101	1357372.56838
P15-DU14-n	46.57352	-111.93167	856583.69084	1357372.56838
P15-DU14-o	46.57382	-111.93169	856693.69068	1357372.56838
P15-DU14-p	46.57412	-111.93170	856803.69051	1357372.56838
P15-DU14-q	46.57443	-111.93171	856913.69035	1357372.56838
P15-DU14-r	46.57473	-111.93173	857023.69018	1357372.56838
P15-DU14-s	46.57474	-111.93120	857023.69018	1357504.56818
P15-DU14-t	46.57444	-111.93119	856913.69035	1357504.56818
P15-DU14-u	46.57414	-111.93117	856803.69051	1357504.56818
P15-DU14-v	46.57383	-111.93116	856693.69068	1357504.56818
P15-DU14-w	46.57353	-111.93115	856583.69084	1357504.56818
P15-DU14-x	46.57323	-111.93113	856473.69101	1357504.56818
P15-DU14-y	46.57324	-111.93061	856473.69101	1357636.56798
P15-DU14-z	46.57354	-111.93062	856583.69084	1357636.56798

Station_ID	Latitude	Longitude	Northing	Easting
P15-DU15-a	46.57325	-111.93008	856473.69101	1357768.56778
P15-DU15-aa	46.57390	-111.92801	856693.69068	1358296.56699
P15-DU15-b	46.57356	-111.93010	856583.69084	1357768.56778
P15-DU15-bb	46.57420	-111.92803	856803.69051	1358296.56699
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P15-DU15-x	46.57329	-111.92851	856473.69101	1358164.56719
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P21-DU16-b	46.57165	-111.92380	855841.26795	1359329.39551
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P21-DU16-z	46.57167	-111.92276	855841.02233	1359589.98888

Appendix D
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN UPDATE 2015

EAST HELENA FACILITY

- DRAFT -

Prepared for:

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Revised Draft July 2015

QUALITY ASSURANCE PROJECT PLAN UPDATE 2015EAST HELENA FACILITY

APPROVAL SIGNATURE SHEET

_____

Date

Montana Environmental Trust Group, LLC
Trustee of the Montana Environmental Custodial Trust

_____

Date

USEPA Region 8

_____

Robert Anderson, Project Manager Date
Hydrometrics, Inc.

_____

Mark Walker, QA Manager Date
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QUALITY ASSURANCE PROJECT PLAN UPDATE 2015EAST HELENA FACILITY

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QUALITY ASSURANCE PROJECT PLAN UPDATE 2015EAST HELENA FACILITY

- DRAFT -

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared at the request of the Montana Trust Group, LLC, as Trustee for the Montana Environmental Custodial Trust (the Custodial Trust) in general accordance with U.S. Environmental Protection Agency (EPA) guidance (EPA, 2001 and 2002a) to direct the planning, implementation, and assessment of environmental data collection activities at the East Helena Facility (the former Asarco East Helena smelter and surrounding properties now owned by the Custodial Trust). The QAPP is intended to be used in conjunction with other East Helena Facility project documents, such as Field Sampling and Analysis Plans (FSAPs), Sampling and Analysis Plans (SAPs), and/or Work Plans (WPs), hereafeter referred to as "Associated Plan(s)", that have been or will be prepared to address ongoing environmental work at the facility, in order to ensure that all data collected is of the appropriate type, quantity, and quality to achieve the objectives of the individual project, and ultimately to support completion of a Corrective Measures Study for the Facility.

The QAPP is structured in conformance with EPA (2001), including the following four groups of QA elements:

- Project Management – Section 2.0 of the QAPP;
- Data Generation and Acquisition – Section 3.0 of the QAPP;
- Assessment and Oversight – Section 4.0 of the QAPP; and
- Data Validation and Usability – Section 5.0 of the QAPP.

The overall purpose of the QAPP is to provide in one document a clear and concise presentation of the technical approach (planning), procedures and methodologies (implementation), and data review and evaluation (assessment) tasks used to complete environmental data collection

projects for the East Helena Facility, along with a description of how specific quality assurance (QA) and quality control (QC) activities will be applied. The QAPP has been structured to be as flexible and widely applicable as possible.

The QAPP should be reviewed and updated as necessary, to ensure that any revisions pertinent to future data collection activities are incorporated into the document and communicated to project personnel, and also to ensure that any such data collection activities are subject to equivalent planning, implementation, and assessment requirements.

2.0 PROJECT MANAGEMENT

2.1 PROJECT/TASK ORGANIZATION AND RESPONSIBILITY

This section of the East Helena Facility QAPP provides an overview of project organization and responsibilities for implementation of environmental data collection activities at the site. A summary table outlining required elements for QAPPs (stipulated in EPA, 2001) and the corresponding location in this QAPP where these requirements are addressed is in Appendix A. An organization chart illustrating the relationships among the site owner (the Custodial Trust), regulatory oversight agencies, and other data users and/or generators will be provided within the Associated Plan(s).

2.2 PROBLEM DEFINITION/BACKGROUND

The history of the East Helena Facility, including environmental investigations, remedial activities, and regulatory actions conducted to date has been reviewed in detail in a number of existing documents, including the Phase II RFI Site Characterization Work Plan (Hydrometrics, 2010b), Phase II RCRA Facility Investigation—East Helena Facility (Phase II RFI; GSI Water Solutions, Inc., 2014), draft Former ASARCO East Helena Facility Corrective Measures Study Work Plan 2013 (CH2M HILL, 2014) and several completed RCRA Interim Measures Work Plans (IMWPs).

2.2.1 Problem Background (Site History)

The East Helena Facility is a former custom lead smelter located on approximately 142 acres. The Facility is located primarily on the Prickly Pear Creek alluvial plain, and is bounded to the south by Upper Lake and Lower Lake, to the east and northeast by Prickly Pear Creek, and to the west and southwest by uplands or foothills comprised of tertiary-age sediments. The Facility is bordered on the north by State Highway 12 and the American Chemet Facility (a manufacturer and marketer of metals-based chemicals), with the business district and major residential areas in the City of East Helena located a short distance north of the Facility (see Figure 1-1 of the Phase II RFI Work Plan.

The following brief operational summary of the East Helena smelter was obtained from the draft MPDES discharge permit for the East Helena Facility wastewater treatment plant (MDEQ, 2010):

> Asarco operated the smelter for over 100 years as a custom, primary lead smelter using pyrometallurgical processes to recover base metals from ores and concentrates. The plant produced lead bullion and by-products such as silver, gold, copper, and sulfuric acid. Ore concentrates were transported by railcars or trucks to the plant and mixed with siliceous flux, limestone flux, iron flux, coke, and recycled by-products dust. This mixture was roasted in the sinter plant to drive off the sulfur content. The resultant sulfur dioxide gas was captured and cooled in the acid plant to produce sulfuric acid, a product shipped off-site for use. The sinter was then sent to the blast furnace for smelting. In the blast furnace, several layers of metals formed. Molten lead sank to the bottom of the furnace and was referred to as lead bullion. The lightest metals, including arsenic and antimony, floated to the top and formed a layer called speiss. Copper and metal sulfides formed a layer called matte. The blast furnace also produced slag, which was stored on-site. The lead bullion would then undergo the drossing process in which the bullion was agitated in kettles and then cooled. A product called dross was produced which was lead oxides, copper, antimony, and other metals that floated to the top of the process. After additional metals recovery, the dross was sent off-site for metals recovery. Lead was also shipped off-site for further processing.

In September 1984, pursuant to Section 105 of CERCLA, EPA added to the National Priorities List the Facility, all of the City of East Helena, nearby residential subdivisions, numerous rural developments such as farms and homes on small acreage plots, and surrounding undeveloped lands (the Site). In November 1989 EPA divided the Site into five operable units (OUs) ((1) Process Ponds and Fluid; (2) Surface Soils and Surface Water; (3) Groundwater; (4) Slag Pile; and (5) Ore Storage Areas) and issued a record of decision for the Process Ponds and Fluids OU (Process Ponds ROD). The remedial action and groundwater monitoring program required by the Process Ponds ROD was set forth in a December 1990 Consent Decree (the Process Ponds CD) between EPA and ASARCO.

In 1997, EPA initiated a transfer of responsibility for ongoing remedial activities at the Facility from its CERCLA program to its Corrective Action program under the Resource Conservation and Recovery Act (RCRA). In May of 1998, ASARCO and EPA entered into a Consent Decree (the 1998 CD) to further the objectives of RCRA and the Clean Water Act (CWA) (U.S. District Court, 1998). Since then, groundwater sampling and analysis requirements of

the Process Ponds CD have been performed pursuant to the 1998 CD and the Surface Soils/Surface Water, Groundwater, Slag Pile and Ore Storage Areas operable units have been addressed under the 1998 CD.

On December 9, 2009, the Montana Environmental Custodial Trust was established as part of the larger Asarco bankruptcy settlement agreement approved by the Bankruptcy Court (SD, Texas) and the US Federal District Court (SD, Texas). A Consent Decree and Settlement Agreement regarding Montana Sites (the Settlement Agreement) was entered into by Asarco, US Department of Justice (DOJ), EPA, the State of Montana (the State) and the Montana Environmental Trust Group, LLC, as Trustee for the Montana Environmental Custodial Trust (the Custodial Trust). The Settlement Agreement describes the role and responsibilities of the Custodial Trust, which include owning, managing, and performing the clean-up and revitalization of Asarco's property in East Helena, Montana under oversight of EPA.

As part of the Settlement Agreement the Custodial Trust agreed to fulfill ASARCO's obligations under the 1998 CD. These obligations include completion of all environmental investigations and related work at ASARCO properties, including addressing groundwater contamination resulting from ASARCO's past practices. This work is to be completed by the Custodial Trust with EPA oversight.

As part of the 1998 CD, Asarco prepared a RCRA Current Conditions/Release Assessment (CC/RA) (Hydrometrics, 1999a). The purpose of the RCRA CC/RA was to assess the completeness and quality of the existing data used to define, in whole or in part, the nature and extent of any hazardous waste and hazardous constituent releases, if any, at or migrating from the Facility. Based on its review of the RCRA CC/RA, EPA determined that interim remedial measures were necessary and warranted for portions of the Facility.

Long-term groundwater and surface water monitoring has been conducted at the Facility from 1991 to the present. This monitoring program consists of monitoring groundwater elevations and quality, and surface water elevations and quality via semiannual (at a minimum) sample collection (typically in spring and fall) within and adjacent to the East Helena Facility. The

data generated through this long-term monitoring program will be used to evaluate long-term trends in groundwater and surface water elevations and quality and to characterize the status and evolution of groundwater contaminant plumes beneath and downgradient of the facility, evaluate ongoing IMs implementation, and conduct the CMS.

2.2.2 Problem Definition

The problem to be addressed at the East Helena Facility may be stated as follows:

> Metals and other constituents have been released to the environment (soil, air, groundwater, and surface water) as a result of historic activities at the Facility. While extensive remedial measures have been implemented in many portions of the Facility as described above and in the Corrective Measures Study Work Plan, elevated constituent concentrations persist in site soils and groundwater. Surface and subsurface soils contain elevated concentrations of constituents including but not limited to arsenic, cadmium, copper, lead and zinc. Groundwater monitoring on and downgradient of the Facility has revealed two plumes with elevated arsenic and selenium concentrations in groundwater extending north and northwestward from the Facility.

2.3 PROJECT/TASK DESCRIPTION AND SCHEDULE

As this QAPP has been prepared to meet the ongoing Facility investigation, monitoring, and evaluation needs, specific projects tasks, descriptions and schedules will be provided in the Associated Plan(s) including but not limited to the 2015 Corrective Action Monitoring Plan (CAMP; Hydrometrics, 2015a), subsequent CAMPs, and Supplemental RFI Sampling and Analysis Plan (CH2M HILL, 2015).

2.4 QUALITY OBJECTIVES AND CRITERIA

This QAPP describes procedures for ensuring that chemical data generated from soil, groundwater, and surface water samples collected in conjunction with data collection activities at the East Helena Facility are of known and acceptable quality to support the intended data uses. The QAPP also summarizes procedures for expressing the quality of the results generated through Data Quality Indicators (DQIs). Quantitative DQIs include precision, accuracy and completeness, and qualitative DQIs include representativeness and comparability. DQI targets are presented in Section 5.3 below.

EPA's *Requirements for Quality Assurance Project Plans* (QA/R-5; EPA, 2001) and *Guidance for Quality Assurance Project Plans* (QA/G-5; EPA, 2002a) state that a systematic planning process should be used to determine the quality objectives for a project and the performance criteria used to achieve those objectives. The Data Quality Objectives (DQO) process (EPA, 2006a) provides an example of how to apply systematic planning to generate performance and acceptance criteria for collecting new environmental data. Use of the DQO framework is non-mandatory, but recommended by EPA when data are to be used to make decisions (e.g., compliance vs. non-compliance with a standard) or to estimate some property of the environment (e.g., determining the average soil concentration of a contaminant).

The DQO process consists of seven steps (EPA, 2006a):

1. State the Problem;
2. Identify the Goal of the Study;
3. Identify Information Inputs;
4. Define the Boundaries of the Study;
5. Develop the Analytic Approach;
6. Specify Performance or Acceptance Criteria; and
7. Develop the Plan for Obtaining Data.

The application of these DQO steps to the environmental data collection activities proposed at the East Helena Facility are discussed below in Sections 2.4.1 through 2.4.7.

2.4.1 State the Problem

Major environmental remediation has been ongoing at the Facility during the last 25 years; however, environmental problems and need for additional data persist for the former Facility for both soil and groundwater both on and off the plant site. Additional data collection will be used to support the ongoing evaluation of IMs and development of the CMS.

2.4.2 Identify the Goal of the Study

The objectives of the data collection activities to be performed at the East Helena Facility are outlined within the Associated Plan(s), as described in Section 2.3. All objectives are established to ensure that all data collected will be applicable to the primary issues to be addressed at the Facility including but not limited to evaluation of ongoing IMs, performance and detection monitoring, and the collection of data to support the ongoing CMS.

2.4.3 Identify Information Inputs

The types and sources of information needed to support stated study goals will also be included within the Associated Plan(s) as described previously. It should be noted that the suite of analytical parameters proposed for analysis has been designed to address data gaps, with emphasis on the constituents of concern as described in the Phase RFI. Field and laboratory procedures and methods have been selected to be consistent with prior investigations to the extent practicable, so that data comparability is maximized and the set of suitable data available for inclusion in the CMS will be as extensive as possible. At the same time, analytical methods and reporting limits for individual constituents have been set at levels appropriate for use in conducting risk assessments as needed.

2.4.4 Define the Boundaries of the Study

In general, the spatial study boundaries of investigation and ongoing monitoring are provided in Exhibit 3 of the First Modification to the 1998 RCRA Consent Decree (First Modification; Dreher et al., 2012).

2.4.5 Develop the Analytic Approach

In contrast with sampling activities developed to address simple decision or estimation problems such as those presented in DQO guidance (EPA, 2006a), data collection activities for the East Helena Facility have been developed based on an assessment of the extensive amount of available information gathered during nearly 30 years of site characterization and remediation. The groundwater and surface water sampling and analysis program outlined within the CAMP is designed based on the current understanding of site and regional hydrogeology, site access, the geometry of existing contaminant plumes, and to support the

ongoing CMS and IMs evaluations. The sampling and analysis of surface soil and sediment described in the Supplemental RFI SAP (CH2M, 2015), is intended to support the CMS and therefore an evaluation of the nature and extent of surface soil and sediment contamination within specifically defined geographic areas. The Supplemental RFI SAP sampling program includes judgmental and random sampling approaches to support decisions made in the OU-2 ROD. Additional analytical and data evaluation approaches (for example, specific statistical analysis methods) may be described and proposed in Associated Plan(s) which will be supported by this QAPP.

2.4.6 Specify Performance or Acceptance Criteria

Specification of performance or acceptance criteria are intended to minimize the possibility of making erroneous conclusions, or failing to keep uncertainty in estimates to within acceptable levels. In order to ensure that uncertainty in the collected data is controlled and can be meaningfully evaluated relative to the existing data set, sampling- and measurement-specific DQIs have been specified as performance criteria in Section 5.3. These criteria cover the well-known PARCC parameters (data precision, accuracy, representativeness, completeness, and comparability), and are assessed through evaluation of field and laboratory quality control sample results, review of data collection documentation (including the results of any corrective actions), and the results of any field or laboratory audits. Collected data will be evaluated against the criteria outlined in Section 5.3 during the assessment of data quality and usability. Results or measurements not meeting criteria will be qualified in the project database, so that data users will be aware of potential data quality issues and can make informed decisions about whether particular results should be excluded from the decision-making process.

Decisions regarding potential further actions at the facility will ultimately be addressed in the CMS, and will be based on a comprehensive consideration of all available data, along with the results of the existing baseline ecological and human health risk assessments and any additional evaluations that may be conducted within the guidance of this QAPP. Data comparability will be a principal concern during the data validation and usability assessment.

2.4.7 Develop the Plan for Obtaining Data

The final step of the DQO process involves specification of the type, number, location, and physical quantity of samples and data, and the QA/QC activities that will be implemented to ensure sampling and measurement errors are managed sufficiently to meet performance/acceptance criteria. As noted above in Section 2.4.5, existing approaches and potential future approaches will be defined within the Associated Plan(s). All collected data will be used to support the CMS.

Details on the type, number, location, and quantity of samples to be collected are presented in the Associated Plan(s); each Associated Plan(s) will include a reference to this QAPP.

Quality assurance for field data collection activities will be ensured through the use of standard field operating procedures, sample chain-of-custody documentation, and submission of field quality control (QC) samples. Standard Operating Procedures (SOPs) for all field activities including the collection, documentation and shipment of environmental media, decontamination of sampling equipment, and all other applicable activities have been included on the compact disc in Appendix B. Quality assurance in laboratory analyses will be ensured through the use of approved methods of analysis and through adherence to a laboratory quality assurance program, which includes regular analysis and reporting of laboratory QC samples. Data review, validation, and verification relative to specific criteria are discussed in Section 5.0 of this QAPP.

2.5 SPECIAL TRAINING/CERTIFICATION

Site-specific general health and safety training requirements (e.g., safety issues concerning arsenic, lead, and cadmium exposure) are addressed in the Hydrometrics' Health & Safety Plan (Hydrometrics, 2015b). The Facility Health and Safety Officer is responsible for ensuring that project personnel have received the proper health and safety training, and that health and safety requirements are met at all times.

The qualifications of the selected laboratory are discussed in Section 3.4, and a copy of the laboratory quality assurance manual is on the compact disc in Appendix C. Although no

specific laboratory certifications are required for this project, the qualifications of the selected laboratory (Energy Laboratories) to conduct analysis of samples under the terms of the Consent Decree have previously been provided for EPA review and approval (Asarco, 1998, 2000). Additionally, the EPA has approved Energy Laboratories for laboratory analysis by the Custodial Trust.

2.6 DOCUMENTS AND RECORDS

All samples collected and sent to the laboratory for analysis will follow standard documentation and chain of custody procedures. Field data reporting shall be recorded in field notebooks and will contain results of all measurements made in the field. Documentation includes:

- Chain of custody forms;
- Field notebooks and forms;
- Shipping records;
- Transmittal records; and
- Corrective action reports.

Additional information on sample handling, documentation, and records is in Section 3.3.

The task of recording laboratory data begins once the samples arrive at the laboratory and continues until the final laboratory report is submitted. The Laboratory QA Manager will review the report summary and case narrative to ensure that the data report meets project requirements. In addition to the record of chain-of-custody, the laboratory shall include:

- Cover letter;
- Case narrative;
- Analytical sample results; and
- Associated quality control results.

The selected laboratory for performing chemical and physical analyses will deliver complete documentation including the results of the tests, the testing method employed, practical

quantitation (detection) limits (PQLs), and any relevant method specific quality control information (calibration, laboratory standard sample results, etc.). Although no raw data are required in the laboratory deliverable, raw data will be archived by the laboratory to allow further review of the data if warranted. All sample results will be provided in both paper and electronic formats. The deliverable package will also contain a summary of any deviations from procedures described in this QAPP resulting from corrective actions. All hardcopies of field data, laboratory data packages, and data quality/validation reports will be stored and cataloged by the Custodial Trust or its designee, along with any QA/QC records such as audit reports, training records, and corrective action reports.

3.0 DATA ACQUISITION AND MEASUREMENT

3.1 SAMPLING PROCESS DESIGN

Sampling process design addresses the type and number of samples required, sample locations, sample frequencies, sample matrices, and rationale. Sampling process design is addressed in the Associated Plan(s) that reference this QAPP.

Note that field variances can arise when the sample network is changed (i.e., more/fewer samples, sampling locations other than those specified in the Associated Plan(s); when sampling procedures and/or field analytical procedures require modification due to unexpected conditions; and/or if EPA requests contingent sampling (i.e., additional sampling decisions subject to results of earlier sampling events). Technical staff and project personnel will be responsible for reporting all field variances, technical or QA nonconformances or suspected deficiencies of any activity or issued document by reporting the situation to the QA Manager or designee. The QA Manager will assess suspected problems, and in consultation with the Project Manager, make a decision based on the potential for the situation to impact the quality of the data. If it is determined that the situation warrants a reportable variance or nonconformance requiring corrective action, then a report will be initiated by the manager. Field variance and nonconformance procedures are outlined in HF-SOP-30 (Appendix B).

3.2 SAMPLING METHODS REQUIREMENTS

All field sampling will be conducted in general accordance with the SOPs provided in Appendix B and/or as described in the Associated Plan(s). The SOPs applicable to activities at the Facility are denoted in Table B-1 in Appendix B. Sampling methods and procedures for all environmental media are presented within the Associated Plan(s) and SOPs (Appendix B). A summary of applicable SOPs and sample container and preservation requirements for soil and water matrices is in Table 3-1.

TABLE 3-1. SAMPLE CONTAINER AND PRESERVATION REQUIREMENTS

Matrix	Parameters	Collection Methods(1)	Sample Containers	Preservative(2)
Soil Samples	Total Metals Extraction/Adsorption Testing	HS-SOP-6 HS-SOP-57 HS-SOP-72	Ziploc –type bags (double-bagged) or glass jars	None
Water Samples (Groundwater and Surface Water)	Field Parameters	HF-SOP-20 HF-SOP-22 HF-SOP-79 HF-SOP-84	None	None
	Common Constituents	HF-SOP-11	1000 ml HDPE	Cool to 4°C
	Trace Constituents (dissolved for groundwater, total recoverable for surface water ***except aluminum***)	HF-SOP-11 HF-SOP-73	500 ml HDPE	Filter dissolved samples (0.45 µm) HNO_3 to pH <2 Cool to 4°C

NOTES: (1) Hydrometrics' Standard Operating Procedures (see Appendix B).
(2) All chemical preservatives will be added in the field.

3.3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

The SOPs for sample labeling, documentation and shipping procedures are in Appendix B. All samples collected and sent to the laboratory for analysis will follow standard documentation, packing, and chain-of-custody procedures. Samples will be stored in iced coolers or refrigerated following collection, then hand-delivered to the laboratory in iced coolers.

Sample custody (responsibility for the integrity of samples and prevention of tampering) will be the responsibility of the samplers until samples are shipped. Sample coolers will be sealed with custody seals prior to shipping and the laboratory will record the condition of the seals upon arrival to ensure that the containers have not been opened during transport. Upon arrival at the laboratory, sample custody shifts to laboratory personnel, who are responsible for tracking individual samples through login, analysis, and reporting. At the time of sample login,

the laboratory will assign a unique laboratory sample number, which can be cross-referenced to the field sample number and used to track analytical results.

Documents generated during sample collection will consist of:

1. Sample collection field notes and forms;
2. Chain-of-Custody forms; and
3. Shipping receipts in the event that samples are sent to a laboratory via independent courier.

Sampling activities will be recorded in a project-specific field notebook, and the appropriate sample collection form will be completed. Each sample will be identified on adhesive labels attached to sample bottles, or on the inner bag of double-bagged soil samples. All labels will be completed using waterproof ink. Field notebooks used to record pertinent sampling information will include, at a minimum, the following:

- Project name;
- Date and time;
- Sample location;
- Sample number;
- Sample depth (if applicable);
- Media type;
- Field meter calibration information;
- Sampling personnel present;
- Analyses requested;
- Sample preservation;
- Field observations (soil descriptions and field parameter measurements);
- Weather observations; and
- Other relevant project-specific site or sample information.

Entries will be made in permanent ink, with corrections crossed out with a single line, dated and initialed. Field books will be signed and dated at the bottom of each page by personnel making entries on that page.

Individual samples (including QC samples) will be assigned unique sample numbers according to the following sample numbering scheme unless otherwise noted in the Associated Plan(s):

AAA[A]-YYMM-XXX

where AAA[A] is a three- or four-character code denoting the project, YYMM is a four-digit code denoting the year and month (e.g., 1007 for July 2010), and XXX is a three-digit code that is incremented sequentially for each successive sample.

3.4 ANALYTICAL METHODS REQUIREMENTS

Laboratory analysis will be conducted by Energy Laboratories' Helena, Montana branch. Energy Laboratories is certified by EPA Region 8 and the State of Montana under the Safe Drinking Water Act. Energy Laboratories' Quality Assurance Manual is included on the compact disc in Appendix C. Field parameters will be analyzed by field personnel using the procedures outlined in Appendix C=B. All laboratory analyses will be conducted in accordance with EPA-approved and/or industry standard analytical methods.

3.4.1 Total Constituents in Soils

Total concentrations of metals, metalloids, and nonmetals will be analyzed in soil samples using acid digestion followed by a suitable analytical technique (usually ICP or ICP-MS). Required parameters, analytical methods, and project-required detection limits for surface and subsurface soil samples will be specified in the Associated Plan(s). All soil samples will also be analyzed for pH unless otherwise noted in the Associated Plan(s).

3.4.2 Extraction/Adsorption Testing of Arsenic and Selenium

A number of tests may be conducted specifically for providing information to support groundwater fate and transport modeling of arsenic and selenium in groundwater at the East

Helena Facility. The types of tests conducted on selected soil samples may include the following:

- Synthetic Precipitation Leaching Procedure (SPLP) metals;
- Sequential extractions;
- Batch adsorption tests; and
- Batch leaching tests.

The SPLP samples will be prepared in accordance with EPA Method 1312. Sequential extraction, batch adsorption and batch leaching tests will involve measurement of parameter concentrations in water after equilibration of soils with leaching or extractant solutions at given solid/solution ratios. Example sequential extraction methods are given in HL-SOP-42 (Appendix B); modified extraction procedures may be utilized to target specific geochemical phases. Adsorption and leach test methods will generally follow EPA's *Batch-Type Procedures for Estimating Soil Adsorption of Chemicals* (Roy et al., 1991). Specific leaching, extraction and/or adsorption testing procedures, including solutions, solid to liquid ratios, contact times, and target analytical parameters will be specified in the Associated Plan(s).

3.4.3 Groundwater Analyses

Required parameters, analytical methods, and project-required detection limits for groundwater quality samples collected at the East Helena Facility are shown in the 2015 CAMP (Hydrometrics, 2015a). Groundwater samples may be analyzed for physical parameters, common constituents, and/or a comprehensive suite of trace constituents. The PRDLs for individual parameters have been set at concentrations normally achievable by routine analytical testing in the absence of unusual matrix interference (laboratory's practical quantitation limit). These limits will support project objectives for both risk assessment and comparison with regulatory standards. It must be recognized that the PRDL is a detection limit goal, which may not be achieved in all samples due to sample matrix interference or other

problems. If a PRDL is not met by the laboratory, the data will be reviewed to determine if any actions (e.g., sample reanalysis or selection of an alternative analytical method) are required.

3.4.4 Surface Water Analyses

Required parameters, analytical methods, and project-required detection limits for surface water quality samples collected at the East Helena Facility are shown in the 2015 CAMP (Hydrometrics, 2015a). Similar to groundwater, samples may be analyzed for physical parameters, common constituents, and/or a comprehensive suite of trace constituents. The PRDLs for individual parameters have been set at concentrations normally achievable by routine analytical testing in the absence of unusual matrix interference (laboratory's practical quantitation limit). These limits will support project objectives for both risk assessment and comparison with regulatory standards; therefore, PRDLs for a number of parameters are different in surface water compared with groundwater. It must be recognized that the PRDL is a detection limit goal, which may not be achieved in all samples due to sample matrix interference or other problems. If a PRDL is not met by the laboratory, the data will be reviewed to determine if any actions (e.g., sample reanalysis or selection of an alternative analytical method) are required.

3.5 QUALITY CONTROL REQUIREMENTS

3.5.1 Field Quality Control Sample Collection

Field quality control samples will be used to provide quality assurance for field sampling and subsequent laboratory analysis of metals concentrations. This section describes the types of field quality control samples to be collected, and the frequency at which each type of field quality control sample will be collected.

3.5.1.1 <u>Field Quality Control for Soil Samples</u>

<u>Field Duplicates</u>

Field duplicate samples are replicate samples from a single sampling location submitted to a laboratory for the same set of analyses. Duplicates will be sent to the same laboratory, but will be identified with different sample numbers. Field duplicates will be collected at a minimum frequency of one per twenty field samples (5 percent).

Control limits for soil sample duplicates will be agreement of duplicate sample results to within a relative percent difference (RPD) of 35% for when both sample concentrations (original and duplicate) are greater than five times the PRDL, and plus or minus two times the PRDL when either of the sample concentrations is less than five times the PRDL. The calculation for RPD is:

$$RPD = abs[(S-D)/(S+D)] \times 200$$

Where:

RPD = Relative Percent Difference;

abs = absolute value;

S = Original Sample Value;

D = Duplicate Sample Value.

Field Blanks (Rinsate Blanks)

Rinsate (equipment) blanks will consist of deionized water that has been used to rinse decontaminated soil sampling equipment (trowels, mixing bowls). Rinsate blanks will be collected at a frequency of one per day.

Target control limits for all types of field blanks are no contaminants present above laboratory's PQLs.

3.5.1.2 Field Quality Control for Groundwater and Surface Water Samples

Field Duplicates

Field duplicate samples for groundwater samples collected from monitoring wells and for surface water samples will be obtained at a frequency of one per twenty samples collected (1/20) or one per day, whichever is greater. Field duplicate samples for groundwater samples collected from residential or private wells will be obtained at a frequency of one per twenty samples collected over the course of the complete monitoring event (with no one per day requirement). Water duplicates will be collected by filling two samples containers consecutively from the same sampling location. Control limits for water duplicate samples will be the agreement of sample results within a RPD of 20% when both sample concentrations (original and duplicate) are greater

than five times the PRDL and plus or minus the PRDL when either of the sample concentrations is less than five times the PRDL.

Field Blanks (Rinsate and D.I. Blanks)

Rinsate blanks will consist of aqueous (deionized water) rinsate blanks collected using decontaminated sample collection equipment. D.I. blanks will consist of deionized water placed into sample containers. For groundwater samples collected from monitoring wells, both rinsate and D.I. blanks will be collected at a frequency of one per twenty water samples (1/20) or one per day, whichever is greater. For surface water samples, D.I. blanks will be collected at a frequency of one per twenty water samples (1/20) or one per day, whichever is greater. Rinsate blanks will not be collected for surface water samples, since no reusable equipment is involved in the collection of surface water samples. For groundwater samples collected from residential or private wells, D.I. and rinsate blank samples will be collected at a frequency of one per twenty samples collected over the course of the complete monitoring event (with no one per day requirement).

Target control limits for all types of field blanks are no contaminants present above laboratory's PQLs.

3.5.2 Laboratory Quality Control Samples

Laboratory quality assurance and quality control will be maintained through adherence to the laboratory's internal quality assurance protocol during analysis. Laboratory QC sample frequency and control limit guidelines are specified in the QA Manual in Appendix C.

Laboratory analysis for both water and soil matrix samples will include prescribed QC procedures and samples according to the published analytical method and internal laboratory QC procedures. For the purposes of this project, the following laboratory QC sample results will be reported (by the laboratory) and reviewed during the data validation process:

- Laboratory preparation blanks;
- Matrix spike duplicates;

- Laboratory duplicates; and
- Laboratory control standards.

Target control limits for these laboratory control samples are described in Section 5.0.

3.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

Field Instrument Maintenance

The field instruments to be used for this project will include thermometers, pH meters, dissolved oxygen meters, water level meters, and conductivity meters. Specific preventative maintenance procedures to be followed for field equipment are those recommended by the manufacturer. Field instruments will be checked and calibrated daily before use. Calibration checks will be documented on the calibration log sheets. The maintenance schedule and trouble-shooting procedures for field instruments are indicated in SOPs. Critical spare parts such as tape, pH probes, and batteries will be kept on-site to reduce downtime. Backup instruments and equipment will be available on-site or within 1-day shipment to avoid delays in the field schedule. Table 3-5 summarizes the preventative maintenance schedule for field equipment.

TABLE 3-5. PREVENTATIVE MAINTENANCE FOR FIELD INSTRUMENTS

Instruments	Maintenance Procedures/Schedule	Spare Parts In Stock
pH/Redox Meter	1. Calibrate beginning of each day, and as necessary during use. 2. Check calibration periodically throughout day. 3. Store in appropriate storage solution. 4. Replace electrodes as needed. 5. Replace batteries if necessary.	1. pH buffers 2. Batteries 3. Spare electrodes
Conductivity Meter	1. Calibrate beginning of each day, and as necessary during use. 2. Replace batteries as necessary.	1. Batteries

Dissolved Oxygen Meter	1. Calibrate daily and as necessary during use. 2. Check membranes for bubbles daily. 3. Replace membranes as specified by manufacturer. 4. Replace batteries if necessary.	1. Batteries 2. Membranes 3. Solution

Laboratory Instrument Maintenance

As part of their QA/QC Programs, routine preventative maintenance programs are conducted by the Energy Laboratories to minimize the occurrence of instrument failure and other system malfunctions. Each laboratory performs routine scheduled maintenance, or coordinates with the vendor for the repair of all instruments. All laboratory instruments are maintained in accordance with manufacturer's specifications and the requirements of the specific method employed. This maintenance is carried out on a regular, scheduled basis, and is documented in the laboratory instrument service logbook for each instrument. Emergency repair or scheduled manufacturer's maintenance is provided under a repair and maintenance contract with factory representatives.

3.7 INSTRUMENT CALIBRATION AND FREQUENCY

3.7.1 Field Instrument Calibration

The field instruments will be calibrated as described in field SOPs (provided for in this QAPP and Appendix B). Field instruments will include a pH/temperature meter, dissolved oxygen meter, and specific conductance meter. As a rule, instruments will be calibrated daily prior to use and will be checked periodically with standards to assess instrument drift.

The pH-meter will be calibrated using a 2- or 3-point calibration with reference standards (pH 4, 7, and/or 10 buffers) bracketing the expected field sample values. Conductivity meters are calibrated with a single reference solution, and dissolved oxygen meters are calibrated to the specific elevation of the sample site. All the calibration procedures performed will be documented on the field calibration form and will include the date/time of calibration, name of person performing the calibration, reference standard used, temperature at which readings were taken and the readings. Multiple readings on one sample or standard, as well as readings on replicate samples, will likewise be documented. For specific instructions on the calibration

frequency, the acceptance criteria and the conditions that will require more frequent recalibration, refer to the specific SOPs for each field analysis (Appendix B).

3.7.2 Laboratory Instrument Calibration

Appendix C details each analysis performed in the laboratory and describes the calibration procedures, their frequency, acceptance criteria and the conditions that will require recalibration.

The laboratory maintains a sample logbook for each instrument which will contain the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions run and the samples associated with these calibrations.

Calibration of laboratory equipment will be based on approved written procedures. Records of calibration, repairs, or replacement will be filed and maintained by the designated laboratory personnel performing quality control activities. These records will be filed at the location where the work is performed and will be subject to QA audit. For all instruments, the laboratory will maintain a factory-trained repair staff with in-house spare parts or will maintain service contracts with vendors.

3.8 INSPECTION / ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES

The inspection, acceptance and inventory requirements of supplies and consumables will be the responsibility of the field team leader and the QA Manager. The supplies required for this type of sampling are readily available and are easily obtained from local merchants or environmental sampling vendors. Typically, an abundance of supplies will be purchased prior to initiation of field activities. These materials, once obtained, will be inspected and inventoried. As the field activities proceed, it will be the responsibility of the field leader to keep track of the amount of supplies and consumables used. If the quantity of a particular supply or consumable is running low, then it is the responsibility of the field leader to obtain the amount needed.

3.9 DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

No formal review of existing data is proposed as part of this QAPP. The usability of existing data for to conduct the CMS will be assessed by referring to the conclusions regarding individual databases, and by a review of all data quality assessments for environmental media collected and analyzed. Given the consistency in field and laboratory methods over time for data collection activities at the East Helena Facility, including routine analysis of field and laboratory QC samples, it is anticipated that all historical data should be usable. Critical data sets (e.g., those used for risk assessment purposes) may require a separate, more rigorous evaluation.

3.10 DATA MANAGEMENT

Data records will primarily be maintained, reviewed, and updated as necessary in electronic format (databases). Verification of data at entry is performed as the first step in the validation process. Once the data are entered manually or electronically, database results are compared with laboratory hard copy results to ensure that the data results are accurate. Procedures for recording, reviewing, and archiving field and laboratory data are further detailed in the field SOPs (Appendix B), Laboratory QA manuals (Appendix C), and in the East Helena Facility Data Management Plan (DMP) (Hydrometrics, 2011).

3.10.1 Data Reduction

Field Data Reduction

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. All field measurements will be recorded in field notebooks as they are collected. If errors are made, results will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original (erroneous) entry.

Details regarding field data reduction are in Section 2.3.1 of the Facility DMP (Hydrometrics, 2011). For each individual monitoring event, field data reduction will include completion of a *Field and Laboratory Documentation Checklist for Environmental Data Collection Activities*, provided as Attachment 1 to the DMP. In accordance with this checklist, field data review and reduction will include:

- Review of calibration forms, field notebooks, and sample collection forms;
- Review of laboratory submittals (cover letters, parameter lists, and chains-of-custody (COCs);
- Review of calculated values such as surface water flow measurements;
- Tabulating field information (site and sample IDs, sample dates and times, field parameter results) in spreadsheet format;
- Scanning field notes and field forms into electronic format (e.g., Adobe Portable Document Format (pdf)) and saving scanned files to the project directory on the network;
- Providing the copies to the Data Management and Validation Coordinator via email or project ftp site upload; and
- Filing originals in a project-specific location at the Hydrometrics' Helena, Montana office.

Laboratory Data Reduction Procedures

Laboratory data reduction procedures will follow protocol described in the laboratory's QA manuals (see Appendix C). Samples will be assigned a unique laboratory sample number when they are received at the laboratory, which will then be used to cross-reference the field sample number and to track analytical results for the sample. All raw analytical data will be recorded in numerically identified laboratory notebooks. Data are recorded in these notebooks along with other pertinent information, such as the field sample identification number and the sample tag number. Other details will also be recorded in the laboratory notebooks, such as the analytical method used, name of analyst, the date of analysis, matrix sampled, reagent concentrations, instrument settings, and the raw data. Each page of these notebooks shall be signed and dated by the analyst. Periodic documented review of these notebooks by the Laboratory QA Manager takes place prior to final data reporting.

Quality control data (e.g., laboratory duplicates, matrix spikes, duplicates and standards) will be compared to the method acceptance criteria. Data considered to be acceptable will be entered into the laboratory computer system. Data summaries will be sent to the Laboratory QA Manager for review. If approved, data are logged into the project database format. Unacceptable data shall be appropriately qualified in the project report. Case narratives will be prepared which will include information concerning data exceeding acceptance limits, and any other anomalous conditions encountered during sample analysis. After the Laboratory QA Manager approves these data, they are considered ready for third party data validation.

In accordance with the *Field and Laboratory Documentation Checklist for Environmental Data Collection Activities*, provided as Attachment 1 to the DMP (Hydrometrics, 2011), laboratory reports will be cross-checked with field documentation to verify that reports have been received for all samples submitted.

3.10.2 Data Validation

Validation or data quality review is a systematic process for determining the compliance of the analytical data with the applicable method requirements and project specifications. Data will be assessed in general accordance with EPA's data verification and validation guidance procedures (EPA, 2002c). The evaluation will determine if the data are the correct type, quantity and quality to support the project objectives and the subsequent CMS for the facility. In the event that the data collected do not meet the intended uses, limitations on the use of data may be specified, or additional data may need to be collected. Additional details on the data review and validation process are outlined below in Section 5.0, and in the East Helena Facility Data Management Plan (Hydrometrics, 2011).

4.0 ASSESSMENT/OVERSIGHT

4.1 ASSESSMENT AND RESPONSE ACTIONS

4.1.1 Corrective Action

Any deviations from Associated Plan(s), or this QAPP, which are necessary in order to generate data to meet the intended data uses, are considered corrective actions. Corrective actions may include:

- Changes in sample collection methods;
- Collection of additional samples;
- Sample reanalysis; and
- Modification of analytical procedures or selection of new procedures.

The procedure for assessing and implementing corrective actions is given in HF-SOP-30, Decision Process for Field Variances and Nonconformances (Appendix B). In general, the procedure provides for (1) identification of deficiencies or nonconformances; (2) notification of project managers and suggested resolution; (3) follow-up (may include field visit or audit); and (4) formal notification and modification of Associated Plan(s) as necessary. It should be emphasized that implementation of corrective actions must be a flexible process, given wide range of potential types of variances or nonconformances that may be encountered.

Corrective actions must be approved by the project manager or QA Manager prior to implementation and must be fully documented as described in HF-SOP-30. A summary of corrective actions (if applicable) will be included in the data quality report.

Corrective actions may also involve revisions to historic data in the existing database. As discussed in Section 3.3.3 of the East Helena Facility Data Management Plan (Hydrometrics, 2011), the East Helena Facility EnviroData database includes records from nearly thirty years of environmental monitoring at the Facility, with data collected under various programs using a wide range of quality assurance procedures. As such, database users or managers may occasionally discover necessary corrections or revisions. In order to track and document these

revisions, a Change Request/Tracking form for the East Helena Facility EnviroData database has been developed, and is included as Attachment 3 of the Facility DMP. This form will be used to initiate a request for database revision, to approve a requested change, and to verify that the database was revised as requested. Any changes to the database must be approved by METG. Completed database Change Request/Tracking forms will become part of the permanent East Helena Facility data record.

4.1.2 Performance and System Audits

System Audits

System audits are qualitative evaluations of data quality systems (field procedures and equipment, laboratory procedures and facilities, data management systems, etc.) conducted for the purpose of determining compliance with the organizational and procedural requirements presented in this QAPP. For ongoing data collection, EPA oversight of Associated Plan(s) will serve as the system audit. The results of previous audits and/or studies conducted by Energy Laboratories will be provided upon request.

A key component of the system audit for the East Helena Facility data management system will be implementation of the post-validation database approval process described in Section 3.2 of the Facility DMP (Hydrometrics, 2011). After completion of the data verification and validation process for a specific monitoring event (see Section 5.0 of this QAPP), the data stored in the EnviroData database will be checked by the QA manager for completeness and correctness in accordance with the *Post-Validation Database Approval for Environmental Data Collection Activities*, provided as Attachment 2 of the DMP. As noted on post-validation approval form, this post-validation database review will include:

- Review of the data validation report for the specific monitoring event, and verification that any comments are addressed in the final data validation report;
- Spot-checking the updated EnviroData database for consistency with original field and laboratory documentation; and
- Verifying that survey information in the database (horizontal and/or vertical control) for new or updated monitoring locations is correct.

It should be noted that it would not be feasible or efficient during the post-validation review to check every field and laboratory result in the database against original field or laboratory documentation, particularly for large monitoring events (this review should be conducted during the verification/validation process). As a general guideline, a minimum of 10% of all samples collected during the monitoring event or five (5) samples total (whichever is greater) should be checked for consistency of all results between the database and the original field and laboratory documentation. These samples should be selected at random, and if any discrepancies are encountered, additional detailed investigation may be warranted. The details of the post-validation database review, including the number/percentage of samples reviewed and other pertinent information, should be recorded as appropriate on the form in Attachment 2.

Performance Audits

Performance audits are quantitative determinations of the performance of the measurement system (i.e., including errors associated with field sample handling procedures and laboratory analytical processes). Energy Laboratories routinely participates in State of Montana and Federal laboratory performance audits. Performance evaluation (PE) standards may be submitted at the discretion and request of regulatory personnel as an independent check on the overall accuracy of laboratory analysis.

4.2 REPORTS TO MANAGEMENT

Reports to management will include:

- Data validation report(s);
- Results of any field or laboratory performance audits; and
- Corrective action reports.

Data validation reports will be prepared by the Data Management and Validation Coordinator in accordance with Section 5.0 of this QAPP, and will be distributed to the Project Manager and QA manager. Typically, separate data validation reports are prepared for different sampling events and/or sample matrices. For example, review and validation of soil sample results would be reported separately from review and validation of water samples, and different water sampling

events would also be reported separately. The QA Manager will review and approve validation reports as part of the post-validation data approval process (see Section 4.1.2 above and Section 4.1 of the Facility DMP (Hydrometrics, 2011)).

Results of any performance audits conducted during field or laboratory activities will be documented by the QA Manager and distributed to the Field Team Leader and Project Manager. Results of any previous State and/or Federal laboratory audits will be available upon request for management review.

As previously stated, corrective actions must be approved by the Project Manager or QA Manager prior to implementation. All corrective actions will be documented by the QA Manager in a corrective action report, and submitted to the Project Manager. A summary of corrective actions taken will be included in the final data summary report.

A final report will be prepared after environmental data are collected and analyzed, to summarize the overall quality of the data in terms of meeting the project objectives. Each report will consist of a complete project database (with results qualified as necessary based on the validation criteria in Section 5.0), a summary of the data quality review conducted for each media type, an assessment of the overall completeness objectives for each analyte and matrix, and a summary of relevant corrective action measures that were implemented.

Monthly progress reports, required by Section XI of the Consent Decree, will include a narrative summary of sampling and testing conducted in the previous month, as well as any data packages that have been generated, validated, and reviewed in accordance with approved Associated Plan(s).

5.0 DATA VALIDATION AND USABILITY

5.1 DATA REVIEW, VALIDATION, AND VERIFICATION

Overall completeness and adherence to project objectives is assessed through validation and verification. Verification includes confirmation of adherence to sample design, collection, handling, custody, shipping, transmittal, and documentation procedures. Validation includes the confirmation of adherence to specific analytical procedure criteria and protocols, and the assessment of data quality in terms of usability. Verification and validation methods are discussed in Section 5.2.

Electronic data deliverables (EDDs) from the laboratory, will be transferred into the East Helena Facility project database by the Data Management and Validation Coordinator. All data entries will be compared to hardcopy or Adobe® portable document formatted (pdf) laboratory reports, to ensure the project database remains free of transcription errors.

The need for additional corrective action (see Section 4.1.1) may be identified during data validation or data verification. Potential types of corrective action resulting from data verification may include the collection of additional samples or a summary of deficiencies. Potential types of corrective action resulting from data that are considered unusable (as determined by data validation) may include resampling by the field team or reanalysis of samples by the laboratory. When the Data Management and Validation Coordinator identifies a potential corrective action situation, the QA Manager and Project Manager will be responsible for approving the implementation of corrective action, including any resampling, during data assessment. Corrective actions will be documented by the QA Manager.

5.2 VERIFICATION AND VALIDATION METHODS

All data deliverables containing analytical data and quality control information will be reviewed for overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in the project planning documents (including this QAPP) are present. At a minimum, deliverables will include field notes and/or forms, transmittal information, sample chain-of-custody forms, analytical results,

methods and PQLs, and laboratory QC summaries. The reviewer will determine whether all required items are present and request copies of missing deliverables.

The number and type of samples collected will be compared with project specifications to ensure conformance with the sampling process design. Review of sample collection and handling procedures will include verification of the following:

- Completeness of submittal packages;
- Completeness of field documentation, including chain-of-custody documentation;
- Field equipment calibration and maintenance and/or quality of field measurements; and
- Adherence to proper sample collection procedures.

All data will be reviewed for completeness of deliverables, and adherence to the sampling and analytical protocols prescribed in this QAPP.

Data validation will include a detailed review of all analytical results, including:

- Reporting limits (RLs) and PQLs vs. PRDLs;
- Holding times;
- Analytical methods;
- Field QC sample results; and
- Laboratory QC sample results.

Table 5-1 summarizes the inorganic sample quality control review criteria to be used for data collected at the Facility. It is important to note that the following table is only a condensed guideline and that additional criteria (as specified by EPA functional guidelines) and professional judgment must be used to determine if the data should be qualified or rejected. The criteria in the following table are consistent with EPA functional guidelines for inorganic data review (EPA, 2004).

TABLE 5-1. VALIDATION CRITERIA FOR ANALYTICAL DATA

TASK	FREQUENCY REQUIREMENT	CONTROL LIMIT	FLAGGING REQUIREMENTS
Field Blanks (Rinsate and D.I.)	1 per 20 samples or 1 per day for water samples (whichever is greater); 1 per day for soil sampling rinsate blanks	<PRDL	Flag associated sample results with UJ for values < 5 times the blank level.
Field Duplicates	1 per 20 samples or 1 per day (whichever is greater) for water samples; 1 per 20 samples for soil samples	RPD +/-20% for aqueous (+/- 35% for soil) sample values >5 times PRDL. Duplicate value within +/- PRDL (2 times PRDL for soil) for values < 5 times PRDL.	Flag associated sample results with J for values > PRDL, and UJ for values < PRDL.
Holding Time	All sample analysis	Within specified holding time for analyte (and analyses)	Professional judgment is used for flagging purposes. However, in general, flag associated sample results > PRDL that exceeded the holding time by one fold with J; and UJ for results < PRDL. Flag associated samples results that exceeded the holding time by two fold with R.
Laboratory Blanks (Prep or Method)	1 per 20 samples or 1 per digestion batch	<PRDL	Flag associated sample results with UJ for values < 5 times the blank level.
Laboratory Duplicates	1 per 20 samples or 1 per batch	RPD +/-20% for water and +/- 35% for soil sample values >5 times PRDL. Duplicate value within +/- PRDL (2 times PRDL for soil) for values < 5 times PRDL.	Flag associated sample results with J for values > PRDL, and UJ for values < PRDL.
Laboratory Control Standard (LCS)	1 per 20 samples or 1 per batch	Recovery 80% to 120% or within 95% confidence limits of the known value.	For recovery rates 50% to 79% (or < the confidence limit), flag associated sample results with J- for values > PRDL, and UJ for values < PRDL. For recovery rates > 120% (or > the confidence limit), flag associated sample results with J+ for values > PRDL. For recovery rates < 50%, flag associated sample results with J- for values > PRDL, and R (rejected) for values < PRDL.
Matrix Spikes	1 per 20 samples or 1 per batch	Recovery 75% - 125% for samples values (original sample) < 4 times the spike value added to matrix spike sample	Professional judgment is used for flagging purposes. However, in general, for recovery rates 30% to 74% (or < the confidence limit), flag associated sample results with J- for values > PRDL, and UJ for values < PRDL. For recovery rates > 125% (or > the confidence limit), flag associated sample results with J+ for values > PRDL. For recovery rates < 30%, flag associated sample results with J- for values > PRDL, and R (rejected) for values < PRDL.

Notes: Duplicate RPD calculation is described in Section 3.5.1.1. LCS and matrix spike recovery calculation are described in Section 5.3.2.

Data qualifiers will be assigned to data exceeding quality control criteria. A summary of the data qualifier codes is provided in Table 5-2.

TABLE 5-2. DATA VALIDATION CODES AND DEFINITIONS

CODE	DEFINITION
A	Anomalous data. (Not an EPA code.)
J	The associated numerical value is an estimated quantity because quality control criteria were not met. A bias was not determined.
J-	The associated numerical value is estimated with a low bias because quality control criteria were not met.
J+	The associated numerical value is estimated with a high bias because quality control criteria were not met.
UJ	The true value may be less than the reported value because quality control criteria were not met. This qualifier is usually associated with either non-detected values or detected values that are linked to blank contaminates.
R	Quality control indicates that the data are unusable (compound may or may not be present).

5.3 RECONCILIATION WITH USER REQUIREMENTS

To ensure that the data generated are of sufficient quality to support the intended data uses, the following sampling and analysis DQIs for the PARCC parameters (precision, accuracy, representativeness, completeness and comparability) are specified. Assessment of these non-direct measurements will guide the evaluation of overall data quality.

Additional information on the general usability of the data will be provided on the *Post-Validation Data Approval for Environmental Data Collection Activities* form, to be completed following validation of monitoring or sampling data from individual field events. The database approval process is discussed in detail in the East Helena Facility Data Management Plan (Hydrometrics, 2011), and is summarized in Section 4.1.2 of this QAPP.

5.3.1 Precision Objective

Precision is defined as a measure of reproducibility of replicate measurements, and is inversely related to the variability among the results obtained (e.g., highly variable results have low precision). Precision is assessed by field and laboratory duplicate (includes matrix spike and LCS duplicates) result comparisons. Field duplicates measure field and laboratory precision whereas, laboratory duplicates measure only laboratory precision.

The precision objective goal for soil sample duplicates will be agreement of duplicate sample results to within a RPD of 35% for when both sample concentrations (original and duplicate) are greater than five times the PRDL, and plus or minus two times the PRDL when either of the sample concentrations is less than five times the PRDL.

The precision objective goal for aqueous sample duplicates will be agreement of duplicate sample results to within a RPD of 20% for when both sample concentrations (original and duplicate) are greater than five times the PRDL, and one times the PRDL when either of the sample concentrations is less than five times the PRDL.

5.3.2 Accuracy Objective

Accuracy is the agreement between a measured value and a 'true' value. Accuracy is assessed by laboratory matrix spike samples and LCSs.

The accuracy objective goal for matrix spike and matrix spike duplicate samples will be a recovery of 75% to 125%. The accuracy objective goal LCSs will be a recovery of 80% to 120% or within the 95% confidence limit of the known value. If method-specific control limits for particular laboratory techniques differ from these, comparisons will be made with the method-specific control limits. Recoveries for matrix spike and LCS results will be calculated using the following formulas:

Matrix Spike Recovery

$$MS\ R\% = [(SSR-SR)/SA] \times 100$$

Where:

MS R% = Matrix spike recovery percentage;

SSR = Matrix spike sample result;

SR = Original sample result;

SA = Concentration of the spike added to the matrix spike sample.

LCS Recovery

LCS R% = (SR/Known Value) x 100

Where:

LCS R% = LCS Recovery Percentage

SR = LCS sample result

Known Value = LCS's Known Value

5.3.3 Representativeness Objective

Representativeness is the extent to which discrete measurements and testing accurately describe the environmental system. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures, as provided for in the project planning documents (including this QAPP).

5.3.4 Completeness Objective

Completeness is achieved when the number of valid measurements is sufficient to satisfactorily address project objectives. Completeness is calculated as the number of valid measurements divided by the total number of planned measurements, expressed as a percentage. The completeness goal for this project is 90%.

A valid measurement is one in which the sample was properly collected and considered representative of the material sampled, and which was not rejected during the data quality review process. Results qualified during the data quality review process as estimated will be considered

valid measurements, unless extenuating circumstances or professional judgment indicate otherwise.

5.3.5 Comparability Objective

Comparability is the degree to which two or more data sets from the same site are generated using consistent procedures. Inherent compositional differences aside, discrete data sets may differ as a result of non-random (biased) sampling, variability in sampling technique, and variations in methods of analysis. To ensure comparability of data collected, the following actions will be implemented:

1. Soil and water sampling programs are based to a large extent on previously implemented sampling programs to maximize data comparability;
2. Standard Operating Procedures (SOPs) will be employed for sampling and analytical activities, as appropriate;
3. Field personnel will be thoroughly trained in sampling techniques;
4. Data results will be reported in standard units;
5. Data qualifiers will consistent for all project data;
6. All sampling sites will be accurately delineated and recorded (HF-SOP-2); and
7. Analyses will be performed using EPA-accepted methods, as available and appropriate.

6.0 REFERENCES

Asarco, 1998. Letter from Jon Nickel, Asarco, to Susan Zazzali, USEPA. Dated May 18, 1998.

Asarco, 2000. Letter from Jon Nickel, Asarco, to Susan Zazzali, USEPA. Dated February 29, 2000.

CH2M HILL. 2014. Former ASARCO East Helena Facility Corrective Measures Study Work Plan 2013. Draft. Prepared for The Montana Environmental Trust Group, LLC, and the Montana Environmental Custodial Trust. January 2014.

EPA, 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/14-79-020. Revised March 1983.

EPA, 2007. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. SW-846, 3rd Edition. Update IVB. Revision 6. February 2007.

EPA, 2001. EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5). EPA/240/B-01/003, Office of Environmental Information, March 2001.

EPA, 2002a. Guidance for Quality Assurance Project Plans (EPA QA/G-5). EPA/240/R-02/009, Office of Environmental Information, December 2002.

EPA, 2002b. Guidance on Choosing a Sampling Design for Environmental Data Collection (EPA QA/G-5S). EPA/240/R-02/005, Office of Environmental Information, December 2002.

EPA, 2002c. Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8). EPA/240/R-02/004, Office of Environmental Information, November 2002.

EPA, 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review -- Final. EPA-540/R-04-004, October 2004.

EPA, 2006a. Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4). EPA/240/B-06/001, Office of Environmental Information, February 2006.

EPA, 2006b. Data Quality Assessment: Statistical methods for Practitioners EPA QA/G-9S). EPA/240/B-06/003, Office of Environmental Information, February 2006.

EPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530-R-09-007, Office of Resource Conservation and Recovery, Program Implementation and Information Division. March 2009.

Exponent, 2009a. Draft Baseline Ecological Risk Assessment Work Plan and Field Sampling and Analysis Plan.

Exponent, 2009b. Draft Human Health Risk Assessment Work Plan.

GSI Water Solutions, Inc., 2014. Phase II RCRA Facility Investigation, East Helena Facility. April 2014.

Helsel and Hirsch, 2002. Statistical Methods in Water Resources. Techniques of Water-Resources Investigations of the United States Geological Survey. Book 4 (Hydrologic Analysis and Interpretation), Chapter A3. September 2002.

Hydrometrics, 1999a. Current Conditions/Release Assessment, East Helena Facility. Prepared for ASARCO, Inc. Revised January 1999.

Hydrometrics, 1999b. Interim Measures Work Plan, East Helena Facility. Prepared for ASARCO, Inc. Revised July 1999.

Hydrometrics, 2000. RCRA Facility Investigation Quality Assurance Project Plan – East Helena Facility. Volume III – RCRA Facility Investigation Work Plan. Prepared for ASARCO, Inc. December 2000.

Hydrometrics, 2007. Design Analysis Report – Asarco East Helena Corrective Action Management Unit (CAMU) Sampling and Monitoring Plan. Appendix D to the Design Analysis Report for the Phase 2 CAMU Cell. Prepared for ASARCO, Inc. May 2007.

Hydrometrics, 2009. Health & Safety Plan for the Long-Term Groundwater and Surface Water Monitoring Program at the Asarco East Helena Plant. March 2009.

Hydrometrics, 2010a. 2010 Post-RI/FS Groundwater and Surface Water Field Sampling and Analysis Plan.

Hydrometrics, 2010b. Phase II RCRA Facility Investigation (RFI) Site Characterization Work Plan and Field Sampling Plan.

Hydrometrics, 2010c. Phase II RCRA Facility Investigation (RFI) Field Sampling and Analysis Plan.

Hydrometrics, 2011. Data Management Plan for Environmental Data Collection Activities. Revised August 2011.

METG, 2015a. *Groundwater and Surface Water Corrective Action Monitoring Plan for the East Helena Facility – East Helena, Montana.* Revised March 2015.

METG, 2015b. *Master Health and Safety Plan for the East Helena Facility – East Helena, Montana.* Prepared December 2012 and Revised February 2015.

MDEQ, 2010. MPDES Permit No. MT0030147 – Statement of Basis. Montana Department of Environmental Quality Permitting and Compliance Division. March-April 2010.

Roy, W.R., I.G. Drapac, S.F.J. Chou, and R.A. Griffin. 1991. Batch-type Procedures for Estimating Soil Adsorption of Chemicals. EPA/530-SW-87-006-F, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. District Court, 1998. District of Montana – RCRA Comment Decree, East Helena Plant. United States of America, Plaintiff, v. Asarco Incorporated, Defendant, Civil Action No. CF 98-3-H-CCL.

USGS, 1977. National Handbook of Methods of Water – Data Acquisition. Chapter 1 – Surface Water.

APPENDIX A

CROSSWALK TABLE -- EPA REQUIREMENTS FOR QUALITY ASSURANCE PROJECT PLANS (QA/R-5) AND EAST HELENA FACILITY QAPP FOR ENVIRONMENTAL DATA COLLECTION ACTIVITIES

CROSSWALK TABLE

QA/R-5 Elements	East Helena Facility QAPP Location
Group A: Project Management Elements	
A1 Title and Approval Sheet	Page ii
A2 Table of Contents	Page iv
A3 Distribution List	Page iii
A4 Project/Task Organization	See Associated Plan(s)
A5 Problem Definition/Background	See Associated Plan(s)
A6 Project/Task Description	See Associated Plan(s)
A7 Quality Objectives and Criteria	See Associated Plan(s)
A8 Special Training/Certification	Section 2.5
A9 Documents and Records	Section 2.6
Group B: Data Generation and Acquisition Elements	
B1 Sampling Process Design	See Associated Plan(s)
B2 Sampling Methods	Section 3.2; Appendix B
B3 Sample Handling and Custody	Section 3.3; Table 3-5; Appendix B
B4 Analytical Methods Requirements	Section 3.4; Appendix C; Tables 3-6 through 3-8
B5 Quality Control Requirements	Section 3.5; Appendix C
B6 Instrument/Equipment Testing, Inspection, and Maintenance	Section 3.6; Appendix B; Appendix C
B7 Instrument/Equipment Calibration and Frequency	Section 3.7; Appendix B; Appendix C
B8 Inspection/Acceptance of Supplies and Consumables	Section 3.8
B9 Non-direct Measurements	Section 3.9
B10 Data Management	Section 3.10
Group C: Assessment and Oversight Elements	
C1 Assessments and Response Actions	Section 4.1; Appendix B
C2 Reports to Management	Section 4.2
Group D: Data Validation and Usability Elements	
D1 Data Review, Verification, and Validation	Section 5.1
D2 Verification and Validation Methods	Section 5.2; Tables 5-1 and 5-2
D3 Reconciliation with User Requirements	Section 5.3

APPENDIX B

HYDROMETRICS' STANDARD OPERATING PROCEDURES (SOPs)

SOP #	Title
HF-SOP-3	Preservation and Storage of Inorganic Water Samples
HF-SOP-9	Logging Of Monitoring Wells Geological Conditions, Construction and Development
HF-SOP-10	Water Level Measurement with an Electric Probe
HF-SOP-11	Sampling Monitoring Wells for Inorganic Parameters
HF-SOP-19	Obtaining Water Quality Samples from Streams
HF-SOP-20	Field Measurement of pH using a pH Meter
HF-SOP-22	Field Measurement of Dissolved Oxygen
HF-SOP-30	Decision Process for Field Variances and Nonconformances
HF-SOP-37	Streamflow Measurement Using a Marsh-McBirney Water Current Meter
HF-SOP-44	Flow Measurements Using a Portable 90° V-Notch Cutthroat Flume
HF-SOP-46	Streamflow Measurement Using a Portable 3-inch Parshall Flume (Montana Flume)
HF-SOP-73	Filtration of Water Samples
HF-SOP-79	Field Measurement of Specific Conductivity
HF-SOP-84	Field Measurement of Temperature
HL-SOP-42	Sequential Extraction of Metals from Soils
HSOP-2	Determination, Identification, and Description of Field Sampling Sites
HSOP-4	Chain-of-Custody Procedures, Packing and Shipping Samples
HSOP-7	Decontamination of Sampling Equipment
HSOP-13	Equipment Rinsate Blank Collection
HSOP-29	Labeling and Documentation of Samples
HSOP-31	Field Notebooks
HS-SOP-6	Procedure for Collecting Surface Soil Samples
HS-SOP-57	Soil Sampling Procedure for Test Pits
HS-SOP-72	Split Spoon Sampling

TABLE B-1. STANDARD OPERATING PROCEDURES
FOR ENVIRONMENTAL DATA COLLECTION ACTIVITIES
EAST HELENA FACILITY

GENERAL SAMPLING PROCEDURES

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-3	Preservation and Storage of Inorganic Water Samples	X
HF-SOP-30	Decision Process for Field Variances and Nonconformances	X
HF-SOP-32	Preservation and Storage of Organic Water Samples	
HF-SOP-58	Management and Validation of Field and Laboratory Data	
HF-SOP-66	Collection, Preservation, and Storage of Water Samples Using USGS Clean Analytical Techniques	
HF-SOP-67	Decontamination of Sampling Equipment Using USGS Clean Analytical Techniques	
HF-SOP-73	Filtration of Water Samples	X
HSOP-2	Determination, Identification, and Description of Field Sampling Sites	X
HSOP-4	Chain-of-Custody Procedures, Packing and Shipping Samples	X
HSOP-7	Decontamination of Sampling Equipment	X
HSOP-13	Equipment Rinsate Blank Collection	X
HSOP-29	Labeling and Documentation of Samples	X
HSOP-31	Field Notebooks	X

GROUNDWATER SAMPLING PROCEDURES

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-6	Obtaining Groundwater Samples With a Bladder Pump	
HF-SOP-10	Water Level Measurement With An Electric Probe	X
HF-SOP-11	Sampling Monitoring Wells For Inorganic Parameters	X
HF-SOP-18	Measurement of Light Non-Aqueous Phase Liquids (LNAPL) Using an Oil/Water Interface Probe	
HF-SOP-38	Sampling Monitoring Wells For Organic Parameters	
HF-SOP-71	Fluid Sampling With Peristaltic Pump	
HF-SOP-102	Sampling of Municipal Wells	
HF-SOP-105	Low Flow Sampling of Monitoring Wells for Inorganic Parameters	

SURFACE WATER SAMPLING PROCEDURES

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-12	Sampling Suspended Sediment	
HF-SOP-19	Obtaining Water Quality Samples From Streams	X
HF-SOP-59	Single Stage Sediment Samples	
HM-SOP-62	Use of the USGS Churn Splitter	

SEDIMENT SAMPLING PROCEDURES

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-13	Sampling Stream Bottom Sediment With a Piston Core Sampler	
HF-SOP-52	Measuring Bedload	
HF-SOP-69	Sampling Lake Bottom Sediment	

SOIL SAMPLING PROCEDURES

SOP #	TITLE	EAST HELENA QAPP
HSOP-33	Soil Sample Collection Using a Hand Auger	
HS-SOP-6	Procedure For Collecting Surface Soil Samples	X
HS-SOP-10	Procedure for Collecting Soil Samples for VPH Analysis Using the En Core© Soil Sampler	
HS-SOP-12	Procedure for Sampling Sod	
HS-SOP-14	Replacement Soil Sampling	
HS-SOP-18	Use of Pressure-Vacuum Lysimeter to Sample Soil Moisture	
HS-SOP-34	Procedure for Collecting Direct-Push Soil Samples	
HS-SOP-36	Organic Vapor Analyzer Operating Procedure	
HS-SOP-39	Soil Moisture Measurement With a Soil Probe	
HS-SOP-45	Headspace Gas Analytical Screening Procedure for Soils	
HS-SOP-48	Nuclear Density Gauges	
HS-SOP-57	Soil Sampling Procedure For Test Pits	X
HS-SOP-58	Double Ring Infiltration Test	
HS-SOP-63	Replacement Stockpile Sampling	
HS-SOP-65	Installation of Soil Moisture Tubes For Use With The Neutron Hydro-Probe	
HS-SOP-72	Split Spoon Sampling	X
HS-SOP-86	Replacement Soil/Compost Stockpile Sampling	

FIELD PARAMETER TESTING

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-20	Field Measurement of pH Using a pH Meter	X
HF-SOP-22	Field Measurement of Dissolved Oxygen	X
HF-SOP-23	Field Measurement of Redox Potential (Eh)	
HF-SOP-42	Field Measurement of pH Using Beckman Model pHI Series pH Meter	
HF-SOP-48	Measurement of Water Quality Parameters Using a Horiba U-10 Water Quality Checker	
HF-SOP-49	Use of a Flow Cell For Collecting Field Parameters	
HF-SOP-53	Field or Laboratory Measurement of Turbidity	
HF-SOP-79	Field Measurement of Specific Conductivity	X
HF-SOP-84	Field Measurement of Temperature	X
HF-SOP-87	Field Measurement of Iron (II) and Iron (III) in Water Samples	
HL-SOP-41	Determination of Iron (II) and Iron (III) in Groundwater Samples	

STAGE AND FLOW MEASUREMENT

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-14	Maintenance and Operation of Stevens Type F Recorders	
HF-SOP-15	Measurement of Stream or Pond Stage	
HF-SOP-16	Streamflow Measurement Using a Price Type AA or Pygmy Current Meter	
HF-SOP-17	Streamflow Measurement Using a Parshall Flume	
HF-SOP-24	Streamflow Measurement Using Crest-Stage Gage	
HF-SOP-25	Streamflow Measurement Using a Weir	
HF-SOP-26	Streamflow Measurement Using a Flume	
HF-SOP-27	Flow Estimation Method for Springs and Culverts	
HF-SOP-37	Streamflow Measurement Using a Marsh-McBirney Water Current Meter	X
HF-SOP-44	Flow Measurements Using a Portable 90° V-Notch Cutthroat Flume	X
HF-SOP-46	Streamflow Measurement Using a Portable 3-Inch Parshall Flume (Montana Flume)	X
HF-SOP-50	Synoptic Runs on Streams	
HF-SOP-80	Water Level Monitoring With The Stevens Multilogger 9200	
HF-SOP-81	Operation of The Stevens Type A/F Multilogger	

AQUIFER TESTING

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-8	Aquifer Testing - Pump Method	
HF-SOP-9	Logging of Monitoring Well Geological Conditions, Construction and Development	X
HF-SOP-99	Operation of Pneumatic Slug Tester	
HF-SOP-100	Aquifer Test Methods - Slug Technique	
HF-SOP-101	Aquifer Test Methods - Bailer Technique	
HF-SOP-103	Water Level Monitoring with the In-Situ Hermit © 1000 Data Logger	
HF-SOP-104	Water Level Monitoring with the In-Situ Troll © SP4000-232 Data Logger	

WATER ANALYSIS

SOP #	TITLE	EAST HELENA QAPP
HL-SOP-2	Laboratory Measurement of pH	
HL-SOP-18	Hydrometer Analysis	
HL-SOP-42	Sequential Extraction of Metals from Soils	X

SOIL ANALYSIS

SOP #	TITLE	EAST HELENA QAPP
HL-SOP-19	Sieve Analysis	
HL-SOP-20	Preparing a Saturated Soil Paste	
HL-SOP-21	Preparing a Saturation Extract	
HL-SOP-23	pH Reading of Saturated Soil Paste	
HL-SOP-24	Determination of Percent Organic Carbon In Soil	
HL-SOP-26	Determination of Soil Water Holding Capacity	
HL-SOP-35	Laboratory Analysis of Demolition Debris for Arsenic, Cadmium and Lead	
HL-SOP-53	Spectrace 5000 EDXRF Routine Soil Analysis	
HS-SOP-27	Determination of Soil Saturation Percentage	
HS-SOP-52	Pre-Analytical Soil Handling and Preparation	
HS-SOP-83	Pre-Analytical Soil Handling and Preparation for Silt	

MISCELLANEOUS PROCEDURES

SOP #	TITLE	EAST HELENA QAPP
HF-SOP-86	House Dust Sampling Using a High Volume Vacuum	
HM-SOP-10	Plant Matter Sample Collection	
HM-SOP-30	Wet Wipe Sample Collection	
HM-SOP-31	Scraping Sample Collection From Demolition Debris	
HM-SOP-32	Drill Core Sample Collection	
HM-SOP-37	Chip Sample Collection	
HM-SOP-55	Operation of a Class A Evaporation Station	

PUT HSOPs ON A CD INSTEAD OF COPYING

APPENDIX C

ENERGY LABORATORIES' QUALITY ASSURANCE MANUAL

ENERGY LABORATORIES-HELENA, MT
QUALITY ASSURANCE MANUAL

Revision May 5, 2015

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Laboratory Manager

_____
Quality Assurance Officer:

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ELI COMMITMENT

Energy Laboratories, Inc. Strives Toward:

1. Being highly skilled in the field of analytical chemistry.
2. Delivering quality and service with integrity.
3. Encouraging the professional development of our staff.
4. Offering our employees a safe and positive work environment.
5. Being profitable and using resources wisely for a sustainable future.

INTRODUCTION

Energy Laboratories, Inc. provides chemical, industrial hygiene, and environmental analytical services to private industry, agricultural industry, engineering consultants, government agencies, and private individuals. Analytical services include: analysis of waters and soils for inorganic and organic constituents, aquatic toxicity testing, hazardous waste analysis, radiochemistry, industrial hygiene, microbiology, soils and water physical parameters, and petroleum analysis.

Founded in 1952, Energy Laboratories currently incorporates five separate testing laboratories. The corporate headquarters are located in Billings, MT, with branch laboratories located in Casper, WY; Gillette, WY; College Station, TX; and Helena, MT.

ELI, as a coordinated company of five participating branches, has developed a QA program that takes into account the various method types and EPA programs, while also considering sample matrices, to develop a single comprehensive set of QA guidance. We have used scientific approaches, Good Laboratory Practices, EPA Methods and Guidance documents, and accreditation audit guidance to develop our overall QA Program.

The Quality Assurance Program establishes acceptable performance criteria for all routine analytical procedures being performed by laboratory personnel. The Quality Assurance Assessment Program provides a formal system for evaluating the quality of data being generated and reported. The ELI Laboratory Safety Manual & Chemical Hygiene Plan defines the safety and monitoring procedures used by laboratory personnel in laboratory operations. These, in addition to the experience and expertise of our analysts, provide a comprehensive Quality Assurance Program. Energy Laboratories, Inc., in Helena, Montana, is certified under the Safe Drinking Water Act by Region VIII EPA for Wyoming, and the States of Montana. Individual State approval for RCRA and CWA (NPDES) is managed through the Federal/State DMRQA program or through reciprocal certifications when required by a specific state. ELI obtains these certifications through reciprocal recognition of ELI's primary Montana State. Branch laboratories of ELI are certified in their own state and in additional states. Copies of ELI's certificates for all laboratories are maintained on ELI's website: www.energylab.com.

The ELI Quality Assurance Manual, the ELI Qualifications Manual, and the ELI Technical Services and Fee Schedule together are used to outline the ELI Quality Assurance/Quality Control Program. This Quality Assurance Manual is appropriate to all departments of Energy Laboratories-Helena. The procedures discussed or referenced in this manual describe our day-to-day laboratory practices and adhere to USEPA Safe Drinking Water Act, and TNI (The NELAC Institute) requirements as well as Good Laboratory Practices (GLPs). Information on the ELI-Helena and all other ELI branch labs applicable accreditations and certifications are maintained on the ELI website

at www.energylab.com.The State of Montana accreditation for the ELI Helena laboratory can be found in Appendix A of this plan. Where possible, ELI uses EPA, AOAC, ASTM, APHA, NIOSH, OSHA, or published analytical methods and follows the procedures with strict adherence to described protocol and recommended QA/QC parameters. The analytical methods approved and in use are described in Standard Operating Procedures, and are available for review at the laboratory. Vital parts of our Quality Assurance Program, Quality Control and Quality Assessment programs are outlined in Chapters One and Two of this manual.

To generate data that will meet project-specific requirements, it is necessary to define the type of decisions that will be made and identify the intended use of the data. Data Quality Objectives (DQOs) are an integrated set of specifications that define data quality requirements and the intended use of the data. Project-specific DQOs will be established as needed for both field and lab operations. Through the DQO process, appropriate reporting limits, extraction/digestion methods, clean-up methods, analytical methods, target analytes, method quality control samples, sample security requirements, quality control acceptance ranges, corrective action procedures, reporting formats and reporting limits can be specified. Professional laboratory project managers are available to assist clients in specifying appropriate laboratory analyses and reporting procedures necessary to meet project requirements.

Client-specific DQOs can be coordinated with the laboratory through our Project Managers via quotations or contracts, or with relevant documentation provided to the laboratory prior to (or at time of) sample receipt. Client-specific requirements are communicated to analysts and final report validators through the laboratory LIMS system. By default, our methods, analytes, and QC parameters are set up to meet the DQOs specified in the referenced method and/or federal/state regulations. ELI encourages clients to provide ELI documentation of any client-specific, regulatory or project monitoring requirements.

Certain types of requests may not be suitable to standardized analytical methods. These custom requests are handled individually with laboratory management and staff scientists. Project-specific methods and reporting packages are available. Attention to documentation of the analytical procedure and use of suitable QC parameters is maintained according to good scientific discipline and Good Laboratory Practice guidelines.

The ELI-Helena laboratory manager, or their designee, will evaluate all new contracts to determine that the laboratory is capable of performing the requested work. This process includes ensuring that the laboratory maintains the required accreditation, equipment and resources. In the event that sample analysis is not performed at our Helena location, clients are notified on the laboratory analytical report if the work is subcontracted to a qualified branch laboratory or an outside laboratory (See Subcontracting Policy – Chapter 6 in this QA Manual.).

This Quality Manual and related quality documentation meet requirements of the National Environmental Laboratory Accreditation Program (NELAP), which is an EPA approved accreditation program.

CHAPTER 1 – QUALITY CONTROL PROGRAM

Quality Policy Statement

Energy Laboratories, Inc. is committed to producing laboratory data of known and documented quality that is scientifically valid, meets method specifications, satisfies regulatory requirements, and accomplishes the data quality objectives of the client and project. Management ensures that the laboratory maintains current certifications and is in compliance with accreditations through USEPA, State Agencies, and NELAP. Those method, regulatory, and client requirements (as well as the policies, procedures, and all referenced documents) are incorporated into our Quality Assurance Program; which is outlined within this Quality Assurance Manual. Our Quality Systems are designed to comply with the standards as defined by the most current version of the NELAC accreditation standard and ISO 17025 standards. To ensure compliance with these standards, all laboratory personnel are required to be familiar with quality documentation and implement those policies and procedures in their work. ELI is dedicated to the continual improvement of the management system's effectiveness by providing appropriate corporate resources to set objectives, offering training opportunities, and monitoring the quality performance of our staff. ELI also provides facilities and equipment adequate and appropriate to these objectives.

Quality Assurance Program

The purpose of the Quality Assurance Program is to ensure that the analytical services provided by Energy Laboratories are of high quality, data is within established accuracy and precision limits (required by the referenced method or Standard Operating Procedure), and each analytical result produced meets or exceeds our accreditation requirements. Management ensures that the integrity of the management system is maintained. The Technical Director, or their designee, ensures that changes to the management system are planned, implemented and documented.

Management establishes and maintains data integrity by providing the following to ELI's data integrity system:

1) Data Integrity Training (Including the highest standards of ethical behavior)
2) Periodic review of data integrity procedural documentation
3) Annual review of data integrity procedures with updates as needed
4) Periodic, in-depth monitoring of data integrity
5) Maintenance of signed data integrity documentation for all laboratory employees

All employees are expected to implement and follow the policies contained within the Quality Assurance Program. Internal documents (controlled and associated with the Quality Assurance Program) are listed in Appendix B.

The quality systems in the program consist of the policies and procedures, and all referenced documents, described in this Quality Assurance Manual. The Quality Control Program also functions to maintain the laboratory's compliance with accreditations through USEPA, State Agencies, and NELAP.

The Quality Control Program requires that the following points be met for each applicable analytical method:

- Performance of any analytical method requires that the proper equipment and instrumentation are available. A list of major equipment is listed in Appendix F. The procedure for operation of an analytical instrument is described in the equipment manufacturer's operating manual, and may also be supplemented with a specific Standard Operating Procedure (SOP) for the instrument and/or the method.

- Specific SOPs cover operation of the instrument including the sequence of operations involved in instrument start-up, calibrating, analyzing, and shutting down. Chapter Thirteen of this manual includes recommended preventative maintenance, and/or a list of parameters used to identify other types of maintenance. SOPs outline any special safety precautions for operation of the instrument.

- SOPs of well-detailed EPA, ASTM, NIOSH, APHA, OSHA, or published procedures include, as appropriate, a list of any method-specific items or variances, a list of QC parameters and their recommended method performance ranges, recommended or example analytical sequences, specific or unique safety information, method references, and a signed signature page. SOPs details, and format of method SOPs, follow NELAP requirements. Detailed SOPs may be prepared for those procedures that do not have published methods. Further details of SOP format and information required in method SOPs can be found in the ELI SOP, *Preparation, Numbering, Use, and Revision of Standard Operating Procedures.* Written Standard Operating Procedures referenced within this manual are available at the laboratory for review. (ELI SOPs are considered confidential proprietary information and ELI does not allow copies to be removed).

- For radiochemical analysis performed at ELI's branch labs, each method undergoes Method Validation as outlined in EPA's specific method and/or the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP), Chapter 6.

- The required detection level (RDL) for radiochemical analysis of drinking water samples is calculated based on the requirements in 40 CFR 141.25(c), which is a sample specific determination. The equation is specific for each method and noted in the method-specific SOP.

- The initial test method evaluation for chemical analysis involves Method Detection Limit (MDL) studies, (refer to ELI SOP, *Determination of Method Detection Limits (MDL) and Quantitation Limits*), confirmation of the Limit of Detection (LOD) and/or Practical Quantitation Limit (PQL), also known as the Limit of Quantitation (LOQ), an evaluation of method performance (using four or more replicates of quality control samples), evaluation of the selectivity of the method, and any additional method-specific requirements

- ELI demonstrates that laboratory staff is qualified and capable of performing the method. Analysts are assigned duties based on their skills and experience. Training records are maintained for all analysts. Curricula vitae of supervisory and senior analysts are described in Appendix E and the ELI Qualifications Manual.

- It is the responsibility of the analyst to become thoroughly familiar with the methodology and instrument operation before performing the analysis. It is the responsibility of the person providing training to monitor all laboratory results generated for a reasonable time. The amount of time necessary may vary depending on the method and the experience of the analyst. At a minimum, the analyst's performance is to be monitored until the analyst

demonstrates the ability to generate results of acceptable accuracy and precision according to the method.

- All analysts are required to demonstrate and maintain a record of proof of competency by routinely analyzing quality control samples appropriate to the analytical procedures they perform. Competency in analyzing these control samples is documented in analysts' training files per NELAP requirements (for more information, see ELI SOP, *Personnel Training and Training Records*). For those analyses where external proficiency testing (PT) samples are not routinely analyzed, competency is documented by including the results of routine analysis of method-specific quality control samples (prepared by laboratory staff) and/or a verifying statement of procedural review by a supervisor or trained analyst.

- Each analytical method is subjected to quality control monitoring. The purpose is to demonstrate that results generated meet acceptable accuracy and precision criteria for the method. Precision and bias are determined for standard and non-standard methods. Precision and bias are determined for standard methods through control charting of data from quality control samples. Precision and bias using non-standard, modified standard or laboratory-developed methods are compared to the criteria established by the client (when requested), the method, or the laboratory.

- Quality control requirements are outlined in the methods and ELI, at a minimum, follows the guidelines specified in the methods used. Additional QC requirements are also added as appropriate. Statistical method performance is periodically evaluated against method requirements using control charts.

- Quality control monitoring to measure accuracy for each method generally requires that five to ten percent of all samples analyzed be fortified (spiked) with a known concentration of target analytes tested by the method. The percent recovery is then calculated. This provides a means for monitoring method accuracy and evaluating sample matrix effects. Where appropriate, surrogates are included in the method to monitor method performance on each individual sample. Blank spike samples replace matrix spike samples for certain methods, or when there is insufficient sample for a matrix spike analysis. Historical, routine batch QC sample performance can be used to estimate the precision and accuracy of the method.

- Quality control monitoring to measure precision for each method requires replicate samples be prepared and analyzed when appropriate. Actual requirements are outlined in the specific SOP. When replicate samples or matrix spike duplicates are analyzed, relative percent difference is calculated and used to monitor precision of the method. In instances where there are no specific method requirements, it is the policy of this laboratory to analyze five to ten percent of all samples in duplicate. Duplicate test results must be within the control limits established for each analysis type or data is qualified. Acceptance limits generally follow specifications listed in the method. Matrix spike duplicates replace sample duplicates for most methods.

- When not defined in the method, and as appropriate, method blanks and/or instrument blanks are analyzed one in every 20 samples at a minimum. Method blanks are used to verify that contamination from laboratory reagents and glassware is not present in the analytical sample process. Generally, the method blank should be less than the reporting

limit, or 10 times less than the concentration amount in the sample, for the analytical parameter being tested, whichever is greater.

- When not defined in the method, and as appropriate, method spikes (blank spikes) are analyzed one in every 20 samples, at a minimum.

- Calibration standards are analyzed and calibration curves are developed for all applicable methods. For additional information on instrument calibration, see Chapter Seven of this QA manual.

- The initial calibration is continuously monitored by analyzing a continuing calibration standard every 10 to 20 samples, or within a specified time frequency, and at the end of each analytical sequence; depending on the method and instrumentation. Results must be within an established range as described by the method SOP. Initial calibrations are verified against a standard from a second source.

- Proficiency testing samples and further quality control check samples may be required for various methods. Refer to Chapter Two of this QA manual for further details.

Estimation of Uncertainty

The estimation of uncertainty consists of the sum of the uncertainties of the individual steps or processes of an analytical procedure. The variability of the sampling plan, sample heterogeneity, extraction procedure, instrument calibration, instrument drift, systematic bias, and many other factors all contribute to the uncertainty of a measurement or result.

ELI estimates uncertainty utilizing Confidence Intervals defined as ±2σ (95%) and ±3σ (99%) where σ is the standard deviation of the recovery of quality control samples. The confidence intervals calculated from these QC samples are based on the spike level concentrations for each method. Uncertainty at low concentrations may be one to three times the quantitation limit. Real world samples, depending on matrix interferences, may have a greater amount of uncertainty associated. Due to limitations in assessing the uncertainty for each matrix type, the confidence intervals calculated from method QC samples provides an estimate of uncertainty.

Energy Laboratories, Inc. uses the procedures outlined in ELI SOP, *Control Chart Generation and Maintenance*, for the purpose of evaluating estimation of uncertainty for chemical analyses and uses the determination of uncertainty on a sample-specific basis for all radiochemistry measurements. These estimates of uncertainty have formulas documented in the individual SOP.

Maintenance of Performance Records

All quality control monitoring is recorded and documented. Quality control data is recorded in laboratory notebooks, electronic summary files, and/or analysis sheets. Generally, review of QC data and trends is managed within the Laboratory LIMS system. QC data management and control chart generation, maintenance, and usage are described in ELI SOP, *Control Chart Generation and Maintenance*. It is the responsibility of the analyst to see that all results are recorded in a timely manner.

All quality control data is filed and available for inspection and assessment by analysts, supervisors, management, and quality control personnel.

Method Quality Control Specifications

Summaries of Quality Assurance/Quality Control specifications for a selected subset of procedures offered by ELI are outlined in Appendix C. These types of tables are available upon request for our clients to use in the preparation of Quality Assurance Project Plans (QAPPs). Exact details of method QC can be found in the applicable method SOPs.

CHAPTER 2 – QUALITY ASSESSMENT PROGRAM

The function of the Quality Assessment Program is to provide formal evaluation of the quality of data being generated and reported by the laboratory. External and internal quality control measures are used in this assessment. These measures include proficiency testing samples, laboratory quality control check samples, and routine internal and external audits on methodology and documentation procedures.

Proficiency Testing (PT) Samples

PT samples are supplied by an outside entity and contain known amounts of constituents. The laboratory does not have access to known values of the samples. Only the PT provider has knowledge of constituent levels prior to the formal publishing of the test results.

PT samples are received on a routine basis, with results sent to the providing entity for evaluation. Proficiency Testing (PT) samples for USEPA and various State certifications are Water Pollution Study samples (WP or DMRQA), Water Supply Study samples (WS), and LPTP Soil PT samples provided by either Resource Technology Corporation (RTC) and/or Environmental Resource Associates (ERA); both being NELAP approved PT providers. Routine participation in LPTP, WS and WP PT sample studies is used to maintain certifications for Safe Drinking Water Act (SDWA), Clean Water Act (CWA), National Pollutant Discharge Elimination System (NPDES), Discharge Monitoring Report Quality Assurance (DMRQA), permit monitoring analyses, Resource Conservation and Recovery Act (RCRA) analyses, as well as other states and projects requiring method accredited parameter analyses. The samples are analyzed in the same manner as any routine sample in the laboratory. Acceptable results are those that fall within a defined range as determined by the vendor/EPA/ NELAP; based on multi-laboratory study results. The provider sends results to USEPA and other certifying agencies as requested by ELI-Helena. PT study results are posted on the ELI website www.energylab.com.

A copy of the certificate for our primary certification to perform drinking water analyses issued by the State of Montana is included in Appendix A. The Montana certification includes a list of parameters/methods for which drinking water certification has been granted. ELI also participates in the Federal/State DMRQA programs for clients which require/request this with their NPDES permits. Reciprocal accreditation in other states is based on either of these, or both, depending on specific state certification requirements/parameters. A list of current certifications is maintained on the ELI website at www.energylab.com.

Blind Quality Control Check Samples are samples submitted as regular lab samples and are processed through the system in the same manner as any other sample. The analysts do not know the true values of these samples when performing the analyses. Method performance reports are returned to the analysts. Clients occasionally submit these types of samples for their QAPP.

Inter-Laboratory comparison samples are samples containing known/unknown quantities of analytes that are split and analyzed by more than one laboratory.

Quality Control Check Samples

Quality Control Check Samples are performance evaluation samples used for routine method performance monitoring. As appropriate, analytical procedures include the analysis of a quality

control sample with every sample batch analyzed. The materials are obtained from a commercial source when available, or they may be prepared in-house. Acceptable results are within a defined range based on certified ranges, or against statistically determined control limits, method-defined criteria or client defined Data Quality Objectives. Routinely used methods not subjected to PT sample monitoring are evaluated with Quality Control Check Samples, as appropriate.

QC samples are processed through the system in the same manner as any other sample, except the analyst is aware of the source, concentration, and acceptance ranges of target analytes and calculates analyte recoveries to evaluate method performance in real time.

Quality Assurance Audits

Quality Assurance Audits consist of internal and external laboratory inspections designed to monitor adherence to Quality Systems and quality control requirements. These audits check general laboratory operations, overall Quality Systems, adherence to QA program requirements, sample tracking procedures, sample holding times, storage requirements, adherence to procedures during analysis, calculations, completion of required quality control samples within the group surrounding the sample, and proper record-keeping.

Internal quality control audits are conducted or coordinated by the Quality Assurance Officer of the laboratory. See ELI SOP, *Internal Quality Assurance Audits*, for further information. ELI conducts internal inspections on a regular basis to monitor adherence to quality control requirements. Results of formal audits are given to management with possible recommendations for corrective action in the event any discrepancies are found. As necessary, a follow-up review is conducted to determine that identified problems have been addressed. Annually, the overall quality systems of the laboratory are reviewed and a summary report is prepared.

Per NELAP/ISO 17025-2005 requirements, the management of the laboratory will conduct an annual review of the Quality System, including policies, procedures and environmental testing activities. This is done to ensure the continuing suitability and effectiveness of the QA systems, as well as provide the opportunity to introduce necessary changes or improvements. The review shall take into account, at a minimum, the following:

- The suitability of policies and procedures
- Reports from managerial and supervisory personnel
- The outcome of recent internal audits
- Corrective and preventative actions
- Assessments by external bodies
- The results of inter-laboratory comparisons or proficiency tests
- Changes in the volume and type of work
- Client feedback
- Complaints
- Recommendations for improvement
- Other relevant factors, such as quality control activities, resources and staff training

The findings from management reviews and the corrective actions that arise from these findings shall be recorded. The management shall ensure that any corrective actions are carried out within an appropriate, pre-determined time frame.

ELI also conducts Peer Audits as part of an internal auditing program established within the company. This process utilizes analysts and supervisors from other branch laboratories to evaluate a designated ELI branch. The Peer Audits serve to not only address conformance issues, but also provide ELI with a tool to continuously improve process and consistency throughout the company. The goals of the Peer Audits are to:

- Encourage relationships between analysts
- Transfer technical knowledge between peers
- Establish consistency of analytical process/method between branch laboratories
- Identify the depth of analysts' knowledge at each position by observing what analysts are doing at the bench
- Determine training needs of personnel
- Document process/method and verify that issues are being corrected when found
- Work with, and in support of, QA department efforts

Depending on the size of the laboratory, a large number of methods and processes are examined during a Peer Audit. Results from these audits are provided to the branch management, as well as Corporate Management. Corrective Action Plans of a Peer Audit are initiated with the assistance of the Corporate Quality Assurance Officer for resolution of any findings.

ELI welcomes external Quality Assurance Audits, by qualified outside auditors, for review and comment on the overall QA program. To maintain certifications, accrediting authorities from the State of Montana conduct periodic comprehensive external audits. External audits to meet Quality Assurance Project Plans (QAPPs), as applicable to environmental remediation projects, or for major industries, are conducted as requested. For more information, see ELI SOP, *External Quality Assurance Audits*.

CHAPTER 3 – LABORATORY FACILITIES

The facility for Energy Laboratories, Inc. – Helena, MT consists of multiple buildings with over 10,000 square feet of total space; these buildings are located in Helena at 3161 East Lyndale, Helena, MT 59601.

The phone number for Helena Energy Laboratories, Inc. is (406) 442-0711, the fax number is 406-442-0712, the toll free number is 877-472-0711, and the email address is Helena@energylab.com.

Laboratory space includes adequate bench top and floor space to accommodate periods of peak work load. Working space includes sufficient bench top area for processing samples; storage space for reagents, chemicals, glassware, bench and portable equipment items; floor space for stationary equipment; and adequate associated area for cleaning glassware. Laboratory departments are organized and the facilities are designed for specific laboratory operations in order to protect the safety of analysts and to minimize potential sources of contamination between and within department areas (for more information, see ELI SOP, *Facility Description, Access, and Security*).

The laboratory is appropriately ventilated and illuminated, and is not subject to excessive temperature changes. Specific laboratory areas are temperature and humidity controlled as required. Ample cabinets, drawers and shelves are available for storage and protection of glassware. Exhaust fume hoods are available as needed for use during preparation, extraction, and analysis of samples. Employee exposure monitoring is conducted to provide a safe working environment.

To maintain security, all visitors must enter their name on the ELI sign-in log at the front desk and wear a visitor's badge.

The laboratory has provisions for the disposal of chemical and microbiological wastes. These provisions are described in Standard Operating Procedures as well as outlined in the Laboratory Safety Manual & Chemical Hygiene Plan along with other safety and health guidelines. For more information, see ELI SOP, *General Laboratory Waste Disposal*.

CHAPTER 4 – PERSONNEL REQUIREMENTS AND LABORATORY ORGANIZATION

Relationship between Management, Technical Operations, Support Services and the Quality System

Laboratory Organization

The corporate organization of the five ELI laboratories located in Montana (2), Wyoming (2), and Texas is provided in Appendix D. The Billings laboratory is the center for all corporate functions. Each laboratory is managed and operated individually under the supervision of a Laboratory Manager. Branch laboratories have fiscal and QA/QC responsibilities to Corporate, as well as general operating policies and goals. Quality Assurance Manuals are prepared individually for each branch and follow the QA/QC program outlined in the ELI-Helena QA manual.

The ELI-Helena Organizational Chart is also included in Appendix D with curricula vitae of key ELI-Helena laboratory personnel maintained in Appendix E of this manual. A Personnel Summary for all ELI employees listing title, academic background, and years of relevant experience is also maintained in the Corporate Qualifications Manual.

Quality Assurance receives direct support from senior management. Branch Quality Assurance Officer reports directly to the Corporate Quality Assurance Officer as well as the Laboratory Manager. Quality Assurance Officers provide independent oversight of Quality Systems within the overall Energy Laboratories structure. When Quality Assurance Officers fill more than one role within the organization, they operate independently of direct environmental data generation while fulfilling quality assurance responsibilities. Quality Assurance Officers facilitate development of and maintain the branch Quality Assurance Manual, provide assistance to personnel on quality assurance / quality control issues, maintain a quality assurance training program, and review quality documentation including SOPs.

Management ensures the development and implementation of programs and policies to continuously improve the effectiveness of ELI's QA Program and Management Systems. Management performs an annual review of the laboratory's Quality System (policies, procedures, work instructions) to assure their continuing suitability and effectiveness (See ELI SOP: *Management Reviews*, for detailed procedures). As appropriate, management identifies and implements any necessary changes or improvements. Corrective and preventive actions are detailed in a Corrective Action Report and filed with the QA Department. (Refer to ELI SOP: *Nonconformance Procedures and Corrective/Preventive Action Reports,* for detailed procedures.) In addition, management performs meetings with supervisory and key staff members throughout the year. Supervisors and QA personnel provide input on their specific areas of responsibility and evaluate the following:

1) Client-Related Items
2) Internal and External Audit Reports
3) Proficiency Testing Results
4) Review of Performance by Department
5) Corrective and Preventive Actions
6) Personnel Training Needs
7) Quality System Policies and Procedures
8) Resources including Personnel, Equipment and Facilities

Laboratory Management Review findings are compiled into a summary report. The report includes deficiencies identified and areas for improvement. The QA department ensures items from the Management Review are tracked, including actions that must be addressed, assignment of parties responsible for the actions to be taken, and recommendations on improvements to the Quality System. The Technical Director, Laboratory Manager, Quality Assurance Officer or designee, shall assign specific persons to address management review findings and establish deadlines for their completion. The Technical Director, Laboratory Manager, Quality Assurance Officer or designee, reviews and approves all documents issued to personnel in the laboratory as part of the management system. The Technical Director, or designee, has overall responsibility for the technical operations of the laboratory. Any procedural deviations to SOPs that are client or project-specific must receive approval either from the Technical Director, Laboratory Manager, and Quality Assurance Officer. Work is stopped when identification of any of the following is made: unapproved departures from the management system, unauthorized deviations from the procedures for performing tests and/or calibrations, and data quality or data integrity issues. The Technical Director, Laboratory Manager, QA Officer, or designee, is responsible for providing authorization for the work to resume once the identified issue has been addressed.

Personnel Requirements

ELI maintains experienced staff and management. Below is a summary of the primary roles, responsibilities and qualifications for the designated positions. Laboratory experience can be substituted for academic requirements. At ELI's smaller laboratory operations, the technical director may serve multiple roles. Detailed job descriptions are maintained by the Human Resources department. Specific titles of employees are at the discretion of the Laboratory Manager.

Laboratory Manager

The Laboratory Manager is required to have education equivalent to a Bachelor of Science degree in Chemistry or a related science. Five years of relevant laboratory experience is required.

The Laboratory Manager is responsible for all operations, client management, analysis scheduling, equipment acquisition, as well as compliance with all employment, safety, environmental and NELAP/ISO 17025 regulations. The Laboratory Manager may delegate daily activities of these work aspects to appropriate personnel. The Laboratory Manager reports directly to the Corporate Operations Manager. All Laboratory Managers have both technical and management responsibilities.

Quality Assurance Officer

The Quality Assurance Officer is required to have an education or experience equivalent to a Bachelor's of Science degree in Chemistry or a related science. Five years of relevant laboratory experience is preferred.

The Quality Assurance Officer is responsible for quality systems development, implementation, and management. The Quality Assurance Officer is also responsible for maintaining and improving compliance with all applicable state and federal regulations as well as maintaining compliance with NELAP/ISO 17025 regulations regarding Quality Systems. The Quality Assurance Officer or his/her designee manages the laboratory's certification programs to meet government regulatory requirements. The QA program is implemented in cooperation with all levels of management and

staff. Quality Assurance Officers report directly to the Corporate Quality Assurance Officer. The Laboratory Manager will direct daily laboratory-specific QA/QC requirements.

Technical Director

The Technical Director is required to have a Bachelor of Science degree in Chemistry or a related science. Five years of relevant laboratory experience is required.

The Technical Director is responsible for ensuring compliance with all laboratory policies and that the analyses conducted under their supervision are compliant with all state, EPA, and NELAC/ISO17025 standards. The Technical Director reports directly to the Laboratory Manager.

The technical director may serve multiple roles. Laboratory Managers serve as one of the branch technical directors.

Laboratory Supervisor

A Laboratory Supervisor is required to have education equivalent to a Bachelor of Science degree in Chemistry or related science. Two years of relevant laboratory experience is required.

ELI's Laboratory Supervisors are responsible for the day-to-day operation of the laboratories: scheduling testing, assigning work, and completing the technical review of laboratory data. Supervisors are responsible for ensuring compliance with all laboratory policies and ensure that the analyses conducted under their supervision are compliant with all state, EPA, and NELAC/ISO17025 standards. They report directly to the Laboratory Manager.

Analysts

Analysts are required to have an education equivalent to a Bachelor of Science degree in Chemistry (or related science), or a High School diploma with experience as an analyst in training. New analysts require a minimum of six months of on-the-job training, under direct supervision of a qualified analyst, in the measurements being considered for certification. After the initial training period, and on a continuing basis thereafter, the analyst must demonstrate acceptable skills through the successful participation in the analysis of applicable performance evaluation and quality control samples.

Analysts perform the following duties: Preparation of samples and reagents, analysis and preliminary data input, as well as various other tests. Analysts are responsible for complying with all laboratory policies and procedures.

Laboratory Technicians

Laboratory Technicians are required to have a High School Diploma or equivalent. Laboratory Technicians work under the supervision of the primary analyst performing general laboratory tests.

Under the supervision of a primary analyst, Laboratory Technicians perform the following duties: preparation of samples and reagents, analysis, and preliminary data input, as well as various other tests.

Laboratory Technicians are responsible for complying with all laboratory policies and procedures.

Approved Signatories

Signatures for policies are based on appropriate individuals, roles and responsibilities as determined by the policy being reviewed and approved. A list of significant signatories is included below. Additional signatures may be required for specific procedures.

- Laboratory Manager
- Technical Director
- Quality Assurance Officer
- Corporate Officer- Board of Directors

A master list including signatures and initials for all employees is maintained for reference and signature verification.

CHAPTER 5 – SAMPLING PROCEDURES

Private individuals or companies, who are responsible for using proper collection procedures, collect most of the samples processed in this laboratory. Members of the staff are acquainted with proper sample collection and handling procedures and advise those who need help in this area. Instructions and forms for initiating Chain-of-Custody are available from ELI. Laboratory procedures for logging in samples for analysis and maintaining Chain-of-Custody are described in ELI SOP, *Sample Receipt, Login, and Labeling*.

When the laboratory has been assigned the responsibility of sample collection, there is strict adherence to correct sampling protocols, initiation of chain-of-custody, sampling documentation, complete sample identification, and prompt transfer of sample(s) to the laboratory. Procedures are described in ELI SOP, *Field Sampling*.

This laboratory provides proper sample containers and preservatives as specified for the procedure. Certified sample bottles may be ordered upon request. Sample containers, preservatives, coolers for shipping, re-sealable plastic bags for ice containment, trip blanks for monitoring contamination during shipping, temperature blanks for accurately monitoring sample receiving temperatures, Chain-of-Custody forms, Chain-of-Custody seals, sample bottle labels, instructions for sampling, sample labeling, sample preservation, and sample packaging/shipping are provided upon request. Sample container type, sample volume, preservation requirements, and maximum holding times, are detailed for each analyte/method in the ELI Technical Services and Fee Schedule. See the ELI website, www.energylab.com for the current pricing.

Energy Laboratories maintains a strict Sample Acceptance Policy. The client is immediately notified (as appropriate) upon sample receipt if there is any doubt concerning the sample's suitability for testing, including but not limited to, when:

- Samples that are out of temperature compliance;
- Samples are received in unacceptable containers;
- Samples have labels or chain-of-custody procedures that are incomplete;
- Samples cannot be analyzed within method recommended holding time; or
- The custody seal has been broken.

*NOTE: Samples that have not been properly preserved are noted on the Sample Work Order Receipt Checklist.

Notification of sample receipt condition is available through the final report, Energy Source, Email, Telephone and/or voice.

Samples not collected or documented properly can be rejected for any regulatory-based analysis with re-sampling recommended. If re-sampling is not possible, or the client cannot be contacted, the sample may be analyzed, and if analyzed, the sample will be clearly qualified in the data package.

The laboratory will preserve samples at the time of sample login if samples are unpreserved and preservation is required by the methodology. Aqueous samples for volatile analysis are checked for preservation at the time of analysis. Samples for microbiological analysis are collected in pre-sterilized 120 mL plastic bottles containing sodium thiosulfate.

Sample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at collection. Refer to ELI Technical Services and Fee Schedule for detailed information on sample preservation requirements per applicable method and regulatory requirements.

The laboratory initiates a sample condition report titled Workorder Receipt Checklist at the time of sample receipt. The sample condition report contains Chain-of-Custody procedures, sample preservation status, carrier used for sample shipment, sample receipt temperature, and provides general comments concerning sample condition. The sample condition report is provided with the analytical data report package. For more information, see ELI SOP, *Sample Receipt, Login, and Labeling*.

When any sample is shipped by common carrier or sent through the United States Mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements as described in the ELI Technical Services and Fee Schedule, the Office of Hazardous Materials, Material Transportation Bureau, and Department of Transportation has determined the Federal Hazardous Materials Regulations do not apply to the following:

A) Hydrochloric Acid - (HCl) in water solutions of 0.04 % by weight or less (pH of 1.96 or greater).
B) Nitric Acid - (HNO_3) in water solutions of 0.15 % by weight or less (pH of 1.62 or greater).
C) Sulfuric Acid - (H_2SO_4) in water solutions of 0.35% by weight or less (pH of 1.15 or greater).
D) Sodium Hydroxide - (NaOH) in water solutions of 0.080% by weight or less (pH of 12.30 or less).

For regulatory compliance monitoring, it is required that all samples be analyzed within the prescribed holding times. Holding times are the maximum times allowed between sampling and analysis for results to still be considered valid. Samples should be delivered to the laboratory as soon as possible following collection to assure that holding times can be met. Samples are analyzed as soon as possible after sample receipt. When maximum holding times cannot be met, re-sampling is requested. If samples are analyzed out of hold, data is appropriately qualified.

To ensure that drinking water analysis for radiochemistry is met, the requirements for sample handling, preservation, and instrumentation for radiochemical analysis are included in ELI SOP: "*Sample Receipt, Log-In and Labeling*". (For additional information, refer to "Manual for the Certification of Laboratories Analyzing Drinking Water", Table VI-2: Sample Handling, Preservation, and Instrumentation, EPA 5th Edition, January 2005).

CHAPTER 6 – SAMPLE HANDLING

The ELI laboratory utilizes a sample tracking policy that includes client-initiated chain of custody. Upon receipt, the security of the samples is maintained by the implementation of the laboratory access and security policies. See ELI SOP, *Facility Description, Access and Security*.

Sample Receipt

All samples arriving at the laboratory are logged in the Laboratory Information Management System (LIMS). Each sample container is given a unique laboratory sample number. The sample receipt checklist evaluates Chain-of-Custody procedures, sample preservation status, carrier used for sample shipment, sample temperature, and provides general comments concerning sample condition. The completed checklist is provided with the analytical report package. Chain-of-Custody forms are checked for pertinent information. If necessary information has been omitted, the collector is notified, if possible, and the missing information is requested.

Samples requiring preservation are checked to determine if the client performed preservation. If requested, ELI staff will preserve or filter samples as appropriate. Samples that degrade quickly or cannot be opened (such as aqueous samples for volatiles) are not preserved at the time of sample login. If samples are improperly preserved, or the maximum holding times are exceeded upon arrival at the laboratory, the client is notified and re-sampling is requested.

Samples are stored per method specifications, or as method/parameter storage requirements are updated per later EPA guidance in Federal Regulations posted in 40CFR (Method Update Rules).

During sample login, all sample information such as sample description, client name and address, analyses requested, special requirements, etc. are entered into the computer database of the Laboratory Information Management System (LIMS). Requested analysis parameters and special requirements are communicated to the analysts via their LIMS work lists. Project-specific requirements are maintained in the LIMS for any samples received from a special project. This process ensures that individual requirements are maintained.

Chain-of-Custody

Evidence level internal chain-of-custody (COC) procedures are available on a project-specific basis. For these procedures, internal COC sample custody is maintained down to the individual analyst level. When transferring the possession of the samples, the transferee must sign and record the date and time on the chain-of-custody record. Every person who takes custody must fill in the appropriate section of the chain-of-custody record. When received by ELI, sample identification information on the sample containers is compared to the custody report form. The sample is inspected and information regarding the condition of the sample and seal (if used) is recorded on a report form; the method of shipping is also documented on the report form. A copy of the report form is kept with the sample data file and a copy is sent to the client with the analysis report. Internal chain-of-custody forms are used to document the progress of the sample through the laboratory. ELI's routine COC policy is maintained at the laboratory level through our laboratory access and security policies. See ELI SOP, *Facility Description, Access, and Security*.

Sample Tracking

Samples are tracked through the analytical process by the LIMS. Completed analyses, which have been approved by the appropriate reviewer as valid data, are reported in the LIMS. When all analyses are complete, the data is reviewed as a whole to ensure results pass data quality checks. The completed report is signed by an approved signatory. The signed report is sent to the client via requested delivery format. Generation of the invoice automatically completes the work order in the LIMS and removes the samples from the status report. For more information, see ELI SOP, *Document and Record Management, Control and Archiving*.

Sample Disposal

It is preferred that remaining hazardous sample material be returned to the originator (client) for disposal. When this is not possible or reasonable, ELI will dispose of remaining hazardous sample materials with a waste disposal surcharge added to the cost of the analysis.

The disposal of laboratory wastes will be performed in accordance with local, state, and federal regulations which apply to such activities. Each method SOP addresses waste minimization and management specific to the method procedure. See ELI SOP, *General Laboratory Waste Disposal,* for more information.

Subcontracting Policy

The ELI Helena laboratory utilizes the expanded branch laboratory capability and expertise to provide comprehensive analytical services. This occurs when the laboratory is requested to perform an analysis outside of the laboratory's capabilities (If sample overload is experienced; if equipment is out of service; for when the laboratory is not accredited for the particular analysis). Upon completion of the analyses, the branch laboratories report the sample results, and their quality control package, to the primary laboratory. The results are reviewed before being reported.

Branch laboratories are certified to perform drinking water analysis in their state and in neighboring states. Samples are forwarded to our branch laboratories only if the laboratory is certified in the state from which the sample originated. Individual branch laboratory Quality Assurance Programs are consistent with the Corporate Quality Assurance Program and are monitored through internal laboratory audits.

To support Energy Laboratories, Inc. Helena analytical services, ELI branch laboratories (which maintain specific instrumentation for specialized analysis) are utilized to provide complete analytical services. Refer to Appendix A for the certificates detailing routine analyses performed by the Helena branch. All branch laboratory certificates are also available on the Energy Laboratories website at www.energylab.com.

ELI Helena routinely subcontracts the following parameters/methods to branch laboratories:

Total Organic Halogens (TOX) by SW-846 9020
Total Arsenic CVAA by ASTM 3114
Low level EDB and DBCP by EPA 504
Carbamates by EPA 531.1
Glyphosate by EPA 547
Diquat by EPA 549.2
Total Organic Carbon (TOC/DOC) by A5310 C or A5310B, and SW-846 9060
Oil & Grease by SW-846 1664A

All Radiochemistry
SVOC by 8270C
Semi-Volatile Organic Compounds by EPA 525
Chlorinated Herbicides by 515.4

In the event that ELI is dependent on the service of an outside laboratory for analyses not available through our facility or our branch laboratories, the client is notified on the laboratory analytical report that their samples were subcontracted to an outside laboratory. The outside laboratory reports the results to ELI and these results become part of the final report. Any external or internal subcontracted analyses that require accredited analyses will be performed by a laboratory accredited for those parameters in the State from which the sample originated. All final reports indicate where the analyses were performed.

CHAPTER 7 – INSTRUMENT OPERATION AND CALIBRATION

Laboratory instruments and equipment are operated and calibrated according to the manufacturer's instructions and according to the requirements of the method being used. Exact calibration procedures are outlined in the appropriate SOP. For most instruments, a calibration curve composed of three to five standards covering the concentration range of the samples is prepared. The acceptance criteria for the calibration curves are listed in the individual methods. Unless otherwise specified in the method, at least one of the standards is at or below the practical quantitation limit (PQL) of the method. Routine PQLs for each method are given in the ELI Technical Services and Fee Schedule. Calibration standards are routinely compared to second source calibration standards to verify accuracy. These second source standard results must fall within an established range, as described by the SOP, to be accepted. Whenever possible, the laboratory uses calibration standards prepared from certified stock standards. Initial instrument calibration curves are verified and routinely monitored by analyzing a continuing calibration standard every 10 to 20 samples (or within a specified time frequency) and at the end of every analytical sequence, depending on the analysis method and instrumentation. When applicable to the method, high-level samples, which produce an analytical response outside the calibrated range of the instrument, are diluted (or reduced in mass) and re-analyzed until a response within the calibrated range is obtained and/or the result is appropriately qualified.

System cleanliness is verified through the analysis of reagent/instrument blanks prior to analysis, between highly contaminated samples, and at regular intervals during the analysis.

Use of measuring equipment and reagents (glassware, water, chemical reagents, and industrial gases) conform to Good Laboratory Practice guidelines. Good Laboratory Practices (GLPs) are laboratory guidelines which were established by the Food and Drug Administration and published in the Federal Register (21 CFR, part 58). The GLP guidelines were adopted by the Environmental Protection Agency. SOPs are developed in accordance with GLP and NELAP guidelines. Laboratory volumetric glassware conforms to National Institute of Standards and Technology (NIST), American Society for Testing and Materials (ASTM) Class A or B standards. All mechanical pipettes are calibrated at least quarterly. Laboratory balances are serviced annually and calibrated by certified technicians. Calibration checks of balances are performed each day of use, using ASTM Class 1 or 2 weights. Laboratory thermometers are calibrated annually against a NIST traceable thermometer and routinely checked for accuracy. Laboratory drying ovens, incubators, freezers, refrigerators, and water bath temperatures are monitored and recorded each working day, or at frequencies as described in the specific SOP. Laboratory pure water is generated by commercial water purification systems and is monitored and documented each working day in accordance with specifications needed for applicable methods. The routine analysis of laboratory blanks is used to verify laboratory water quality and the suitability of sampling containers. Chemical reagents and gases meet or exceed purity requirements for their intended uses. Laboratory stock and working standards are derived from ISO 17025 and/or 9001 (or equivalent-certified) commercially available primary standards whenever possible. Standard preparation notebooks document the reagent/standard type, source, purity, content, concentrations, preparation date, and analyst. All calibration standards are documented in each daily analytical sequence such that they are uniquely identified and traceable to stock standards and their source.

Standard Operating Procedures (SOPs) detail the sequence of operations involved in instrument start-up, calibration, analysis, shut-down, and routine maintenance. Suggestions for corrective action are included with the SOPs and parameters are identified which dictate certain types of

maintenance. Instrument and method detection limit studies are performed at the method required frequency or whenever there is a significant change in instrumentation. Method Detection Limits are determined according to EPA guidelines found in 40 CFR, part 136, Appendix B for general chemistry and 40 CFR 141.25 (c) for radiochemistry (except for the few methods that are not amenable to MDLs). Refer to ELI's Technical Services and Fee Schedule for practical quantitation limits (method reporting limits). Acceptable instrument response/performance criteria are based upon the manufacturer or the analytical method specifications. SOPs exist for all major pieces of analytical equipment/methods.

Instrument logbooks are used to document instrument maintenance and repairs. Instruments that are no longer being utilized are documented in the applicable instrument logbook as "out-of-service" with the date the instrument was taken out of use noted. All out-of-service instruments are labeled with an out-of-service tag that identifies the effective date the instrument was taken out of use.

Laboratory analysts record and document all instrumental runs in Laboratory Instrument Logbooks or computer files. Instrument Logbooks and/or dated computer files record instrument performance data, analytical sequences, instrument maintenance, calibration standards data, and any other additional information pertinent to operation of the instrument.

CHAPTER 8 – RECORDS AND REPORTING

Document Management

Energy Laboratories Inc. QA manages three types of documents: 1) controlled, 2) approved, and 3) obsolete.

A CONTROLLED document is one that is uniquely identified, issued, tracked, and kept current as part of the Quality System. Controlled documents may be internal documents or external documents. A list of ELI's controlled documents is listed in Appendix B. All ELI controlled documents are written and reviewed by personnel technically competent to perform that procedure and approved for use by the Laboratory Manager as well as the Quality Assurance Officer.

APPROVED documents have been reviewed, signed and dated by the technical reviewer, the Quality Assurance Officer and the Laboratory Manager.

OBSOLETE documents are documents that have been superseded by more recent versions. Obsolete documents are retained for legal use or historical knowledge preservation. Old or archived SOPs are available for review using the laboratory's electronic document system. ELI's OBSOLETE document records are maintained for at least ten years.

Documents are reviewed on an annual basis to ensure their contents are suitable and in compliance with the current quality systems requirements, and accurately describe current operations. SOPs include a Record of Revision page, which details revisions. The branch Quality Assurance Officer maintains a master list of controlled documents (which include title, author, and date of issue).

Procedures for identification, collection, access, filing, storage, and disposal of records are found in ELI SOP, *Document and Record Management Control and Archiving*.

Laboratory Notebooks

Several different types of Laboratory Notebooks are maintained at the ELI Laboratory. These include, but are not limited to, the following:

Method/Parameter Notebooks
Project Notebooks
Instrument/Equipment Use and Maintenance Notebooks
Standard Preparation Logbooks
Balance Calibration Logbooks
Pipet Calibration Logbooks
General Logbooks

The general purpose of maintaining each of these Laboratory Notebooks is to record the details that may be important in repeating a procedure, interpreting data, or documenting certain operations. Entries in the notebook may include data such as standard and sample weights, pH measurements, instrument operating parameters, preparation of calibration curves, analytical run sequences, calculations, recording of instrument operating parameters, sample condition, etc. The analyst's notebook is particularly important in documenting analyses that deviate in any way from routine or standard practices. It can also be an important training record. All pertinent data is to be

recorded directly in the notebook. Some notebooks or data records are maintained in electronic format (LIMS, spreadsheets, or databases). Electronic data records are duplicated using hardcopy and/or alternate electronic backup techniques.

It is the responsibility of each analyst to maintain a laboratory notebook according to Good Laboratory Practices (GLP) Guidelines. All physical laboratory notebooks are assigned a unique logbook control number and are assigned to an analyst and/or supervisor. These notebooks remain the responsibility of the ELI staff member's supervisor to whom they are assigned until they are formally transferred to another staff member, until they are completely filled and returned to the ELI QA Department for archiving, or until the staff member resigns and returns them as a part of the check-out process. ELI staff members, other than the individual to whom the laboratory notebook is issued to, may make entries in the notebook as long as those entries are consistent with the intended use of the notebook and such entries are initialed and dated. Procedures for use and maintenance of laboratory notebooks are detailed in ELI SOP, *Laboratory Notebooks*.

Records

The laboratory maintains records of all chemical analyses, including all quality control records, for a minimum of ten years. In the event that Energy Laboratories, Inc., or any individual laboratory transfers ownership or goes out of business, the records will be transferred to the new owners. If a branch laboratory is closed, records will be maintained by Energy Laboratories Corporate office in Billings, Montana. Energy Laboratories, Inc. reserves the right to offer the records to the clients in the event of complete closure. Details are described in ELI SOP, *Document and Record Management, Control and Archiving*.

Data Reduction

Data reduction refers to the process of converting raw data to reportable units. The reporting units used and analytical methods performed are described in the ELI Technical Services and Fee Schedule.

Wherever possible, the instrument is calibrated to read out directly in the units reported. In this case, the value is recorded directly into a laboratory notebook, logbook, bench sheet, or electronic file and presented for review.

In cases such as titration, gravimetric measurements, or other techniques that require calculation prior to reporting, raw data is recorded in the appropriate laboratory notebook or electronic file, or on the appropriate laboratory form. The calculations specified in the methods are used to determine the reported value. That value is also entered into the laboratory notebook or bench sheet. Most calculations are automated to reduce the chance of arithmetic or transcription errors.

Wherever possible, electronic data results are transmitted throughout the laboratory via the LIMS computer network. This process is intended to minimize manual data transcriptions within the laboratory. Additional advantages include the opportunity for rapid comprehensive data validation by supervisors, and more rapid data reporting.

Validation

Data validation includes the procedures used to ensure that the reported values are consistent with the raw data, calculated values, sample type, sample history, and other analysis parameters requested.

The data recorded is validated with several review steps. The analyst who submits the analytical results checks all the values reported for omissions and accuracy. Elements of this review also evaluate all instrument and method QC results. Automated data management programs are designed with an interactive step allowing data review by the analyst. Results to be reported are approved by the analyst.

The report is reviewed for the suitability of the data according to project and method performance specifications. Analytical results for each requested parameter may be evaluated against other requested parameters, project specifications, other samples within the set, historical files associated with the project/client, and/or any other information provided with the sample.

The reports are generated, proofread, and reviewed by designated reporting staff.

Laboratory managers, project managers, supervisors, QA Officer or their designees, may also examine the data included in the final report.

Internal and external laboratory audits review selected sets of data to ensure that the analytical results are correct and accurate, analytical methods are appropriate, documentation and record keeping procedures are complete, and that there is compliance to the overall objectives of the Quality Assurance Program. Data integrity is being monitored on an on-going basis.

All controlled automated programs used to process and report data are initially verified using manually calculated results. Whenever a modification is performed to a program, re-verification of overall software function is performed.

One step of the Quality Control process involves data outlier detection; data that falls outside of established limits. If an outlier is observed, corrective action is taken as appropriate, to investigate and/or correct the cause. Actions to correct these causes may include, but are not limited to, inspection of the instrumentation, checking calibrations, checking sample numbers or dilutions, re-analyzing samples or calibrations.

Reporting

One copy of the report is distributed to the client, via requested delivery format, after the report is validated and signed. A standardized report format is used unless otherwise specified. Client-specified report formats are available upon request. Results can be sent via physical media, email, EDD, website FTP and/or FAX when requested by the client. Energy Laboratories, Inc. offers its clients access to electronic records through our Energy Source Portal.

Various levels of data reporting are available. All analytical results, regardless of the level of reporting used, have record keeping procedures which allow an appropriate "data validation package" to be produced. Note that a comprehensive "data validation package" is most easily generated at the time of sample analysis. Example data packages are available upon request.

Safe Drinking Water Act (SDWA) compliance monitoring samples for microbiological and chemistry samples that exceed the SDWA maximum contaminant level (MCL) may require notification to the appropriate state agencies. Generally, notification to the client, and to the state, of any SDWA MCL exceedance must be within 24 hours of completion of analysis/review, or by noon the next business day. If requested by the client, additional copies of the report will be sent to a specified address or person.

The final copy of a completed report is maintained in an electronic format. An electronic copy of this file is available upon request. Energy Source is a client resource of ELI that provides secure online access for clients to view their data and documents. Clients are able to access their electronic files through ELI's secure website at https://energysource.energylab.com/. For more information, see ELI SOP, *Document and Record Management, Control and Archiving*.

In addition to traditional ink signatures, Energy Laboratories has approved the use of electronic signatures within our company-produced PDF documents. These signatures comply with Title 15 of the US Code Section 101 regarding legal requirements of a digital signature.

Electronic signatures verify that the document has not changed after it was produced. Upon opening the document, notifications automatically display to inform the recipient of the validity of the sender's electronic signature and all included certificates. Should any changes be detected, an alert message is automatically displayed, noting that the signatures cannot be validated due to changes made to the document.

CHAPTER 9 – GENERAL LABORATORY PRACTICES

Chemicals and Reagents

When available and appropriate, chemicals used in the laboratory are analytical reagent grade (AR) chemicals purchased from reliable suppliers. Reagents are prepared, standardized, and made fresh as mandated by the method, their stability, and according to Good Laboratory Practices. Procedures for purchasing of materials may be found in ELI SOP, *Property Procurement, Inventory, and Control*.

Normalized standards are checked regularly against independently prepared reference materials.

All standards and reagents are dated when received, opened, or prepared, and each is labeled with an expiration date when applicable. Standards and reagents are checked for discoloration or signs of degradation and are discarded if these are observed.

Certified primary standards are obtained from ISO accredited commercial sources when available. Standards used for calibration are verified against second source standards. Secondary and working standards are accurately prepared with volumetric flasks, or other calibrated labware, from primary standards and stored in appropriate containers.

ELI has determined 5 years to be a reasonable expiration date for stable salts where the manufacturer does not supply such information. Titrants, standards, and other solutions used for analytical purposes are frequently standardized upon preparation with certified or traceable standards. Method SOPs specify if standardization is necessary. The date and analyst's initials must be recorded on the container whenever re-standardized and these records are maintained in a laboratory notebook or in the LIMS.

Individual SOPs may also provide additional details for reagent requirements.

Reagent Interference

To determine the extent of reagent interference, method blanks are analyzed prior to sample analysis whenever appropriate.

If any interference cannot be eliminated, the magnitude of the interference is considered when calculating the concentration of the specific constituent in the sample, but only when permitted within the applicable method.

If reagents, materials, or solvents contain substances that interfere with a particular determination, they are replaced.

Individual method SOPs may also provide additional requirements for handling reagent interferences.

Glassware Preparation

All glassware used for inorganic and radiochemical analysis is washed in warm detergent solution and thoroughly rinsed in tap water. Glassware is then rinsed well three times with laboratory-purified water. This cleaning procedure is sufficient for many analytical needs, but individual SOPs

detail additional procedures when necessary. Glassware washing procedures for inorganic analysis are described in ELI SOP, *Cleaning of Glassware Used in Inorganic Analyte Sample Preparation and Analysis*.

All glassware used for organic analysis is washed in warm synthetic detergent solution and thoroughly rinsed in tap water. The glassware is then rinsed well with laboratory-purified water, followed by rinses with acetone to remove any residual organics. Prior to use, the glassware is rinsed three times with the organic solvent to be used with the glassware. Glassware washing procedures for cleaning glassware for organic analysis are described in ELI SOP, *Cleaning of Glassware Used in Volatile and Semivolatile Analyte Sample Preparation and Analysis*.

All glassware used for microbiological analysis is washed in warm detergent solution. The detergent must be proven to contain no bacteriostatic or inhibiting substances. The glassware is rinsed thoroughly with laboratory-purified water. Specific details are described in SOPs.

Disposable, glassware/plasticware is preferred for many procedures in the laboratory. The cleanliness and suitability of disposable glassware/plasticware is continuously evaluated for each test with the routine analysis of method blanks.

All volumetric glassware used in precise measurements of volume is Class A or laboratory calibrated.

Laboratory Pure Water

Laboratory-purified water is used in the laboratory for dilution, preparation of reagent solutions and final rinsing of glassware. For organic analysis, organic-free water is prepared and used. Energy Laboratories, Inc. uses water purification systems that are designed to produce deionized water that meets the requirements of the methods. Use and maintenance of laboratory reagent water systems are described in ELI SOP, *Use and Maintenance of the E-Pure Water System* and *Use and Maintenance of the Primary Water Purification Systems*.

Water quality is monitored for acceptability in the procedure in which it is used. Specific details are listed in the appropriate SOPs.

Employee Training

All new ELI employees and contract personnel are given an initial general orientation and tour of the laboratory facilities. Personnel are shown the locations of safety equipment such as safety showers, eye wash fountains, fire extinguishers, and first aid supplies. Personal protective equipment such as lab coats, disposable gloves, and safety glasses (if applicable) are issued at this time.

Safety considerations are a vital part of the training process. All hazards associated with the performance of a procedure or with the operation of an instrument are to be understood by the trainee before training can be considered complete. General laboratory safety procedures are a part of the new and current employee training. Specific safety procedures are outlined in SOPs and in instrument Operator's Manuals. Training in use of protective clothing, eye protection, ventilation, and general safety are provided to each employee. Each employee is required to read and sign the *Laboratory Safety Manual & Chemical Hygiene Plan*.

All new and existing employees must demonstrate capability prior to performing an analytical procedure independently (see Chapter One). Method performance on Quality Control Samples is used to document employee training and work quality. Employees are required to read the Quality Assurance Manual and all appropriate SOPs. Employees are required to sign a Quality Assurance Manual Acknowledgement form which states that they have read, understood, and will comply with the requirements of the Quality Assurance Manual. Employees also are required to sign, for all applicable SOPs, a Record of Acknowledgement Form that states they have read, understood, and agree to abide by the SOP. In the case of method SOPs, the employees sign a Record of Acknowledgement form that states they have read, understood, and agree to abide by the SOP using the latest method technology.

Employees also receive training on general laboratory policies including ethics and conflict of interest. All employees are required to read, understand and comply with the Corporate Compliance & Ethics Manual. Data integrity training is provided for all employees initially upon hire and annually thereafter. In addition to the *Corporate Compliance & Ethics Manual*, the ELI Quality Assurance department maintains a *Laboratory Ethics & Data Integrity Manual*, which supplements the corporate manual and provides specific training on data integrity. All employees are required to read, understand and comply with the ELI *Laboratory Ethics & Data Integrity Manual*. An annual Ethics training course is given to all laboratory employees. Attendance is required and is recorded with a signature attendance sheet or other form of documentation that demonstrates all staff have participated and understand their obligations related to data integrity and ethics policies. For details pertaining to ethics training and additional ethical procedures and policies refer to ELI SOP, *Personnel Training and Training Records*.

ELI encourages attendance at courses, workshops and other forms of continuing education available from on-site seminars, private institutions, local schools, and State and Federal regulatory agencies. Staff and department meetings are held routinely to communicate company policies and procedures. All training on procedures and policies is documented, per NELAP guidelines, in employee training files. For more information see ELI SOP, *Personnel Training and Training Records*.

Data Integrity

In order to provide for the integrity of ELI and client data, the laboratory has multiple controls on the network, LIMS and applications used. These controls limit access to and the ability to change data as well as provide for redundancy in case of loss.

These include but are not limited to:

- Users connecting to ELI computer systems are authenticated through a user name and password combination.
- Passwords are required to be changed on a regular basis.
- Permissions within ELI applications are role based with different roles having various levels of access and control. Users (analysts, supervisors, and managers) are assigned to these roles.
- In the LIMS, analytical data locks after a period of time and cannot be modified without special handling.
- Certain information has been identified for additional tracking and logging. Changes to this information is not only tracked in an audit log but also reported to select personnel.
- Information on ELI servers including the ELI LIMS system is backed up and recoverable.

Standard Operating Procedures

Laboratory operations and procedures are documented in Standard Operating Procedures (SOPs). SOPs provide information on the consistent and safe operation of the laboratory. For analytical methods, SOPs provide information on the details of the analysis that is not specified in a published analytical method. For routine procedures other than analytical methods, SOPs define the steps required in accomplishing a given task. All SOPs are reviewed and updated periodically to reflect any changes in laboratory operations. Method SOPs follow NELAP requirements. For more information on generation and distribution of SOPs, see ELI SOP, *Preparation, Numbering, Use, and Revision of Standard Operating Procedures*.

Client Confidentiality

Each employee has the responsibility to maintain confidentiality in all matters pertaining to our clients, samples submitted, and Energy Laboratories, Inc. Information obtained during employment with this laboratory, regarding the specific business of this laboratory, or its clients shall at no time be revealed to any outside sources without permission from the owner of the data.

Sample submittal, analysis and the report contents are considered confidential information of the client. When requested to provide results (either in person, via telephone or email), the employees shall verify that the requestor is either the person associated with the project, on the COC, or on a list provided by the client who are authorized to receive data. If a person who is not associated with the project personnel (or is not on the approved list), the base client will be contacted to inquire about authorization to release data. These contacts are documented and associated with the work order in the LIMS system to provide archival proof of authorization to release data. If the client does not authorize a release of data, the requestor will be contacted and told of this decision.

Client confidentially is maintained electronically through the use of password-protected logins on all laboratory computer systems. Additionally, the laboratory maintains network security such as anti-virus programs and firewalls that prevent any unauthorized outside access. All copies of the original report are stored on the laboratory's document archival system, which is also protected from unauthorized use by the network security systems. Raw data, reports, and LIMS records are kept in a secure location of the laboratory or off-site. All client confidential paper waste, including printouts, is shredded.

CHAPTER 10 – QUALITY CONTROL MONITORING

Routine Monitoring

Temperatures of incubators, water baths, refrigerators, and ovens are checked and recorded according to a prescribed schedule using a continuous monitoring system.

Conductivity of the laboratory-purified water is continuously monitored using an automated monitoring system and as method blanks in routine analytical runs.

Reagents are dated and initialed at the time of opening. Expirations dates are assigned as a fundamental component of their receipt and/or preparation. Reagents are not used after manufacturer's expiration date is exceeded.

Balances are checked daily, or as required, against ASTM Class 1 or 2 NIST traceable weights and are calibrated and serviced by certified technicians annually.

SOPs are reviewed periodically for accuracy.

Laboratory Notebooks are reviewed periodically for correctness and accuracy by supervisors.

Proficiency Testing (PT) Samples are analyzed as required (See Chapter Two of this QA Manual).

Quality Control Check Samples are analyzed with each analytical batch.

Internal and external audits are performed as specified or requested (See Chapter Two of this QA Manual for additional discussion).

Additional monitoring requirements may also be specified in individual SOPs.

The Laboratory maintains an active fraud protection program that is implemented through the laboratory ethics policy. Additionally, the potential of fraud is monitored through analyst supervision, management supervision, regular internal audits, PT study participation, and an active quality assurance program.

Instruments/Methods

Calibration is performed as outlined in Chapter Seven of this QA Manual.

Generally, and depending on method requirements, the standard curve is verified with a known second source reference sample. The reference sample results must fall within the appropriate target range for the calibration to be accepted.

In most cases, the calibration stability is checked by analyzing a continuing calibration standard every 10 to 20 samples, depending on the analysis and instrumentation. The verification standard results must fall within an established range as described by the SOP.

All laboratory instruments are subjected to preventive maintenance schedules. Preventive maintenance schedules are specified in instrument maintenance logbooks.

As appropriate, instrument and/or method detection limits are determined annually, or more frequently if changes in instrument performance are noted or per method requirements. Procedures for the determination of instrument detection and method detection limits are described in ELI SOP, *Determination of Method Detection Limits (MDL) and Quantitation Limits*.

Precision and accuracy requirements for each method are specified in the SOPs. General guidelines are given below.

- Each analytical batch will contain QC samples to measure the accuracy of the method. Each QC sample result is monitored to be within QC specifications of the method. Results of blank spiked sample analysis must be within the established control limits. Quality Control Limits are specified in the SOPs and meet recommended QC limits as described in the referenced method.

- Each analytical batch will contain QC samples to measure the precision of the method. (See Chapter One for discussion on duplicate sample analysis.) Criteria for duplicate sample acceptance are found in the SOP and are generally taken from the referenced method.

- Each analytical batch will contain QC samples to measure the performance of the method on the sample matrix. These are typically identified as a matrix spike analysis and may be performed in duplicate to assess method precision. Typically the sample is fortified with a known amount of target analyte and spike recoveries are calculated. Results outside of method QC guidance are flagged. Quality control limits and appropriate corrective actions steps are specified in the method SOP.

- Several methods are considered to be concurrent methods in that they are either nearly identical or are identical to a method with a different citation. Even if two methodologies are identical in procedure, slight differences in the QC requirements might be the only difference between the two methodologies. These types of methods may also be considered "concurrent" if the procedures are identical and the more stringent of the two method criteria are used. During data reduction and reporting, the referenced method specifications and criteria will always take priority.

As appropriate, the performance trends of QC sample results are evaluated with Quality Control Charts. Suitability of existing QC limits is evaluated and possibly adjusted, but not to exceed method specification.

CHAPTER 11 – CORRECTIVE ACTION

When the quality control checks indicate that an analysis is not within the established control limits, corrective action is needed. This section gives general guidelines for corrective action. Corrective actions for each method or instrument are detailed in individual SOPs. Records are maintained of non-conformances requiring corrective action to show that the root cause(s) was investigated, and includes the results of the investigation. The QA Manager/Officer will monitor implementation and documentation of the corrective action to assure that the corrective actions were effective.

Method QC samples that fail to fall within QC control limits may be analyzed again to verify if a problem exists. However, matrix spike or matrix spike duplicate QC samples are not required to be re-analyzed if the performance can be attributed to matrix effects; data results are then reported and flagged.

If the repeat analysis is not within control limits, the particular instrument or procedure is checked according to the specific protocols outlined in the method or according to the instrument manufacturer's guidelines. Once results are within control limits, analysis of all samples that were analyzed while the procedure was out of control are repeated, i.e., all analyses are repeated back to the previous acceptable control sample. In the case of radiochemical analysis, the term “analyze again” means to recount the final sample on the same (or different) detector.

If the analyst is unable to achieve acceptable results after following the corrective action guidelines detailed in the SOP, a supervisor is consulted. If necessary, the appropriate service personnel are contacted if the problem is determined to be due to instrument error, and cannot be resolved. It is also possible that the result is due to statistical variation of the results based on the tolerable error rate that has been determined for the analysis (usually 0.05). In certain cases, where control limits are exceeded, it is possible that problems cannot be corrected to satisfy QC criteria. This could be due to problems such as matrix interference, instrument problems, lack of sufficient sample, missed holding times, high blank contamination, etc. If all possible solutions available to correct the problem are examined and the sample results are still considered valid, qualifying comments are attached to the sample report describing the non-compliance and probable cause.

In the case of a single radiochemistry detector being returned to service, this refers only to the samples counted on that detector. For example, an individual gas proportional counter instrument may have up to 16 detectors; if only one does not pass the QC check the others are still valid and sample analyses performed on the others do not need to be repeated.

In the event that a QC audit or other informational review shows an analysis report to be incorrect, incomplete, or adversely compromised, a revised report and explanation is submitted to the client within ten business days unless otherwise communicated to the client with another time period. The report will clearly be identified as a revised report. As appropriate, an explanation submitted to the client should give a detailed review of the problem and document any unapproved deviations from the regulations, standard operating procedures, or project- specific scope of work that may have caused it. The explanation to the client may include, but not be limited to, the following components:

1) What actions have been taken regarding the affected data set(s),
2) Identification of the cause, and
3) Corrective action(s) taken to prevent future occurrence.

In the event that a QC check fails, the analyst will follow the procedures outlined in the QA/QC summary of the SOP.

Quality Control Checks for each method or instrument may vary. Energy Laboratories Inc. follows the QC checks set by each governing method. Due to the wide variations between methods, specifics are listed within each SOP for the given method. Please reference the SOP for specific QC checks for the given method. The QC checks may include: ICV, MB, CCV, CCB, LCS, LCSD, LOD, MS, MSD or others specific to that method.

The following table lists the typical actions to be taken upon discovery of a QC sample failure. The purpose of this table is not to supersede the actions stipulated in the method SOP or the Method criteria.

QA Indicator	Frequency	Acceptance Criteria	Corrective Action For Failure	Comments
ICV	At the beginning of the sequence, immediately after the ICAL.	Usually ± 10%. Method Dependent. Some methods have more stringent criteria.	**Option 1** – Re-analyze the ICV. **Option 2** – Stop analysis and re-calibrate the instrument.	-Evaluates calibration accuracy and method performance. Must be prepared from Second source standard. Know and follow any method specifications regarding the ICV.
CCV	At the beginning of sequence, and every ten samples. Must have a closing CCV at the end of the sequence.	Typically ± 10% recovery. Very method dependent. See SOP & Method.	**Option 1** – Immediately Re-analyze CCV upon failure. **Option 2** –Invalidate all samples not bracketed by passing CCVs, recalibrate, and re-analyze all invalidated samples.	-Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard. Know and follow any method specifications regarding the CCV.
CCB	Every ten samples	CCB<PQL	**Option 1** – Stop analysis, invalidate all samples not bracketed by passing CCBs. Re-calibrate and re-analyze samples.	-Evaluates baseline drift, contamination in the analytical system, and analyte carryover. – Know and follow any method specifications regarding the CCB.
LCS	One per sample batch of 20, or less if tighter criteria specified in the published method.	Typically ± 10% recovery. Very method dependent.	**Option 1** – Re-analyze LCS for recovery. **Option 2** – Stop analysis, recalibrate, re-extract and/or re-analyze all samples.	- Evaluates overall method accuracy/bias for the Preparatory Batch. Know and follow any method specifications regarding the LCS.
MS	One per sample batch of 20, or less if tighter criteria specified in the published method	Typically ± 30% recovery. Very method dependent.	**Option 1** - Report Spike as analyzed. LCS/LFB must be passing. Flag sample for possible matrix effects. **Option 2** –Re-analyze MS/MSD, only if there was an error making the MS, for either recovery or RPD failure.	-Evaluates effect of matrix on method performance. Know and follow any method specifications regarding the MS.

QA Indicator	Frequency	Acceptance Criteria	Corrective Action For Failure	Comments
MSD	One per sample batch of 20, or less if tighter criteria specified in the published method.	Typically ± 30% Recovery. Very method dependent. 10-30% RPD –Check method for exact specifications.	Same as for MS.	-MSD also evaluates method precision. Know and follow any method specifications regarding the MSD.
MBLK	One per sample batch of 20, or less if tighter criteria specified in the published method.	MBLK< PQL	**Option 1** – Re-analyze the entire analysis. All organic analyses with blank detections must be re-analyzed. **Option 2** – Flag data on report as having compound in blank.	-Evaluates overall method including possible contamination in reagents and glassware utilized in preparatory batch. Know and follow any method specifications regarding the MBLK.
DUP	One per sample batch of 20, or less if tighter criteria specified in the published method. (The DUP can be satisfied by a MS/MSD).	10-30% RPD –Check method for exact specifications.	**Option 1** – Re-analyze sample. **Option 2** – Flag analysis as having a failing DUP RPD for reporting.	Evaluates method precision. MSD duplicate analyses preferred on some methods.

Deviation from the method or SOP shall be documented in laboratory records.

Procedure for Dealing with Complaints

DEFINITIONS

Complaint: For the purposes of this procedure, a complaint comes from a client, a user of our data, or employee. The complaint might cover issues about the quality of our data, sample turnaround time, method used, pricing, or other expectations.

Client: The client is a person or company that ordered and paid for the services.

Procedure: The staff person receiving the complaint exercises judgment in deciding the severity and disposition of every complaint. The judgment must be used to decide whom, if anyone, is alerted to the complaint and what actions are appropriate. The complaint issued should be handled with a high degree of discretion and tact by the supervisor or manager involved. The individual handling the complaint is instructed to follow ELI's guidelines provided in this section on how to handle the complaint. This involves listening to the client and getting adequate information so the complaint can be investigated and resolved. The appropriate laboratory staff is notified and a solution to the problem, as well as a timeline for action, is given.

After the complaint is investigated or resolved, as necessary, the client is made aware of the results and determination is made as to what further actions are needed. Complaints and investigations may result in the need to submit a revised report or invoice. Complaints that are straightforward and can be resolved using the resources available to the person handling the complaint should be resolved there. These include such things as minor revisions of reports or invoices. If other decisions need to be made, the appropriate person should be contacted.

It may be appropriate to initiate or prepare a non-compliance report. This report should be completed with the intention of informing the affected staff about the problem so that everyone can learn from it, it can be used as a training tool, change our procedures and improve our service. A procedure to document non-compliance reports is documented in ELI SOP, *Nonconformance Procedures and Corrective/Preventive Action Reports.*

If an employee or former employee sees an issue, they are encouraged to report concerns regarding Quality Systems, unethical behavior, and/or financial mismanagement. This issue should initially be brought to the attention of their supervisor. The supervisor will take appropriate action to resolve the concern. If the employee is uncomfortable with approaching their supervisor or feels that the issue was not properly dealt with, they may approach higher levels of management with their issue.

Energy Laboratories, Inc., has also implemented a program to facilitate confidential reporting to upper management. This tool allows employees, customers, vendors, auditors and other interested parties to report situations or behaviors that they consider to be unethical, immoral, or improper. It also allows the reporting of suggestions or comments. The program has been implemented at ELI so that anyone reporting a situation can be assured that there will not be retaliation for reporting. It is meant to encourage parties to communicate with upper management when there appears to be no alternative for resolving the types of issues already described. . Access to the program is available on the ELI internal website.

Penalty for Improper, Unethical or Illegal Actions

Energy Laboratories, Inc. employees are expected to work in an ethical, proper, and legal manner. They are expected to perform laboratory analyses according to the cited method(s) and in conjunction with the SOP and the Quality Assurance Plan. Employees are expected and required to report any violations of this policy. All employees are mandated to participate in an ethics-training program as part of their orientation upon hire.

Improper, unethical, or illegal actions by an employee will be addressed on a case-by-case basis as determined by the seriousness of the offense. Corrective actions may include disciplinary action up to and including discharge.

CHAPTER 12 – MANAGEMENT OF CHANGE

Management of change is the process used to review and manage proposed changes to materials, technology, equipment, procedures, personnel and facility operations. These changes may be permanent or temporary depending on circumstances. Change is managed, communicated, and documented as appropriate to the level of change, by the Laboratory Manager and the Supervisors of each department. Significant revisions to controlled documents may require employees to sign a record of acknowledgement.

- New Equipment Validation – Documented in the Instrument Maintenance Module. Supporting studies are documented in the LIMS.
- Implementation of new test methods and method updates – Documented in the method SOP and Instrument Maintenance Module. Supporting studies are documented in the LIMS.
- The QA Manual and SOPs – Documented in the Record of Revision and stored in the Document Control Software.
- Work order changes are documented in the work order report and stored in the LIMS or Document Control Software.
- LIMS changes - documented in a version control repository.
- Personnel changes - documented in employee training records or personnel records.

CHAPTER 13 – MAJOR EQUIPMENT AND METHODS

A summarized listing of major instrumentation utilized in the laboratory is included in Appendix F. See attached State of Montana certificate in Appendix A for a complete list of accredited methods and analytes that ELI performs to support SDWA regulated methods. Refer to the ELI Technical Services and Fee Schedule, located on the ELI website at www.energylab.com, for a list of comprehensive services including methods and analyte parameters that Energy Laboratories, Inc. performs.

CHAPTER 14 – PREVENTIVE MAINTENANCE

Preventive maintenance is performed on laboratory equipment according to the manufacturer's guidelines and our operational experience. Repairs and maintenance are accomplished in-house by experienced laboratory personnel whenever possible. Other than consumable equipment items, an inventory of spare parts is not maintained. Spare parts are available from outside vendors on an as needed basis. (To ensure method capability, some methods have more than one instrument available). An example of maintenance performed follows:

Instrument	**Maintenance**	**Frequency – Note that Daily is based on use.**
Balances	Check with Class 1 weights	Daily
	Independent Service	Annually
Pipettes	Check volume	Quarterly/Daily
IC	Change Bed supports	Weekly
	Change Guard Column	As Needed
	Change Analytical Column	As Needed
	Calibrate	After maintenance or as needed
	Clean Stator Plate	Annually
	Change tubing	As needed
	Calibrate Conductivity Cell	Every 6 months
	Backup Data	Monthly
ICP-Atomic Emission	Check Pump Tubing	Daily
	Check Coolant Levels	Monthly
	Lubricate Autosampler	As needed
	Air Filter	Quarterly
	Optics Servicing	As needed
ICP-Mass Spectrometry	Check Pump Tubing	Daily
	Check Coolant Levels	Monthly
	Check Electron Multiplier	Daily
	Lubricate Autosampler	As needed
	Air Filter	Quarterly
Gas Chromatograph	Change Septum	As needed
	Check Injection Liner	Daily
	Clean Detector	As needed
	Change Gas Cylinders	At 200 psi
	Change Column	As needed
Auto Analyzers		
	Check For Leaks	Daily
	Change Tubing	When wear is visible
	Lubricate Pumps	Annually
	Lubricate Sampler	Annually
Man-tech Auto-titrator	Visually inspect all probes/ stirrer/ thermometer and fill probes	Daily/As needed
	Flush pH probe/ Fluoride probe	Every 15 days
	Calibrate sample dosing pump	Quarterly
	Replace Tubing	Annually/ As needed
	Clean out titration vessel and rinse station	Quarterly/ As needed
	Clean buret	Quarterly
	Calibrate buret	Monthly
	Replace pH/ Fluoride probe	As needed
	Replace Tubing	As needed
	Change Lip seals gland washers on dosing pump	As needed
Man-tech Auto-titrator	Visually inspect all probes/ stirrer/	Daily/As needed

Instrument	**Maintenance**	**Frequency – Note that Daily is based on use.**
	thermometer and fill probes	
Metrohm-automated ph, conductivity, auto-titrator	Visually inspect all probes/ stirrer/ thermometer and fill probes	Daily/As needed
	Flush pH probe/ change storage solution	Monthly/ As needed
	Replace Tubing	As needed
	Calibrate buret	Monthly
	Replace pH probe	As needed
Mass Spectrometers	Monitor Vacuum Pressures	Daily
	Monitor Background Levels	Daily
	Monitor Electron Multiplier	Daily
	Change Pump Oil	As Needed
Microbiology	Monitor Room Temperature	Twice daily
	Monitor Incubator Temperature	Twice daily
	Autoclave Maintenance	Annually
	Monitor Water Bath Temperature	Twice daily
Reagent Water Systems	Change/Check Cartridges	Quarterly, or as needed
Compressed Gases	Change Gas Cylinders	At 50 psi, monitor daily
Liquid Chromatograph	Flush System	Daily
	Change Filters	As needed
	Replace Seals	As needed
Continuous Monitoring System	Check Temperatures	Daily, calibrated annually

CHAPTER 15 - REFERENCES

ANSI N42.23-1996, American National Standard Measurement and Associated Instrument Quality Assurance for Radioassay Laboratories.

ASTM Annual Book of Standards, Part 31 (water), American Society for Testing and Materials.

ASTM D 7282-06 Standard Practices for Set-up, Calibration, and Quality Control of Instruments Used for Radioactive Measurements.

Handbook for Analytical Quality Control in Water and Wastewater Laboratories, Environmental Protection Agency. EPA 600/4-79-019

ELI Technical Services and Fee Schedule, Current Revision, Energy Laboratories, Inc.

Manual for the Certification of Laboratories Analyzing Drinking Water, 5th Ed., EPA 815-R-05-004, 2005.

Manual for the Certification of Laboratories Analyzing Drinking Water, Supplement to 5th Ed., EPA 815-F-08-006, June 2008.

Methods for Chemical Analysis of Water and Wastes Environmental Protection Agency, 600/4-79-020.

Methods for the Determination of Metals in Environmental Samples – Supplement I, EPA/600/R-94-111, May 1994.

Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93-100, August 1993.

Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1998.

Methods for the Determination of Organic Compounds in Drinking Water – Supplement I, EPA/600/4-90/020, July 1990.

Methods for the Determination of Organic Compounds in Drinking Water – Supplement II, EPA/600/R-92/129, August 1992.

NELAC Chapter 5: Quality System Standard, 2003 or most current version approved by Florida and Texas NELAC Accreditation program.

NELAP, National Environmental Laboratory Accreditation Program http://www.nelac-institute.org/newnelap.php

Qualifications Manual, Current Revision, Energy Laboratories, Inc.

Standard Methods for the Examination of Water and Wastewater; 20th, 21st and -22nd Editions, APHA.

Technical Notes on Drinking Water Methods, EPA/600/R-94/173, October 1994.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW846), Environmental Protection Agency. http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm

TNI Standard, Volume 1 (EL-V1-2009), The NELAP Institute.

CHAPTER 16 – GLOSSARY OF TERMS

Accuracy - The degree of agreement between an observed value and an accepted reference value.

Analyst - The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

Analytical Sample - Any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, initial calibration verification, initial calibration blank, continuing calibration verification, and continuing calibration blank.

Audit or Assessment- A systematic evaluation to determine the conformance to quantitative specifications of some operational function or activity.

Batch - Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to twenty environmental samples of the same matrix, meeting the criteria above. An analytical batch is composed of prepared environmental samples, extracts, digestates, or concentrates, which are analyzed together as a group.

Blank (BLK) - A sample of clean water that accompanies the samples through different aspects of sampling and/or sample preparation. It is used to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value. There are various types of blanks: equipment blank, field blank, instrument blank, method blank, and reagent blank.

Blank Spike - See Laboratory Fortified Blank.

Blind QC Check Samples - Samples whose analyte concentrations are not known to the analyst. That the sample is a QC check sample may or may not be known to the analyst.

Calibration - The set of operations that establish, under specified conditions, the relationship between values indicated by the measuring instrument and the corresponding known value of the property being measured.

Calibration Blank - A volume of reagent water fortified with the same matrix as the calibration standards, but without the analytes, internal standards, or surrogate analytes.

Calibration Check Standard - See Check Standard.

Calibration Curve – The graphical relationship between the known values and the instrument responses for a series of calibration standards.

Calibration Standard - A solution of known concentration used in the calibration of an analytical instrument.

Chain of Custody Form- A record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of

containers; the mode of collection; collector; time of collection; preservation; and requested analyses.

Check Standard - A material of known composition that is analyzed concurrently with test samples to evaluate a measurement process.

Clean Water Act - Public Law PL 92-500. Found at 40 CFR 100-140 and 400-470. The act regulates the discharge of pollutants into surface waters.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - The enabling legislation (42 USC 9601 - 9675 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 USC 9601 et seq.), to eliminate the health and environmental threats posed by hazardous waste sites.

Continuing Calibration Blank (CCB) – See Check Standard.

Continuing Calibration Standard - See Check Standard.

Continuing Calibration Verification (CCV) - See Check Standard.

Control Limits - A range within which specified measurement results must fall to be compliant.

Control Standard - See Check Standard.

Corrective Action (CA) - An action taken to eliminate the causes of an existing nonconformity, defect, or other undesirable situation in order to prevent recurrence.

Data Quality Objectives (DQO) - An integrated set of specifications that define data quality requirements and the intended use of the data.

Demonstration of Capability (DOC) - A procedure to establish the ability of the analyst to generate data of acceptable quality.

Detectability – For radiochemical analysis, detectability as a Lower Limit Detection (LLD) or Minimum Detection Concentration (MDC), is assessed based on the requirements of 40 CFR 141.25(c) and is a sample-specific determination. The equation is specific for each method and noted in the method SOP.

Detection Limit - See Practical Quantitation Limit and Method Detection Limit. Reporting of detection in radiochemistry is based on specific formulas identified in individual procedures. Single activity point standards are used for efficiency calibration. When required, multiple energy emitters are used for energy calibration.

Document Control - The act of ensuring that documents and revisions are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed.

Duplicate (DUP) - A second aliquot of a sample that is treated the same as the original sample to determine the precision of the method.

Duplicate Sample - See Duplicate.

Fortified Sample - See Matrix Spike.

Holding Times (Maximum Allowable Holding Times) - The maximum time that samples may be held prior to analysis and still be considered valid or not compromised.

Initial Calibration Verification (ICV)- A sample of known concentration, from a source other than that of the calibration standards, analyzed following calibration to demonstrate validity of the calibration.

Instrument Blank - See Calibration Blank.

Internal Standard – A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.

Laboratory Control Sample (LCS) – A sample with a known concentration prepared and/or analyzed as a measure of accuracy for the method.

Laboratory Fortified Blank (LFB) – An aliquot of reagent water to which known quantities of specific compounds are added and which is analyzed as a measure of method recovery.

Laboratory Inter-comparison Sample - A performance evaluation sample analyzed by numerous laboratories. Acceptance criteria are often based statistically on the analysis results.

Limit of Detection (LOD) - For chemical analysis, the LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory-dependent.

Limit of Quantitation (LOQ) – For chemical analysis, the LOQ is an estimate of the minimum amount of a substance that can be reported with a specified degree of confidence. An LOQ is an evaluation of precision and bias.

LIMS - Laboratory Information Management System.

Matrix – The substrate of a test sample.

Matrix Spike - (MS) – An aliquot of a sample to which known quantities of specific compounds are added, and which is carried through the entire analytical process to determine the effect of the matrix on the methods recovery efficiency.

Matrix Spike Duplicate (MSD) – A second aliquot of a sample to which known quantities of specific compounds are added, and which is carried through the entire analytical process to determine the effect of the matrix on the method's recovery efficiency and the precision of the method.

Maximum Contaminant Level (MCL) – Regulatory action levels for a contaminant of concern.

Method Blank (MBLK)- A clean sample processed simultaneously with, and under the same conditions as, samples being tested for an analyte of interest through all steps of the analytical procedure.

Method Detection Limit (MDL) - A measure of the limit of detection for an analytical method determined according to the procedure given in 40 CFR Part 136 Appendix B.

Method Validation - The confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled (NELAC 2003) (MARLAP 2004 for radiochemical methods).

NELAC - National Environmental Laboratory Accreditation Conference.

NELAP - National Environmental Laboratory Accreditation Program.

NPDES - National Pollutant Discharge Elimination System- A discharge permit system authorized under the Clean Water Act.

Performance Evaluation (PE) Sample - A sample with a composition unknown to the analyst that is provided to test whether the analyst/laboratory can produce analytical results within specified limits.

Practical Quantitation Limit (PQL) – The lowest concentration or amount of the target analyte that can be identified, measured and reported with confidence that the analyte concentration is not a false positive value.

Precision - The degree to which a set of observations or measurements of the same property conform to themselves.

Preservation - Refrigeration and/or reagents added at the time of sample collection to maintain the chemical and/or biological integrity of the sample.

Proficiency Testing (PT) Sample - A sample with a composition unknown to the analyst which is provided to test whether the analyst/laboratory can produce analytical results within specified limits.

Quality Assurance – An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

Quality Assurance Project Plan (QAPP) - A formal document describing the detailed quality control procedures pertaining to a specific project. For environmental clean-up projects, this is typically produced by an engineering firm with references to include a laboratory's Quality Assurance Manual.

Quality Control – The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.

Quality Control Sample – A sample used to assess the performance of all, or a portion, of the measurement system.

Replicate - See Duplicate.

Reporting Limit (RL) –. The lowest level of concentration reported for an analyte.

Resource Conservation and Recovery Act (RCRA) - The enabling legislation under 42 USC 321 et seq. (1976) that gives EPA the authority to control hazardous waste.

Safe Drinking Water Act (SDWA) - The enabling legislation, 42 USC 300f et seq. (1974), which requires the USEPA to protect the quality of drinking water in the U.S. by setting maximum allowable contaminant levels, monitoring, and enforcing violations.

Sample (SAMP) - A portion of material to be analyzed.

Spiked Sample – See Matrix Spike.

Standardization - See Calibration.

Standard Operating Procedure (SOP) - A written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks.

TNI – The NELAC Institute

Traceability – The property of a result of a measurement whereby it can be related to appropriate standards.

Trip Blank - One type of Field Blank. An aliquot of analyte-free water or solvent transported to the field in a sealed container and returned to the laboratory with the sample containers.

Acronyms and Abbreviations

AA	-	Accrediting Authority
AB	-	Accrediting Body
ANSI	-	American National Standards Institute
AOAC	-	The Scientific Association Dedicated to Analytical Excellence
APHA	-	American Public Health Association
ASQC	-	American Society for Quality Control
ASTM	-	American Society for Testing and Materials
Bq	-	Becquerel
BLK	-	Blank
Bg	-	Background
°C	-	Degrees Celsius
Cal	-	Calibration
CAS	-	Chemical Abstract Service
CCB	-	Continuing Calibration Blank
CCV	-	Continuing Calibration Verification
COC	-	Chain of Custody
DOC	-	Demonstration of Capability
DO	-	Dissolved Oxygen
DQO	-	Data Quality Objectives
DMRQA	-	NPDES Discharge Monitoring Report Quality Assurance
DUP	-	Duplicate
ELI	-	Energy Laboratories, Inc.
EPA	-	Environmental Protection Agency
FDA	-	Food and Drug Administration
g/L	-	Grams per Liter
GC	-	Gas Chromatography
GC-MS	-	Gas Chromatography-Mass Spectrometry
ICP-AES	-	Inductively Coupled Plasma Atomic Emission Spectrophotometry
ICP-MS	-	Inductively Coupled Plasma-Mass Spectrometry
ICV	-	Initial Calibration Verification
ISO	-	International Organization for Standardization
LCS	-	Laboratory Control Sample
LFB	-	Laboratory Fortified Blank
LIMS	-	Laboratory Information Management System
LLD	-	Low Limit Detection
LOD	-	Limit of Detection
LOQ	-	Limit of Quantitation
MDC	-	Minimum Detection Concentration
MDL	-	Method Detection Limit
MBLK	-	Method Blank
MS/MSD	-	Matrix Spike/Matrix Spike Duplicate
NEHA	-	National Environmental Health Association
NELAC	-	National Environmental Laboratory Accreditation Conference
NELAP	-	National Environmental Laboratory Accreditation Program
NIOSH	-	National Institute for Occupational Safety and Health
NIST	-	National Institute of Standards and Technology
NPDES	-	National Pollutant Discharge Elimination System
OSHA	-	Occupational Safety and Health Administration
pCi/L	-	Picocuries per Liter
PT	-	Proficiency Testing
QA/QC	-	Quality Assurance / Quality Control
QS	-	Quality Systems
QAM	-	Quality Assurance Manual

RDL	-	Required Detection Level
RCRA	-	Resource Conservation and Recovery Act
RL	-	Reporting Limit
RPD	-	Relative Percent Difference
RSD	-	Relative Standard Deviation
SOP	-	Standard Operating Procedure
SPK	-	Spike
Std	-	Standard
SVOC	-	Semi-Volatile Organic Compound
TNI	-	The NELAC Institute
ug/L	-	Micrograms Per Liter
UV/VIS	-	Ultraviolet/Visible Spectroscopy
VOC	-	Volatile Organic Compound
WET	-	Whole Effluent Toxicity

APPENDIX A

Laboratory Certifications

DEPARTMENT OF
PUBLIC HEALTH AND HUMAN SERVICES
STATE OF MONTANA

ENVIRONMENTAL LABORATORY

CERTIFIED DRINKING WATER PARAMETERS

ENERGY LABORATORY, INC.
3161 East Lyndale
Helena, MT 59604
CERT0079
Chemistry Expiration 01/01/2016
Microbiology Expiration 01/01/2016

MICROBIOLOGY PARAMETERS

PARAMETER	METHOD
Total Coliforms	SM 9223 B
E. coli	SM 9223 B

ENUMERATION	METHOD
Total Coliforms	SM 9223 B
E. coli	SM 9223 B

INORGANIC PARAMETERS

PARAMETER	METHOD 1	METHOD 2
Aluminum	EPA 200.7	EPA 200.8
Arsenic	EPA 200.8	
Antimony	EPA 200.8	
Barium	EPA 200.7	EPA 200.8
Beryllium	EPA 200.7	EPA 200.8
Cadmium	EPA 200.7	EPA 200.8
Chromium	EPA 200.7	EPA 200.8
Copper	EPA 200.7	EPA 200.8
Nickel	EPA 200.7	EPA 200.8
Lead	EPA 200.8	
Selenium	EPA 200.8	
Thallium	EPA 200.8	
Uranium	EPA 200.8	
Mercury	EPA 200.8	EPA 245.1
Iron	EPA 200.7	EPA 200.8
Manganese	EPA 200.7	EPA 200.8
Silver	EPA 200.7	EPA 200.8
Zinc	EPA 200.7	EPA 200.8
Fluoride	SM 4500-F-C	EPA 300.0
Nitrate	EPA 353.2	EPA 300.0
Nitrite	EPA 353.2	EPA 300.0
Total Dissolved Solids	SM 2540 C	
Turbidity	SM2130B	
Conductivity	SM 2510 B	
Ortho-Phosphate	EPA 365.1	EPA 300.0
pH	SM4500-HB	
Sulfate	EPA 300.0	EPA 300.0
Alkalinity	SM 2320 B	
Chlorate	EPA 300.0	

Chlorite	EPA 300.0
Chloride	EPA 300.0
Bromide	EPA 300.0
Bromate	EPA 300.0

VOLATILE ORGANIC COMPOUNDS

PARAMETER	METHOD
Bromodicloromethane	EPA 524.2
Bromoform	EPA 524.2
Chlorodibromethane	EPA 524.2
Chloroform	EPA 524.2
Total Trihalomethanes	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethylene	EPA 524.2
1,2 Dichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
Benzene	EPA 524.2
Carbon Tetrachloride	EPA 524.2
Chlorobenzene	EPA 524.2
cis-1,2-Dichloroethylene	EPA 524.2
Dichloromethane	EPA 524.2
Ethylbenzene	EPA 524.2
Styrene	EPA 524.2
Tetrachloroethylene	EPA 524.2
Toluene	EPA 524.2
trans-1,2-Dichloroethylene	EPA 524.2
Trichloroethylene	EPA 524.2
Vinyl Chloride	EPA 524.2
Xylenes	EPA 524.2
1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloropropane	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2-Dibromoethane	EPA 524.2
1,2-Dibromo-3-Chloropropane	EPA 524.2
1,2,3-Trichlorobenzene	EPA 524.2
1,2,3-Trichloropane	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichlorobenzene	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromobenzene	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
Cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2

Fluorotrichloromethane	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
Methyl tert Butyl ether (MTBE)	EPA 524.2
Naphthalene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
o-Chlorotoluene	EPA 524.2
p-Chlorotoluene	EPA 524.2
p-Isopropyltoluene	EPA 524.2
sec-Butylbenzene	EPA 524.2
tert-Butylbenzene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2

APPENDIX B

Quality Systems Controlled Documents

- Quality Assurance Manual
- Laboratory SOPs
  - Organization and Personnel (10-Series)
  - General Facility Operations (20-Series)
  - General Laboratory Procedures (30-Series)
  - Equipment Use and Maintenance (40-Series)
  - Analytical Methods (50-Series)
- Laboratory Notebooks (Quality Assurance Department)
- Qualifications Manual (Corporate Document)
- Energy Laboratories Technical Services and Fee Schedule (Controlled by Corporate Marketing Department)
- Employee Policies and Procedures Package (Controlled by Corporate Human Resource Department)
- Corporate Safety Policies and Programs (Controlled by Corporate Safety Officer)

APPENDIX C
Quality Assurance / Quality Control Specifications

METHOD QA/QC PARAMETERS
MERCURY ANALYSIS BY COLD VAPOR AA
EPA METHODS 245.1(Rev 3.0, May 1994)/7470A
For Aqueous Analysis

QA Indicator	Frequency	Acceptance Criteria	Corrective Action	Comments
Instrument Calibration	Daily or as needed. Multi-point calibration and blank.	$R^2 \geq 0.995$	1) Recalibrate 2) Prepare fresh standards and recalibrate 3) Assess possible causes for failing calibration and adjust method if necessary.	Calibration of instrument. Calibration validity tested by ICV and MBLK
Initial Calibration Verification (ICV)	Following calibration. Is second source standard	R% = 90-110	1) Prepare fresh ICV, Reanalyze 2) Prepare fresh standards/ICV, recalibrate and reanalyze.	Evaluates accuracy/bias in calibration standards
Method Blank (MBLK)	1/preparation batch	< Reporting limit	1) Prepare fresh Blanks, Reanalyze 2) Recalibrate and reanalyze	Evaluates Instrument calibration, reagent contamination, and instrument carryover
Continuing Calibration Verification 1 (CCV1)	Initial CCV, immediately ran after ICV, once per calibration.	R%= 95-105%	1.) Reanalyze CCV1 2.) Recalibrate	Establishes the ability to generate precision and recovery. Named IPR in Cetac software.
Continuing Calibration Verification (CCV)	Analyzed immediately after calibration and after every 10 samples.	R%= 90-110%	1) Reanalyze CCV 2) Recalibrate and rerun all samples since last passing CCV.	Evaluates instrument calibration drift
Continuing Calibration Blank (CCB)	Run every 10 samples, run immediately after CCV.	< Reporting limit	1) Check for high concentration sample 2) Rinse and Reanalyze CCB 3) Reanalyze samples since last passing CCB	Measure analyte carryover in instrument and also evaluates possible contamination in reagents and glassware
Laboratory Control Sample (LCS)	1/preparation batch	90-110%	1) Repeat analysis 2) Correct problem 3) Re-extract and re-analyze all samples associated with LCS	Evaluates overall method accuracy/bias for the preparatory batch
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	Minimum 1/10 samples	R%=70-130% <20% RPD	1) Rerun spike 2) Evaluate lab fortified blank performance	Evaluates effect of matrix on method performance, if the spike is not in compliance, it may be attributed to matrix interference.

Sample Dilution (SD)	Every spiked parent sample	<10% RPD	1) Remake and rerun.	Evaluates for an interference with spiked samples.
LOD Verification	Annually per method requirement or whenever method changes might affect sensitivity	Positive Result	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-3X calculated MDL for single analyte test.
Control Charting and Proof of Competency	Annual statistical review of method. QC data for each analyst or as needed, MDL, PE samples.	Data statistically within control limits.	1) Correct method/instrument problem. 2) QA Audit method 3) Replace analyst	For statistical process control.
External PE Samples	Semiannual WP sample	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3)	External review of analytical method accuracy. Commonly RTC studies.
MDL Studies	Annually per method requirement or whenever method changes might affect sensitivity.	3 to 5 times the reporting limit.	1. Repeat 2. Evaluate cause of issue correct problem 3. Raise MRL to achievable level.	Evaluates minimum method detection limits in a clean matrix

METHOD QA/QC PARAMETERS
ANALYSIS OF SAMPLES FOR MERCURY IN SOLID OR SEMISOLID WASTE
EPA METHOD 7471B

QA Indicator	Frequency	Acceptance Criteria	Corrective Action	Comments
Instrument Calibration	Daily or as needed. Multi-point calibration and blank.	$R^2 \geq 0.995$	1) Recalibrate 2) Prepare fresh standards and recalibrate 3) Assess possible causes for failing calibration and adjust method if necessary.	Calibration of instrument. Calibration validity tested by ICV and MBLK
Initial Calibration Verification (ICV)	Following calibration. Is second source standard	R% = 90-110	1) Prepare fresh ICV, Reanalyze 2) Prepare fresh standards/ICV, recalibrate and reanalyze.	Evaluates accuracy/bias in calibration standards
Method Blank (MBLK)	1/preparation batch	< Reporting limit	1) Prepare fresh Blanks, Reanalyze 2) Recalibrate and reanalyze	Evaluates Instrument calibration, reagent contamination, and instrument carryover
Continuing Calibration Verification (CCV)	Analyzed immediately after calibration and after every 10 samples.	R%= 90-110%	1) Reanalyze CCV 2) Recalibrate and rerun all samples since last passing CCV.	Evaluates instrument calibration drift
Continuing Calibration Blank (CCB)	Run every 10 samples, run immediately after CCV1,CCV.	< Reporting limit	1) Check for high concentration sample 2) Rinse and Reanalyze CCB 3) Reanalyze samples since last passing CCB	Measure analyte carryover in instrument and also evaluates possible contamination in reagents and glassware
Laboratory Control Sample (LCS)	1/preparation batch	R%= 80-120%	1) Repeat analysis 2) Re-extract and re-analyze all samples associated with LCS	Evaluates overall method accuracy/bias for the preparatory batch
Laboratory Fortified Blank (LFB)	1/preparation batch	R%=80-120%	1) Repeat analysis 2) Re-extract and re-analyze all samples associated w/LFB	Evaluates analyte spike recovery in a clean matrix
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	Minimum 1/10 samples	R%=80-120% <20% RPD	1) Rerun spike 2) Evaluate lab fortified blank performance	Evaluates effect of matrix on method performance, if the spike is not in compliance, it may be attributed to matrix interference.

Sample Dilution (SD)	Every spiked parent sample	<10% RPD	1) Remake and rerun.	Evaluates for an interference with spiked samples.
LOD Verification	Annually per method requirement or whenever method changes might affect sensitivity	Positive Result	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-3X calculated MDL for single analyte test.
Control Charting and Proof of Competency	Annual statistical review of method. QC data for each analyst or as needed, MDL, PE samples.	Data statistically within control limits.	1) Correct method/instrument problem. 2) QA Audit method 3) Replace analyst	For statistical process control.
External PE Samples	Semiannual WP sample	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3)	External review of analytical method accuracy. Commonly RTC studies.
MDL Studies	Annually per method requirement or whenever method changes might affect sensitivity.	3 to 5 times the reporting limit.	1. Repeat 2. Evaluate cause of issue correct problem 3. Raise MRL to achievable level.	Evaluates minimum method detection limits in a clean matrix

Method QA/QC Parameters DETERMINATION OF METALS AND TRACE ELEMENTS IN WATER AND WASTES BY INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROMETRY (ICP) EPA METHOD 200.7 (Revision 4.4)/6010B (Revision 2, Dec 1996)				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Waters: Dissolved metals analyzed direct Drinking Waters: Check turbidity – turbidity <1 analyze direct, turbidity >1 digest per 200.2 method Total and Total Recoverable metals are all digested by 200.2 6010 Total and Total Recoverable waters: 3010 digestion Soils: Mine Soil: Specified Extraction Waste Soils: 3050 Digestion	Meet method QC criteria for the matrix.	1) Re-analyze sample. 2) Re-prepare sample/batch.	
Instrument Calibration (IC)	Daily, or when needed.	Multipoint calibration must have correlation coefficient =0.995 or better.	1) Recalibrate.	Minimum 1-point calibration and blank or multipoint calibration depending on instrument. Calibration validity tested by ICV, ICB.
Initial Calibration Verification (ICV)	Daily.	6010B R% =90-110 200.7 R%=95-105	1) Recalibrate and rerun. 2) Prepare fresh standards and/or ICV.	Evaluates accuracy of calibration standards. Second source standard. Immediately follows calibration.
Initial Calibration Blank (ICB)	Daily. Analyzed at beginning of run.	< Reporting Limit	1) Re-pour blanks, recalibrate, and rerun. 2) Prepare fresh	Evaluates instrument calibration, reagent contamination, and

			blank.	instrument carryover.
Low Level Calibration Verification (CRI)	Analyzed at beginning of run.	R% = 50-150	1) Limits are advisory	Verifies Instrument ability to detect/quantitate analytes near the reporting limit. Internal QC tracking purposes. Count as sample for CCVs.
Interference Check Sample "A" (ICSA)	Analyzed at beginning of run.	R% = 80-120 for interferents ± 2* reporting limit for analytes	1) Evaluate sample data. Results near reporting limit suspect if failing. 2) Rerun samples as needed.	Evaluates spectral interference correction factors. Count as sample for CCVs.
Interference Check Sample "AB" (ICSAB)	Analyzed at beginning of run.	R% = 80-120 for all elements	1) Re-determine IECs if failures persist. 2) Rerun samples as needed.	Evaluates spectral interference correction factors. Count as sample for CCVs.
Continuing Calibration Verification (CCV)	Analyzed at beginning of run, every 10 samples and at end of run.	200.7: R%=95-105 Immediately after Initial Calibration 6010B: R% = 90-110 (and as continuing calibration check for 200.7).	1) Recalibrate and rerun samples since last valid CCV. 2) Check for sample matrix problem.	Evaluates Instrument calibration drift. Same source standard.
Continuing Calibration Blank (CCB)	Analyzed after every CCV.	< Reporting Limit	1) Check for high concentration sample carryover 2) Re-analyze CCB. 3) Re-analyze samples as needed.	Measures instrument drift or analyte carryover.
Analytical Spike Sample (MS2/MSD2) (Direct)	Minimum 1/10 samples	6010B: R% = 75-12 200.7: R% = 70-130 % RPD 20%	1) Evaluate LFB performance. 2) Report spike as analyzed if LFB is acceptable. 3) Reprep and reanalyze samples.	Evaluates effect of matrix on method performance. An A Qualifier shows that the analyte level was greater than fou times the spike level. % recovery not calculated. MSD also evaluates method precision.
Serial Dilution Sample (SD or	When new matrix is encountered, 1 per batch,	RPD = 10% for analytes greater	1) Rerun samples.	Used for screening analyses evaluating

dil)	or 1 per 20 samples	than 50 * PQL	2) Run samples on dilution.	new matrices. An N Qualifier shows that the analyte concentration was not sufficiently high to calculate a RPD for the serial dilution test.
Method Blank (MBLK)	1 per analytical run for direct samples or 1 per digestion batch	< Reporting Limit	1) Re-analyze MBLK. 2) Re-digest samples from batch which fail acceptance criteria or flag and report data.	Evaluates possible contamination in reagents and glassware.
Laboratory Fortified Blank (LFB)	1 per analytical run for direct samples, or 1 per digestion batch for 3050 samples	Direct R% = 85-115 3050 R% = 80-120	1) Re-analyze. 2) Re-digest sample batch or flag data.	Evaluates preparation method accuracy.
Laboratory Control Sample (LCS)	1 per digestion batch	Waters: 85-115% Solid/soils: Within established acceptance ranges.	1) Re-analyze LCS. 2) Re-digest sample batch or flag data.	Evaluates preparation method accuracy.
Pre-digestion Spike Sample (MS3/MSD3)	Minimum 1/10	R% = 200.7: 70 - 130 6010B: 75 - 125 % RPD ? 20%	1) See LCS performance. 2) Report spike as analyzed if LCS is acceptable. 3) Reprep and reanalyze.	Evaluates effect of matrix on method performance. An A Qualifier shows that the analyte level was greater than fou times the spike level. % recovery not calculated. MSD also evaluates method precision.
Post Digestion Spike (PDS/PDSD)	20% of samples for 6010B or 1/batch	R%= 6010B: 75-125	LFB/LCS must be passing 1) If matrix interference suspected report as found, or 2) Use “A” qualifier for sample amount > 4X spike level.	Evaluates effect of matrix on method performance. Use the same solution and concentration as LFB/LCS.
Internal Standards (IS)	All samples & QC in sequence	70-130% Advisory Limits	1) Evaluate data for sample matrix affects	Quantitation using Internal Standards improves method accuracy. IS recoveries can

				be affected by sample matrix.
IDL Studies	Annually	Prior Studies	1) Repeat if obvious problem occurs.	Evaluates overall instrument detection limits in clean sample matrix.
MDL Studies	Annually, or whenever method changes might affect sensitivity	Compare to prior MDL Studies < Reporting Limit	1) Repeat if obvious problem occurs. 2) Adjust reporting limit to >MDL.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification Required for each analyte/ method to verify calculated MDL.	Annually per method requirement or whenever a new MDL study is performed.	Positive Result Above signal–to-noise	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-4X MDL for multiple analyte tests.
Inter-Element Correction Factor Studies	Annually, or whenever instrument changes might affect interelement effects. Verified every 6 months.	Comparison to historical data.	1) Repeat. 2) Correct problem.	Correction factors to account for spectral overlap between differing elements.
Upper Linear Range Studies	Annually, or whenever method changes might affect sensitivity.	Comparison to historical data.	1) Repeat. 2) Correct problem. 3) Adjust upper calibration limit.	Used to determine upper linear range for instrument.
External PE Samples	WS and WP and internal blind samples	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3)	External review of analytical method accuracy.
Prep Batch	Each daily analytical sequence. Prepped Samples = Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria	1) Reanalyze batch or qualify results	A group of samples and associated QC
Control Charting/Proof of Competency	Annual, statistical review of method QC data for each analyst or as needed	Data statistically within control limits	1) Correct method problem 2) Adjust control limits	For statistical process control

DETERMINATION OF METALS AND TRACE ELEMENTS IN WATER AND WASTES BY INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY (ICP/MS) EPA METHOD 200.8 (Rev 5.4, May 1994) For Water, Waste, and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Instrument Calibration	Daily, or when needed. 3-point calibration and blank.	See other QC samples.	None	Calibration of Instrument. Calibration validity tested by ICV, CCB, CCV
Initial Calibration Verification (ICV)	Immediately follows calibration. Second source standard used.	R% =90-110 as continuing calibration check	For initial calibration check. 1) Recalibrate and rerun. 2) Prepare fresh standards and/or ICV.	Evaluates accuracy/ bias in calibration standards.
Interference Check Sample "A" (ICSA)	Run at beginning and end of run. Count as sample for CCVs.	R% = 70-130 for interferents ± 2* reporting limit for analytes	1) Evaluate sample data. Results near reporting limit suspect if failing. 2) Rerun samples as needed.	Evaluates spectral interference correction factors.
Interference Check Sample "AB" (ICSAB)	Run at beginning and end of run. Count as sample for CCVs.	R% = 70-130 for interferents and analytes	1) Re-determine IEC's if failures persist. 2) Rerun samples as needed.	Evaluates spectral interference correction factors.
Continuing Calibration Verification (CCV)	Run every 10 analytical samples and at end of run.	R% = 90-110	1) Recalibrate and rerun samples since last valid CCV. 2) Check for sample matrix problem.	Evaluates Instrument drift.
Continuing Calibration Blank (CCB)	Run after every CCV.	Larger of ± 1*lowest reporting limit or 2.2 X MDL.	1) Check for high concentration sample. 2) Reanalyze CCB. 3) Reanalyze affected samples.	Measures analyte carryover and possible contamination.
Analytical Duplicate Sample/ Analytical Spike Duplicate (MSD)	Minimum 1/10 samples for each total and dissolved matrix	Larger of 3 * PQL or 20% RPD	1) See LCS performance. 2) Rerun only if you made an error in making the spike. 3) Report spike as analyzed.	Measures method precision.
Analytical Spike Sample (MS) (Post-digestion spike for digested samples)	Minimum 1/10 samples for each total and dissolved matrix	R% = 70-130	1) See LCS performance. 2) Rerun only if you made an error in making the spike. 3) Report spike as analyzed.	Evaluates affect of matrix on method performance.
Initial Calibration Blank (ICB)	1/analytical run	Larger of ± 1*lowest reporting limit or 2.2 X MDL.	1) Re-pour blanks, recalibrate, and rerun. 2) Prepare fresh blank.	Evaluates instrument calibration, reagent contamination,

				and instrument carryover.
Laboratory Fortified Blank (LFB)	1/analytical run	R% = 85-115	1) Re-digest sample batch or flag data.	Evaluates preparation method precision and accuracy.
Method Blank (MB)	1/digestion batch	Larger of ± 1*lowest reporting limit or 2.2 X MDL.	1) Repeat analysis. 2) Re-digest sample batch or flag data.	Evaluate possible preparation method contamination.
Laboratory Control Sample	1/digestion batch	R% = 85-115	1) Repeat analysis. 2) Re-digest sample batch or flag data.	Evaluate preparation method precision and accuracy.
Digestion Duplicate Sample/ Matrix Spike Duplicate (MSD3)	1/digestion batch	Larger of 3 * PQL or 20% RPD	1) See LCS performance. 2) Rerun only if you made an error in making the spike. 3) Report spike as analyzed.	Evaluates preparation method precision.
Digestion Laboratory Fortified Sample Matrix (MS3)	1/digestion batch	R% = Water : 70- 130 Waste: 75 - 125	1) See LCS performance. 2) Rerun only if you made an error in making the spike. 3) Report spike as analyzed.	Evaluates preparation method efficiency and sample matrix effects.
MDL Studies	Annually, or whenever method changes might affect sensitivity	Prior studies	1. Repeat if obvious problem occurs. 2. Adjust reporting limit to MDL.	Evaluates overall method detection limits in clean sample matrix.
LOD Verification	Following MDL study	Positive result (above background)	1 Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis 4) Consult QA)	Spike sample at 1-4x the MDL.
Upper Linear Range Studies	Annually, or whenever method changes might affect sensitivity	Comparison to historical data.	1) Repeat. 2) Correct problem. 3) Adjust upper calibration limit.	Used to determine upper linear range for instrument.
External PE Samples	WS and WP and internal blind samples	EPA/ERA defined control limits	1) Repeat 2) Correct problem.	External review of analytical method accuracy.

METHOD QA/QC PARAMETERS VOLATILE PETROLEUM HYDROCARBONS (VPH) PER MASSACHUSETTS METHOD 2004 REVISION For Water, Waste, and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Soils: Extracted by SW 5035 (medium/high level) then analyzed by Purge & Trap per 5030B. 10 grams Soil/10mL of methanol VPH Surrogates added to all samples before extraction. Waters: VOA Vials, preserve to a PH<2.	Meet all method QC criteria for the matrix.	1) Re-analyze sample.	VPH surrogates added to all sample before extraction. Waters are introduced into the GC/MS using Purge & Trap. Soils are extracted into methanol and the methanol extract is added to water and analyzed by Purge and Trap/GC/MS.
Instrument Calibration (IC)	5 Point calibration to precede analyses. Use average response factors. Certain compounds are selected for FID calibration and other compounds are used for PID calibration.	25% RSD of Mean Response Factors. Includes individual compound response factors and range response factors.	1) Correct problem. 2) Prepare new standards. 3) Recalibrate.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest. Calibration of instrument and check of response linearity. Consists of a 13 component standard containing both aliphatic and aromatic hydrocarbons
Initial Calibration Verification (ICV)	Follows valid initial calibration. (See Blank Spike)	%R= 75-125%	1) Correct problem. 2) Recalibrate and re-analyze ICV.	Evaluates accuracy/bias in calibration standards.
Continuing Calibration Verification (CCV)	Every 24 Hours and at the end of every analytical sequence	%R= 75-125% of Initial Calibration for the CCV preceding sample analyses.	1) Correct problem. 2) Re-analyze CCV. 3) Recalibrate and re-analyze all samples since last valid calibration check.	Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard or ICV.
Method Blank (MB)	Before samples, and at least one MB every 24 hours.	½ of PQL for target analytes	1) Repeat analyses once. 2) Correct problem. 3) Re-extract and re-analyze all samples associated with failing method blank.	Evaluates overall method including possible contamination in reagents and glassware utilized in preparatory batch. Soil method blanks use clean sand.
Matrix Spike and Matrix Spike duplicate (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	%R = 70-130 %RPD < 20	1) Repeat analyses. 2) Re-extract and re-analyze MS, (if sufficient sample).	Evaluates affect of matrix on method performance.

METHOD QA/QC PARAMETERS VOLATILE PETROLEUM HYDROCARBONS (VPH) PER MASSACHUSETTS METHOD 2004 REVISION For Water, Waste, and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Lab Control Sample (LCS) (Blank Spike)	Minimum 1/20 samples Soils LCSs are prepared using a blank sand matrix.	%R = 70-130	1) Repeat analyses. 2) Prepare new standards. 3) Recalibrate. 4) Re-extract and re-analyze all samples associated with failing LCS (laboratory fortified blank).	Evaluates overall method precision and accuracy. Method specifies 70-130.
Surrogates	Present in all extracted samples (including QC).	Trifluorotoluene %R = 70-130	1) Repeat analyses. 2) Recalibrate with fresh fortification standard. 3) Re-extract samples.	Evaluates method performance on each individual sample analyzed.
Analyte Confirmation in Samples	Confirm target VPH analytes by GC/MS analyses.	Upon client request.	None	Analyte identifications in samples are not routinely confirmed. GC/MS confirmation done only per client request.
MDL Studies	MDL - Annually for water and soils and initially for each new instrument setup.	MDL< PQL	1) Repeat once. 2) Correct problem.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification Required for each analyte/method to verify calculated MDL.	Annually based on MDL Study frequency.	Positive Result, (Above background)	1) Examine method or preparatory steps. 2) Verify MDL study. 3) Repeat analysis. 4) Consult QA.	Spike at 2-3X calculated MDL.
External PE Samples	Semi-annually, WP and LPTP soil study samples.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1) Complete corrective action report. 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual, statistical review of method.	Data statistically within control limits.	1) Trend Analysis/ Method Review. 2) Correct method/instrument problem. 3) Replace analyst.	For statistical process control.
Batch	Each batch consists of a maximum of 20 samples.	Must pass all method QC criteria	Re-analyze batch or qualify results.	A group of samples and associated QC.

METHOD QA/QC PARAMETERS EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) PER MASSACHUSETTS METHOD 2004 Revision For Water, Waste, and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Methods: Soils: 3550 (30 grams to 1mL) Waters: 3510 or 3520 (1 Liter to 1 mL) EPH extraction surrogates added to all samples prior to extraction. EPH separation surrogates added to extract just prior to separation.	Meet all method QC criteria for the matrix.	1) Re-analyze sample.	Samples are extracted using Methylene chloride solvent and then the extract is concentrated. Following separation of extract into an aliphatic and aromatic fraction each fraction is independently analyzed by GC/FID. Sample amount and final extract volume may be adjusted based on analyte levels and/or sample matrix.
Fractionation Check	Per each Lot # of Separation Cartridges Used	Effective separation of target analytes into appropriate fraction. %R=40-140 except the more volatile target analytes with >20% recovery.	1) Repeat once. 2) Correct problem (adjust elution volumes). 3) Prepare new standards. 4) Recalibrate.	Uses aliphatic and aromatic hydrocarbon standards in hexane. The more volatile aromatic and aliphatic compounds may have lower recoveries than method specified limits.
Initial Calibration (IC)	5 point initial calibration each for aliphatics and aromatics, external standardization option of method chosen. Aliphatic Standard Solution Aromatic Standard Solution Range: 1, 50, 200, 500, and 1000 ug/mL. To precede sample analyses.	25% RSD MnRF 25%RSD each component.	1) Repeat once. 2) Correct problem. 3) Prepare new standards. 4) Recalibrate.	Used to Calibrate instrument, evaluates chromatographic separation effectiveness, and instrument response linearity.

METHOD QA/QC PARAMETERS
EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) PER MASSACHUSETTS METHOD
2004 Revision
For Water, Waste, and Soil Analyses

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Chromatography	1) Each IC or CCC- Resolution is verified. 2) Retention Time Windows- Use RRT and analyst discretion for instrument stability.	Chromatographic resolution: Monitored against historical performance levels. 50% separation of phenanthrene and anthracene.	1) Repeat once. 2) Adjust column conditions. 3) Perform instrument maintenance. 4) Replace GC column.	Verifies that gas chromatographic system is operating properly. Resolution criteria for two selected PAH pairs are not met as per method specifications.
Initial Calibration Verification (ICV)	Follows the IC, using second source calibration standards.	+/- 25% of MnRF +/- 25% RF each component	1) Repeat once. 2) Prepare fresh standards and re-analyze. 3) Recalibrate and re-analyze all affected samples.	Evaluates accuracy of calibration standards.
Continuing Calibration Check (CCC)	Mid-level standard analyzed every 12 hours and at the end of every analytical sequence.	+/- 25% of MnRF +/- 25% RF each component	1) Repeat once. 2) Correct problem. 3) Recalibrate and re-analyze all samples since last valid calibration check.	Verifies instrument calibration and stability throughout analyses.
Method Blank (MBLK)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	<½ PQL	1) Repeat analyses once 2) Correct problem 3) Re-extract and re-analyze all samples associated with method blank.	Measures and evaluates possible contamination in reagents and glassware used in method.
Instrument Blank	Each 12 hour analytical sequence or as indicated, such as after a heavily contaminated extract. A method blank analysis can be substituted for an instrument blank.	<½ PQL	1) Repeat analyses once 2) Perform Instrument maintenance 3) Re-analyze all associated samples in analytical sequence where contamination level may affect result.	Measures and evaluates possible contamination in gas chromatographic analysis system.
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	%R = 40-140 except for the more volatile aromatic and aliphatic compounds which may have lower recovery. %RPD = 20% (advisory)	1) Repeat GC analyses 2) Re-extract and re-analyze MS/MSD, (if sufficient sample) or select another sample to MS. 3) Evaluate LFB performance.	Evaluates effect of individual matrix on method performance and method precision. Poor MS/MSD QC performance does not necessarily reject extraction batch group. Control limits are advisory due to sample matrix effects.

METHOD QA/QC PARAMETERS
EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) PER MASSACHUSETTS METHOD
2004 Revision
For Water, Waste, and Soil Analyses

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Blank Spike (BLKSPK)	Minimum 1/20 samples/matrix and each batch of samples, whichever is more frequent. Same spiking solution as for MS/MSD.	%R = 40-140 .	1) Repeat analyses. 2) Prepare new standards. 3) Recalibrate. 4) Re-extract and re-analyze all samples associated with LFB.	Evaluates method accuracy. Used for ongoing proof of competency.
Extraction Surrogates	Added to all samples prior to extraction (including QC). Ortho-Terphenyl (PAH fraction) and 1-Chloro-octadecane (Aliphatic fraction).	%R = 40-140 Control limits are advisory due to possible sample matrix effects.	1) Repeat analyses. 2) Evaluate for matrix effects. 3) Re-extract samples if method batch performance is suspected.	Evaluates extraction and separation method performance on each individual sample analyzed. Water samples containing sediment may have reduced analyte and surrogate extraction efficiency. Extraction performance alone can be evaluated from an EPH screening result.
Separation Surrogates	Surrogates added to sample extract prior to fractionation. 2-Bromonapthalene and 2-Fluorobiphenyl.	%R = 40-140 in Aromatic fraction. Control limits are advisory due to possible sample matrix effects.	1) Repeat analyses. 2) Evaluate for matrix effects. 3) Re-extract samples if method batch performance is suspected.	Evaluates the effectiveness of the aliphatic/aromatic separation step. Proportional Level of presence of either surrogate in the aliphatic fraction suggests incomplete separation of the more volatile PAHs from the aliphatic fraction.
EPH Screening	Analyses of extract prior to the separation step of the EPH method.	%R = 40-140 for extraction surrogates. Full EPH recommended if TEH result >0.1mg/L for waters or 50ug/g for soils.	1) Repeat analyses. 2) Evaluate for matrix effects. 3) Re-extract samples if method batch performance is suspected.	Evaluates method extraction performance on each individual sample analyzed. Target analyte levels in result are used to determine if full EPH analyses is necessary.

METHOD QA/QC PARAMETERS EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) PER MASSACHUSETTS METHOD 2004 Revision For Water, Waste, and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
PAH Target Analyte Confirmations	Analyses performed by 8270 on Aromatic fraction if PAH target analytes are present above MTDEQ limits.	Meets 8270 analyses criteria.	1) Repeat analyses to meet all 8270 method QC criteria.	Confirms and accurately quantitates PAH levels in aromatic extract. 8270 method is considered less sensitive to false positives than the EPH method.
MDL Studies	MDL – Annually for water and soils and initially for each new instrument setup.	MDL< PQL	1. Repeat once 2. Correct problem	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification	Following MDL to confirm calculated MDL value.	Positive Result	1) Examine method or preparatory steps. 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-4X MDL for multiple analyte tests.
External PE Samples	Semi-annually, WP and LPTP (soil) study samples.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies).	1) Complete corrective action report. 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual, statistical review of method.	Data statistically within control limits.	1) Trend Analysis/ Method Review. 2) Correct method/instrument problem. 3) Replace analyst.	For statistical process control.
Batch Definition	Prepped Samples = Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria.	Re-analyze batch or qualify results.	A group of samples and associated QC.

METHOD QA/QC PARAMETERS VOLATILE ORGANICS BY PURGE AND TRAP GC/MS EPA Method SW-846 8260B for Soil and Water				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Methods: Soils: Extracted by SW 5035 (medium/high level) then analyzed by 5030B Purge & Trap. Waters: 5030B Purge & Trap. Surrogates added to all samples and QC samples.	Meet method QC criteria for the matrix.	1) Re-analyze sample.	Waters are introduced into the GC/MS using Purge & Trap. Soils are extracted into methanol and the methanol extract is added to water and analyzed by Purge and Trap/GC/MS.
Initial Calibration	5-7-point initial calibration Range: = 0.5, 1.0, 2, 5, 10, 15, 20 ug/L. (Poorly responding compounds, such as selected alcohols and ketones are at 20X higher ranges).	If %RSD<15 use average RF, alternatively use higher order calibration curve models with >0.995 correlation coefficient. CCC= Continuing Calibration Check Compounds. Calibration curve (first or higher order), all analytes %RSD<30 then R2 >0.99, RF for SPCCs >0.3000 for Chlorobenzene and 1,1,2,2-Tetrachloroethane; >0.1 for Chloromethane and 1,1-Dichloroethane, and Bromoform.	1) Perform instrument maintenance. 2) Recalibrate. 3) Prepare new Standards.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest.
Tuning	BFB Initially and every 12 hours thereafter.	Meet method-tuning criteria.	1) Adjust instrument. 2) Recheck tune. 3) Until successful.	Evaluate mass sensitivity, mass resolution, isotope ratio, and baseline threshold.
Continuing Calibration Check (CCC)	Mid-level standard analyzed every 12 hours.	RF ± 20% of IC for CCCs, 30% for all others. Internal Standard areas %R = 50-150 of IC. RF acceptance criteria for SPCCs same as for initial calibration.	1) Remake and re-analyze. 2) Re-analyze instrument tune 3) Recalibrate and re-analyze all samples since last valid calibration check.	Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard or ICV.
Method Blank (MBLK)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	<½ PQL	1) Repeat analyses once. 2) Correct problem. 3) Re-extract and re-analyze all samples associated with failing method blank.	Evaluates overall method including possible contamination in reagents and glassware utilized in preparatory batch.

METHOD QA/QC PARAMETERS VOLATILE ORGANICS BY PURGE AND TRAP GC/MS EPA Method SW-846 8260B for Soil and Water				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	CLP SOW 3/90 Statistical Control Limits Precision = <20% RPD	1) Repeat analyses. 2) Re-extract and re-analyze MS, (if sufficient sample). 3) Evaluate LFB performance.	Evaluates effect of matrix on method performance.
Lab Fortified Blank (LFB) or Lab Control Sample (LCS)	Minimum 1/20 samples/matrix and each batch of samples, whichever is more frequent. Use second source standards to check calibration.	Statistical Control Limits. Includes the 65 compounds on ELI Short List.	1) Repeat analyses. 2) Prepare new standards. 3) Recalibrate. 4) Re-extract and re-analyze all samples associated with failing LFB/LCS.	Evaluates overall method precision and accuracy. Method specifies %R=70-130.
Internal Standards (Samples and QC)	Monitor total areas in each analysis. Fluorobenzene Chlorobenzene-d5 1,2-Dichlorobenzene-d5	Samples: Area % 50-150% of Initial Calibration. RT = ±30 sec of Initial Calibration.	1) Repeat analyses. 2) Re-prepare samples. 3) Analyze different sample. 4) Re-analyze set of samples.	Measures instrument stability and sensitivity.
Surrogates	Present in all extracted samples (including QC) 1,2-Dichloroethane-d4 Toluene-d8 p-Bromofluorobenzene Dibromofluoromethane	Statistical Control Limits	1) Repeat analyses. 2) Recalibrate with fresh fortification standard. 3) Re-extract samples.	Evaluates method performance on each individual sample analyzed.
Mass Spectra	Review all target analytes in standards, and also target compounds found in samples.	Spectra must be consistent with library database.	1) Verify calibration spectra and retention times. 2) Repeat analyses.	Used to qualitatively identify target compound hits in samples.
MDL Studies	MDL - Annually for water and soils and initially for each new instrument setup or analyst.	MDL< PQL	1) Repeat once. 2) Correct problem.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification (Required for each analyte/method to verify calculated MDL. If not completed, then LOQ verification must be performed.)	Annually based on MDL Study frequency.	Positive Result, (Above background)	1) Examine method or preparatory steps, 2) Verify MDL study. 3) Repeat analysis. 4) Consult QA	Spike at 2-3X calculated MDL.

METHOD QA/QC PARAMETERS VOLATILE ORGANICS BY PURGE AND TRAP GC/MS EPA Method SW-846 8260B for Soil and Water				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
External PE Samples	Semi-annually, WP study samples.	PT sample defined acceptance limits. (Must pass 2 out of last 3 PT studies).	1) Complete corrective action report. 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual, statistical review of method.	Data statistically within control limits.	1) Trend Analysis/ Method Review. 2) Correct method/instrument problem. 3) Replace analyst.	For statistical process control.
Batch Definition	Each batch of 20 samples.	Must pass all method QC criteria as specified above.	Re-analyze batch or qualify results.	A group of samples and associated QC.

METHOD QA/QC PARAMETERS SEMIVOLATILE ANALYSES BY GC/MS By SW-846 Method 8270C and EPA 625				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation Extraction	SW-846 Methods: Soils: 3550B or 3545. Waters: 3510C or 3520C. Wastes: 3550B, 3545, 3580. Surrogates added to all samples.	Meet Method QC criteria for the matrix.	1) Re-analyze sample or re-extract sample. 2) If re-extraction outside of holding time, report both sets of data.	Minimum sample volume required per sample. Soils: 30 grams Water: 1 Liter.
Instrument Calibration (IC)	7-point calibration Range: 10, 20, 50, 75,100,120, 150ug/mL. Bottom point or two may be dropped for reactive compounds as long as five consecutive points are used at a minimum.	See Note #1 at bottom.	1) Perform instrument maintenance. 2) Recalibrate. 3) Prepare new Standards.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest.
Instrument Blank	Following instrument calibration or beginning of each analytical sequence. May be substituted with batch method blank.	Clean baseline. No target analytes.	1) Re-analyze. 2) Perform instrument maintenance.	Evaluates instrument performance chromatographic baseline.
Tuning	DFTPP Initially and every 12 hours thereafter.	Meet method-tuning criteria.	1) Adjust instrument. 2) Recheck tune. 3) Until successful.	Evaluates mass sensitivity, mass resolution, isotope ratio, and baseline threshold.
Initial Calibration Verification (ICV)	Immediately following calibration.	RF for SPCC>0.050 %R of CCCs must be ±20% difference from IC. 625 Method: %R for all compounds is ±20%.	1) Repour and re-analyze. 2) Prepare fresh calibration standards and/or ICV. 3) Recalibrate and re-analyze.	Evaluates calibration accuracy and method performance. Must be prepared from second source standard.
Method Blank (MBLK)	Immediately follows ICV. Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	< ½ PQL excepting phthalates.	1) Prepare fresh blank. 2) Re-extract and re-analyze all samples associated with failing method blank.	Evaluates calibration accuracy, reagent/ glassware contamination, and instrument carryover.

METHOD QA/QC PARAMETERS SEMIVOLATILE ANALYSES BY GC/MS By SW-846 Method 8270C and EPA 625				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Continuing Calibration Verification (CCV)	Mid-level standard analyzed every 12 hours to update internal standard response factors (RF).	RF for SPCC>0.050 %R of CCCs must be ±20% difference from IC. 625 Method: %R for all compounds is ±20%.	1) Remake and re-analyze. 2) Re-analyze instrument tune. 3) Recalibrate and re-analyze samples since last valid CCV.	Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard or ICV.
GC Performance Analyte Degradation	Each tuning; Evaluate TIC areas of DDT breakdown products and chromatographic profile.	< 20% breakdown	1) Instrument maintenance. 2) Re-check tune.	Evaluates chromatographic system for reactivity.
Matrix Spike (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent. For 8270-A representative list. For 625- All target analytes.	See LCS limits. Statistical control limits. RPD: 40%	LCS must be passing 1) If matrix interference suspected report as found, or 2) Re-extract and re-analyze MS if no matrix interference suspected (if sufficient sample). 3) Evaluate LCS performance (See Note #3 at bottom).	Evaluates effect of matrix on method performance. MSD also evaluates method precision.
Duplicate Sample (DUP)	1/10 samples Or 1/20 samples depending on method	5, 10, 20% RPD or 2X PQL depending on method	1) Re-analyze sample pair, evaluate for sample homogeneity or 2) Report with qualifiers.	Evaluates method precision. MSD duplicate analyses preferred on some methods.
Laboratory Control Sample (LCS)	Minimum 1/20 samples/matrix and each batch of samples, whichever is more frequent.	Reference Material specified limits or laboratory statistical limits. 625 method: Limits don't exceed method criteria.	1) Prepare new Standards. 2) Recalibrate. 3) Re-extract and re-analyze all samples associated with failing LCS.	Evaluates spiking technique and when prepared from a source independent of the calibration standards can also measure method performance.
Internal Standards	Monitor total areas in each analysis. Acenapthene-d10 Phenanthrene-d10 Chrysene-d12 1,4-Dichlorobenzene-d4 Napthalene-d8 And Perylene-d12.	Samples: Area % 50-150% of Initial Calibration. RT = ±30 sec of Initial Calibration.	1) Repeat analyses. 2) Re-prepare samples. 3) Analyze different sample. 4) Re-extract and re-analyze set of samples.	Measures instrument stability and sensitivity.
Mass Spectra	Review all target analytes in standards and reported analytes in samples.	Spectra must be consistent with library database.	1) Verify calibration spectra and retention times. 2). Repeat analyses.	Used to qualitatively identify target compound hits in samples.

METHOD QA/QC PARAMETERS
SEMIVOLATILE ANALYSES BY GC/MS
By SW-846 Method 8270C and EPA 625

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Surrogates	Present in all extracted samples (Including QC).	Reference Material specified limits or laboratory statistical limits. 625 Method: Limits don't exceed method criteria.	1) Repeat analyses. 2) Recalibrate with fresh fortification standard. 3) Re-extract samples.	Evaluates method performance on each individual sample analyzed.
MDL Studies	Annually for water and soils. Initially for each new instrument setup or analysts.	0.5X of PQL PQL = 10 ug/L or 0.33 ug/g with exceptions (See Note #4 at bottom).	1) Repeat if obvious problem occurs. 2) Adjust reporting limit to > MDL. 3) LOD analysis.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification	Following MDL to confirm calculated MDL value.	Positive Result	1) Examine method or preparatory steps. 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-4X MDL for multiple analyte tests.
External PE Samples	Semiannual WP and LPTP (soil) PT studies.	PT sample defined acceptance limits. (Must pass 2 out of last 3 PT studies).	1) Complete corrective action report. 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual, statistical review of method.	Data statistically within control limits.	1) Trend Analysis/ Method Review. 2) Correct method/instrument problem. 3) Replace analyst.	For statistical process control.
Batch Definition	Prepped Samples = Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria.	Re-analyze batch or qualify results	A group of samples and associated QC.

Note #1: %RSD for CCC (Table 4 SOP ELI 50-009) <30. RF for SPCCs (N-nitroso-di-n-propyl amine, hexachlorocyclopentadiene, 2, 4 Dinitrophenol, and 4-Nitrophenol) > 0.050.
If % RSD for a compound is < 15, linearity is assumed and average RF is used.
If % RSD > 15 (and less than 30 for CCC), use a calibration curve with correlation coefficient >= 0.990.
Lower calibration levels are not used for certain compounds. PQLs are adjusted as appropriate.

Note #2: RF for SPCC>0.050, RF of CCCs must be <20% difference from IC. RF of all other compounds must be <30% difference from IC.

Note #3: If any analyte in the MS/MSD fails, QC limits for failed compounds must be within acceptable recovery limits for the blank spike laboratory control sample.

Note #4: 4-Nitrophenol, Pentachlorophenol, 2,4-Dinitrophenol, 4,6-Dinitro-2-methylphenol = 50 ug/L.

QA/QC Method Parameters INDUCTIVELY COUPLED PLASMA- MASS SPECTROMETRY EPA METHOD 6020				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Dissolved Waters: Analyze direct. 6020 Total Waters: 3010 Digestion Soils, sludges: 3050 Digestion TCLP: 1311 Extracts: 3010 Digestion	Meet method QC criteria for the matrix.	1) Re-analyze sample. 2) Re-prepare sample/batch.	
Instrument Calibration (IC)	Daily, or when needed. 4-point calibration and blank.	RSD <20%, Alternatively use calibration curve R2>0.99 Evaluated by QC.	1) Correct problem. 2) Prepare new standards. 3) Recalibrate.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest. Calibration validity tested by ICV, ICB.
Initial Calibration Verification (ICV)	Immediately follows calibration. Second source standard used.	R% =90-110 Immediately after IC when new standards are prepared.	1) Recalibrate and re-analyze. 2) Prepare fresh standards and/or ICV.	Evaluates accuracy of calibration standards.
Interference Check Sample "A" (ICSA)	Analyzed at beginning of analytical sequence. Count as sample for CCVs.	R% = 70-130 for Interferents and analytes	1) Evaluate sample data. Results near reporting limit suspect if failing. 2) Re-analyze samples as needed.	Evaluates spectral interference correction factors.
Interference Check Sample "AB" (ICSAB)	Analyzed at beginning of analytical sequence. Count as sample for CCVs.	R% = 70-130 for interferents and analytes	1) Re-determine IECs if failures persist. 2) Re-analyze samples as needed.	Evaluates spectral interference correction factors.
Continuing Calibration Verification (CCV)/ Instrument Performance Check (IPC)	Analyzed at beginning of analytical sequence, every 10 samples and at end of run. Same source standard.	Immediately after IC R% = 90-110 as continuing calibration check.	1) Recalibrate and re-analyze samples since last valid CCV. 2) Check for sample matrix problem.	Evaluates Instrument calibration drift.
Continuing Calibration Blank (CCB)	Analyzed after every CCV.	Larger of ± 1*lowest reporting limit or 2.2 X MDL.	1) Check for high concentration sample. 2) Re-analyze CCB. 3) Re-analyze affected samples.	Measures instrument drift or analyte carryover.
Analytical Spike Sample (MS)	Minimum 1/10 samples	R% = 75-125	1) Evaluate LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Evaluates effect of matrix on method performance. Results not evaluated when sample analyte concentration > 4X spike level.

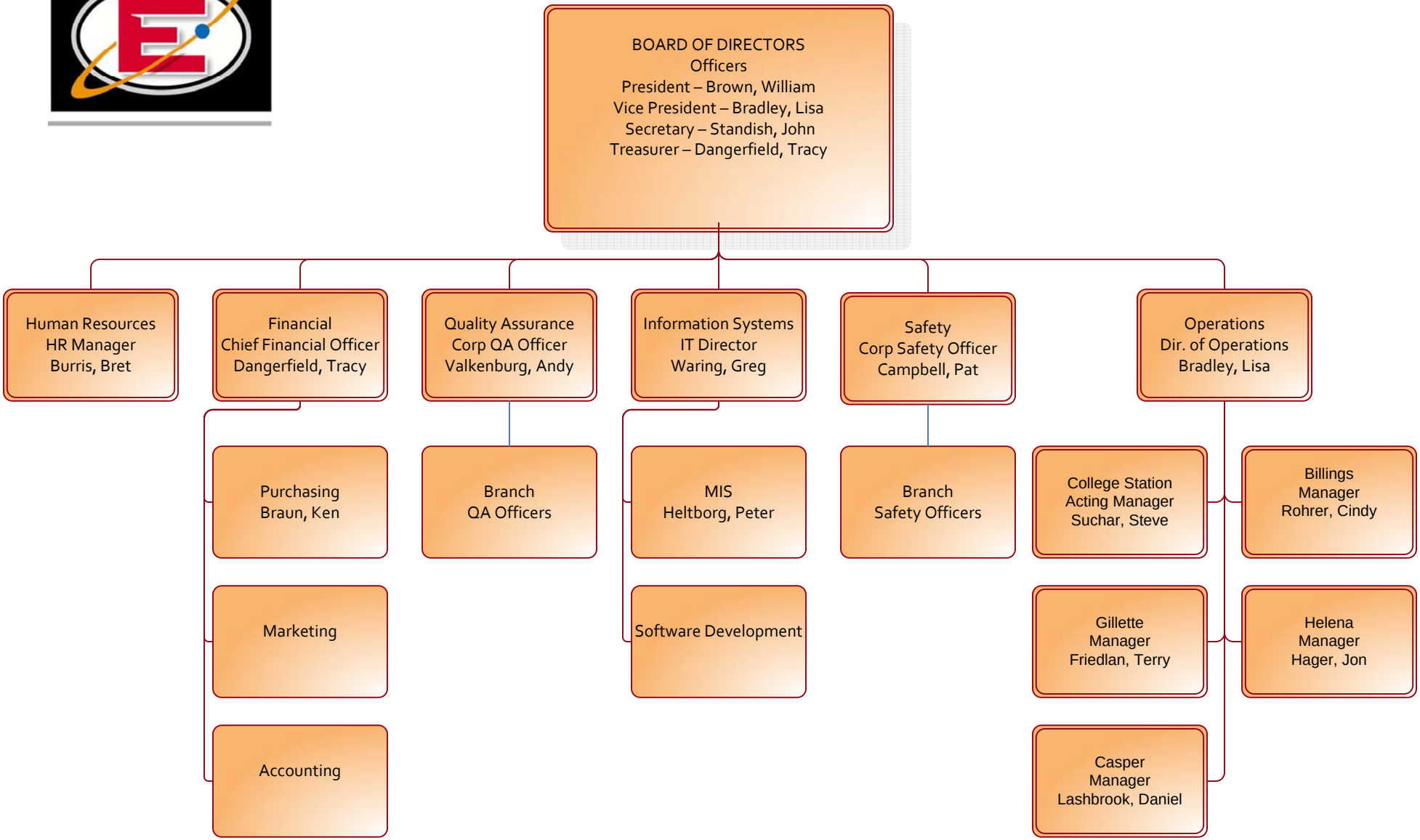
QA/QC Method Parameters INDUCTIVELY COUPLED PLASMA- MASS SPECTROMETRY EPA METHOD 6020				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Analytical Spike Duplicate (MSD), or Analytical Duplicate Sample	Minimum 1/10 samples	Larger of 3 * PQL or 20% RPD %R see MS	1) See LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Measures method precision/sample homogeneity.
Serial Dilution Sample	When new matrix is encountered or 1 per batch or 1 per 20 samples	R% = 90-110 for analytes greater than 50 * PQL	1) Re-analyze samples. 2) Analyze samples on dilution.	Used for screening analyses evaluating new matrices.
Method Blank (MBLK)	1 per analytical sequence for direct samples, or 1 per digestion batch	Larger of ±1*lowest reporting limit or 2.2 X MDL	1) Re-analyze LRB/MBLK. 2) Re-digest samples from batch which fail acceptance criteria or flag and report data.	Evaluates calibration accuracy, reagent/ glassware contamination, and instrument carryover.
Laboratory Fortified Blank (LFB)/ Laboratory Control Sample (LCS)	1 per analytical sequence for direct samples, or 1 per digestion batch	R% = 80-120	1) Re-analyze LFB/LCS. 2) Re-digest sample batch or flag data.	Evaluates preparation method accuracy.
Laboratory Fortified Sample Matrix (MS3)	Minimum 1/20 or 1/digestion batch	R% =75 – 125	1) See LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Evaluates effect of matrix on method performance. Results not evaluated when sample analyte concentration > 4X spike level.
Matrix Spike Duplicate (MSD3) or Digestion Duplicate Sample	Minimum 1/20 or 1/digestion batch	Larger of 3 * PQL or 20% RPD	1) See LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Measures method precision/sample homogeneity.
Internal Standards (IS)	All sample & QC in analytical sequence	70% - 125%	1) Repeat analyses. 2) Analyze a dilution of sample if matrix effects are suspected. 3) Perform instrument maintenance. 4) Re-calibrate.	Measures instrument stability and sensitivity. IS recoveries can be affected by sample matrix.
MDL Studies	Annually, or whenever method changes might affect sensitivity. Initially for each new instrument setup or analysts.	Prior studies	1) Repeat if obvious problem occurs. 2) Adjust reporting limit to >MDL.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification (Required for each analyte/method to verify calculated MDL).	Following MDL to confirm calculated MDL value.	Positive Result (Above background)	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis. 4) Consult QA.	Spike at 1-4X MDL for multiple analyte tests.

QA/QC Method Parameters INDUCTIVELY COUPLED PLASMA- MASS SPECTROMETRY EPA METHOD 6020				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Upper Linear Range Studies	Annually, or whenever method changes might affect sensitivity.	Comparison to historical data.	1) Repeat. 2) Correct problem. 3) Adjust upper calibration limit.	Used to determine upper linear range for instrument.
External PE Samples	Annual WS and WP and internal blind samples	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3)	External review of analytical method accuracy.
Batch Definition	Each daily analytical sequence Prepped Samples = Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria	Re-analyze batch or qualify results	A group of samples and associated QC
Control Charting and Proof of Competency	Annual statistical review of method.	Data statistically within control limits.	1) Trend Analysis/ Method Review. 2) Correct method/instrument problem. 3) Replace analyst.	For statistical process control.
Post Digestion Spike	Minimum 1/20 or 1/digestion batch	R% =75 – 125	1) See LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Evaluates effect of matrix on method performance. Results not evaluated when sample analyte concentration > 4X spike level.
SRM	Run on an occasional basis	Within established acceptance ranges	1) Re-analyze. 2) Redigest and re-analyze. 3) Correct prep methodology to ensure passing SRM.	Evaluates preparation method accuracy.

APPENDIX D

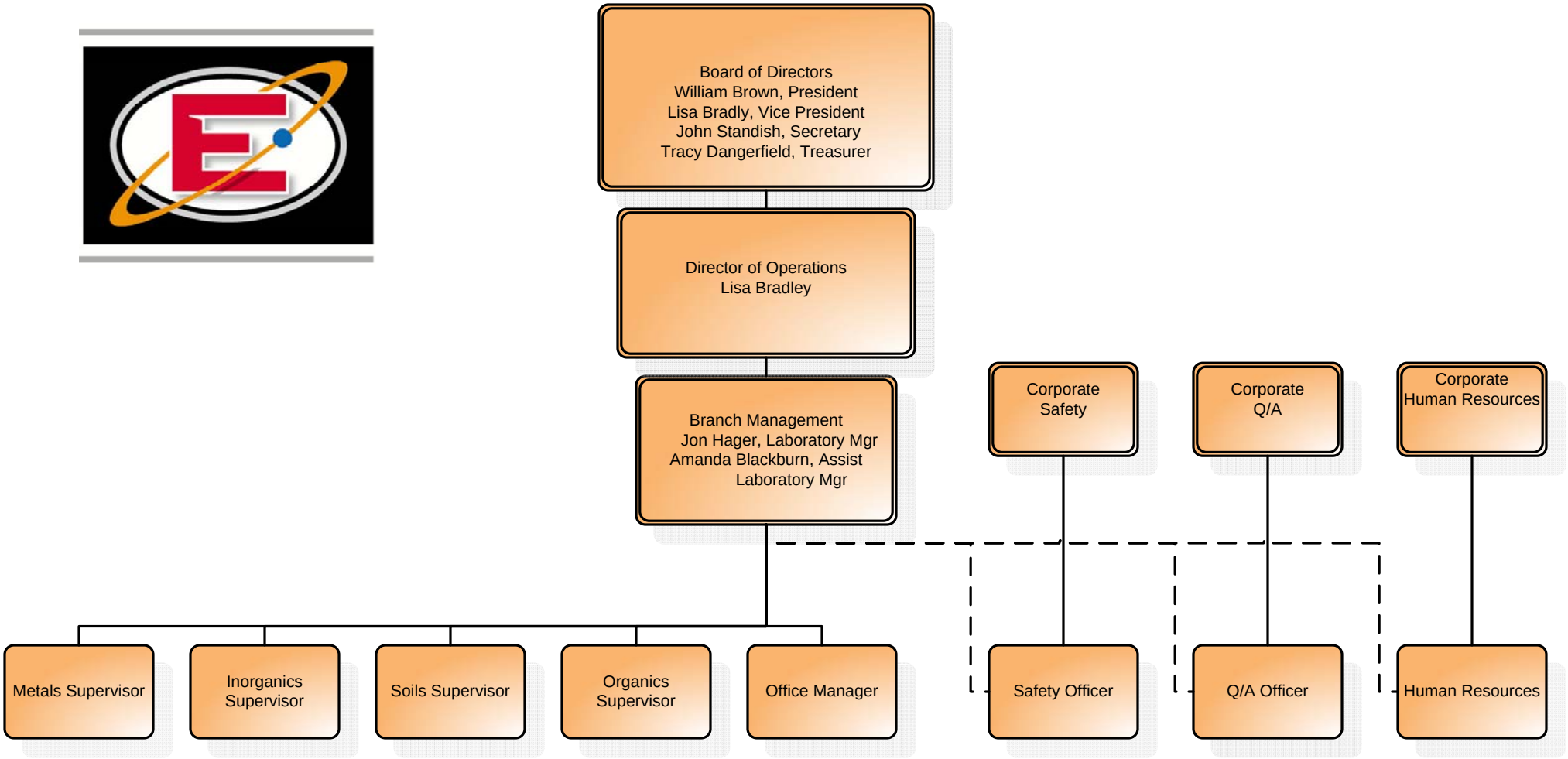
Organizational Charts

Energy Laboratories / Corporate Structure



Energy Laboratories

Helena	5/5/15



APPENDIX E

Curricula Vitae of Key Laboratory Personnel

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William T. Brown

President

Responsible for corporate direction and operations of Energy Laboratories, Inc.

Experience: Thirty plus years of experience in environmental laboratory operations including lab manager, supervisor of organic analysis and senior organic chemist. Experienced in Gas Chromatography, Gas Chromatography/Mass Spectrometry (GC/MS), sample preparation and extraction, ion chromatography and chromatography data systems.

Education
Bachelor of Science in Fish and Wildlife, Montana State University, Bozeman, Montana, 1977

Professional Experience
1986 to present, President - Energy Laboratories, Inc

1981 - 1987, Manager - Energy Laboratories, Inc., Branch Laboratory, Gillette, Wyoming. Responsible for routine analysis and quality control of water, natural gas, and petroleum products. Involved in field on site sampling and testing, meter calibrations, and supervision of branch laboratory staff.

1979 - 1981, Laboratory Technician - Energy Laboratories, Inc., Billings, Montana. Responsible for the natural gas and petroleum products department of the lab including field natural gas testing. Also involved with various work in water and soil analysis including formal training in ion chromatography.

1977 - 1979, Fisheries Biologist - Water and Forests Department of the Government of Niger, Africa. While in the Peace Corps, responsible for developing fisheries management programs in a specific region including monitoring water quality by on-site testing.

LISA A BRADLEY PH.D.

Vice President/ Director of Corporate Laboratory Operations

Responsible for development and oversight of technical operations for Energy Laboratories, Inc.

Experience: Interim laboratory manager, supervisor of inorganic analysis, supervisor of elemental analysis, senior elemental analyst, research assistant, laboratory environmental technician.
Experienced in atomic absorption spectroscopy (AA), inductively coupled plasma optical emission (ICPOES), and mass spectrometry (ICP-MS).

Education
Ph.D., Analytical Chemistry, Indiana University - Bloomington, Indiana, 1996
Bachelor of Science, Chemistry, Montana State University, Bozeman, Montana, 1990

Professional Experience
2007-Present, Vice President/Director of Corporate Technical Operations- Energy Laboratories, Inc., Billings, MT.

2008- Interim Laboratory Manager- Energy Laboratories, Inc., Casper, WY: Supervision of the Casper laboratory.

2005-2008, Supervisor, Inorganics Dept.- Energy Laboratories, Inc., Billings, MT: Responsible for supervision and management of inorganics laboratory.

2000-2005-Supervisor, Metals Dept- Energy Laboratories, Inc., Billings, MT: Supervised metals department; performed chemical analyses using laboratory instrumentation.

1996- 2000, Analytical Chemist - Energy Laboratories, Inc., Billings, Montana: Performed atomic absorption spectroscopy (AA), inductively coupled plasma optical emission (ICP-OES), and mass spectrometry (ICP-MS) analyses.
October 1990-1995, Research Assistant/Department of Chemistry - Indiana University, Bloomington, Indiana.
August, 1990-December, 1992, Associate Instructor of Chemistry - Indiana University, Bloomington, Indiana.

1989, Laboratory Technician - Intermountain Laboratory, Bozeman, Montana.

1986-1990, Undergraduate Research Assistant - Montana State University, Bozeman, Montana

TRACY A. DANGERFIELD, CPA, MBA

Treasurer and Chief Financial Officer

Experienced in business leadership, management and strategic development. Extensive background in accounting, finance and organizational development.

Education
Master of Business Administration, University of Montana, Missoula, MT 2013
Certified Public Accountant, 1992
Bachelor of Science, Business Administration, Minor in Accounting, Eastern Montana College, Billings, MT 1989

Professional Experience
1989-Present, Chief Financial Officer-Energy Laboratories, Inc., Billings, Montana.
Responsible for initiating, developing, and directing administrative operations including finance, human resources, taxation and marketing. Involved with growing Energy Laboratories, Inc. (ELI) from 20 employees to over 225, quadrupling revenues, and expanding to six locations throughout the Rocky Mountain Region. Steered the implementation of an Employee Stock Ownership Plan, transacted the ensuing 30% purchase of ELI, and continues to serve as Plan Trustee.

1985 -1989 Office Management-Energy Laboratories, Inc., Billings, Montana.
Responsible for daily office operations and management of staff.

CORNELIUS A. VALKENBURG PH.D.

Senior Analytical Chemist/Quality Assurance Officer

Education
Ph.D., Analytical Chemistry, Montana State University, Bozeman, Montana, 1987
Bachelor of Arts, Biology with minor in Chemistry, Carroll College, Helena, Montana, 1979

Professional Experience
1992- Present, Analytical Chemist/Quality Assurance Officer - Energy Laboratories, Inc., Billings, Montana. Corporate Quality Assurance Officer responsible for the Quality Assurance monitoring of laboratory operations. Performs method development, prepares and updates standard operating procedures, performs technical training, and involved with special projects. Manages laboratory solvent recycling program.
1989 - 1992, Senior Organic Analytical Chemist - ICF Kaiser Engineers, Las Vegas, Nevada. Provide supervisory and technical support in the design, preparation, analysis, and multi-laboratory certification of analytical method performance evaluation materials used to evaluate current and proposed EPA organic analytical procedures. Also review proposed EPA methods contracts for technical accuracy. Secondary duties as Laboratory Safety Officer.
1987 - 1989, Senior Scientist - Lockheed Engineering and Sciences Company, Environmental Programs (Organic Chemistry Section), Las Vegas, Nevada. Responsible for research and development projects as applied to improved methods for the analysis of EPA priority pollutants. Areas of study include: liquid-liquid extractions, solid-phase extraction, soil leachability modeling (TCLP), chemical derivatives for gas and liquid chromatography, production of performance evaluation materials, gas chromatographic methods, supercritical fluid chromatography and extraction, and laboratory automation.
1981 - 1987, Ph.D. Candidate, Graduate Research, Assistant - Montana State University, Department of Chemistry, Bozeman, Montana. Research in gas chromatographic detector design, modification, and characterization by computer modeling. Teaching of undergraduate laboratories in the areas of inorganic, organic, and analytical chemistry.
1981 - 1981, Research and Development Chemist - Falls Chemicals, Great Falls, Montana. Methods development for the analysis of raw materials and formulated products used or produced by Falls Chemicals. Performed optimization studies for plant chemical processes.
1980 - 1981, Research Technician - Oregon Graduate Center, Beaverton, Oregon. Synthesis and purification of polyamine dueterated analogues for their use as internal standards in mass spectrometry.
1978 - 1979, Field Technician and Student Researcher - State of Montana Water Quality Bureau and Carroll College, Helena, Montana. Evaluate the effects of subsurface drainage on saline seep areas.
Summer 1978, Lab Technician - American Chemet Corporation, East Helena, Montana. Quality control for the manufacture of CuO and CuO2, and the trace analysis of Pb. Methods used were wet chemistry, electrochemistry, and atomic absorption.

Technical Training
Technical Writing, University of Nevada, Las Vegas, Nevada, 1988
Emergency Medical Training, Hillsboro Medical Hospital, 1981
Mass Spectrometry, Oregon Graduate Center, 1981
Dale Carnegie Management Training, Billings, Montana, 1996
Dale Carnegie Graduate Assistant Training, Billings, Montana 1997

Professional Organizations
American Chemical Society

JONATHAN D. HAGER

Laboratory Manager

Academic Training

Bachelor of Arts in Biology, Chemistry Minor, Carroll College, Helena, MT, May 2003

GC/MS Training Seminar, Restek 8 hour seminar, Sept 2005.

Interaction Management, 40 hr class, Billings, MT, 2008.

Professional Experience

May, 2001-Present: Laboratory Manager -Energy Laboratories, Inc., Helena, Montana.

Responsible for ensuring work is performed with ethics, quality and safety as a primary concern. Encourages a quality-oriented and cooperative atmosphere that promotes collaboration and company-wide success.

Coordinates laboratory analysis with client contracts. Responsible for direction, training, and supervision of the analytical laboratory staff. Involved in new procedural and equipment development, quality assurance program, client relations, and report preparation.

Experienced in the analysis of soils and water in a variety of applications.

Professional Organizations

American Chemical Society

Treasure State Resource Industry Association

Association for Environmental Health and Sciences (AEHS)

Alaska Miners Association

Soil Society of America

AMANDA B. BLACKBURN

Quality Assurance Officer/Assistant Laboratory Manager

Academic Experience

Bachelor of Arts in Chemistry, Carroll College, Helena, MT, May 2004
GC/MS Training Seminar, Restek 8 hour seminar, Sept 2005.
Interaction Management, 40 hr class, Billings, MT, 2008.
Contaminant Vapor Migration and Intrusion, 13 hr class, Helena, MT, Feb 2013.

Professional Experience

May 2004-Present, Quality Assurance Officer/Assistant laboratory Manager, Energy Laboratories, Inc., Helena, MT.

Ensures that the laboratory maintains client satisfaction by meeting quality requirements. Maintains training records for all employees and provide ongoing training of QAQC topics to all employees. Maintains a general knowledge of methods performed in the laboratory and the appropriate method corrective actions.

Assists in the supervision of the daily operations of the laboratory while promoting collaboration and communication between analysts. Supervise Inorganics Department.

Certified analyst for total coliform and E.Coli in both public and private water samples.

Coordinate client relations from bottle preparation and sample receipt through reporting and invoicing, and data review of technical reports issued to clients.

Professional Organizations

American Water Works Association

WANDA J JOHNSON

Office Manager/Project Management

Adept at client relations, sample receipt and login, and data processing, including reporting of clients' data.

Education and Academic Training

HS Graduate, General Studies—Business Courses

Interaction Management, 40 hr class, Billings, MT, 2009.

Professional Experience

2002 - Present, Project Manager/Office Manager, Energy Laboratories, Inc., Helena, MT

Project Manager-Responsible for overseeing client needs. Providing assistance with understanding clients permits/planners on what is needed for their systems. Provide Quotes/Assistance with bottle orders. General overall assistance.

Reporting—Generates and mails client reports and invoices. Prepares, proofs, and mails public water system CCR reports each spring.

Client Relations—Creates new client accounts and updates Helena database with any changes to existing accounts from any of the branch labs.

Electronic Data Delivery—Creates and e-mails CSV, Excel, PDF, or EDD files for clients who request those formats.

Helena Accounting—Collects up-front client payment when applicable, and ensures delivery of all payments and invoices to the Energy Labs SBT accounting system at our corporate office.

1993-1999, Heritage Home Health, Helena, MT
Responsible for payroll and accounts receivable for 5 branch offices. Managed employee and contract personnel files to federal and state guidelines requirements. Reviewed medical records for appropriate coding to meet Medicare/Medicaid and insurance requirements.

1990-1993, Independent Home Health, Helena, MT
Responsible for payroll and accounts receivable for 5 branch offices. Managed employee and contact personnel files to federal and state guidelines requirements. Reviewed medical records for appropriate coding to meet Medicare/Medicaid and insurance requirements.

STEPHANIE L. DULL

Safety Officer/ Chemist

Experienced in the administration of safety programs and analysis of environmental samples.
Proficient at running many inorganic analyses and assuring timely turnaround of samples.

Education:

Bachelor of Arts in Biology, Minor in Chemistry, Carroll College, Helena, MT, May 2003

Master of Science of Forensic Science - Advanced Investigation, University of New Haven, West Haven, CT, August 2004

HAZWOPER Certified, 40 hour

Experience:

March 2005 – Present, Safety Officer/Chemist, Energy Laboratories, Inc., Helena, MT

Skilled in many inorganic analyses including alkalinity, chlorides, conductivity, pH, sulfate, TDS, and TSS and Nutrient Analysis.

Experienced in ICP analysis for metals in both water and soil matrices.

Implementation and maintenance of safety program in the Helena lab under the guidance of the Corporate Safety Officer.

Microbiology Analyst-Certified analyst for total coliform and E.Coli in both public and private water samples.

SKYLER PESTER

Soil Laboratory Supervisor

Proficient at performing various soil analyses and analysis of major cations.

Education

Bachelor of Arts in Chemistry – Carroll College Helena MT (2008)
Minor in Biology
Minor in Business Administration

Interaction Management (8 Hours)

Professional Experience

April 2008-Present Energy Laboratories-Helena

2008-2010 – Analyzed Nutrients including phosphate, nitrite, nitrate, ammonia, total Kjeldahl nitrogen, and chemical oxygen demand: utilizing flow injection colorimetry and spectrophotometric analysis.

2010-2011 – Analyzed heavy metals including mercury, arsenic, selenium, and chlorophyll; utilizing cold vapor atomic absorption, hydride generation fluorescence detection, UV-Vis Spectroscopy and high pressure liquid chromatography.

2011-2013 – Analyzed S, D, and P- Block metals, utilizing Inductively Coupled Plasma – Optical Emission Spectroscopy

2011-Present – Soil Department Supervisor, responsible for managing department, coordinating work flow, client interaction, and data review to ensure data quality and integrity.

Certifications

Advanced Wilderness First Aid
CPR/AED
SAR Tech III
Swiftwater Rescue Tech I
Dive Rescue Tech I
Ice Rescue Tech
Hovercraft Pilot.

DUSTIN KONO

Metals Supervisor

Skilled in metals analysis of soil and water with the goal of providing quality results and efficiency.

Education

Bachelor of Science in Biology, Chemistry Minor, MSU-Billings, Billings, MT, 2007

Professional Experience

December 2009 - Present, Analyst/Metals Supervisor, Energy Laboratories, Helena, MT
Experienced with ICP-MS analysis of soil and water samples. Supervise metals analyses including ICP, Mercury and Arsenic/Selenium speciation. Quality of data is monitored along with accuracy of associated methodologies in these areas.

May 2007 - November 2009, Chemist, Northern Analytical Laboratories, Billings, MT

TRACY LORASH

Login/Shipping Supervisor

Academic Training

Medical Coding & Insurance Billing Certificate Program, MSU Billings, May 2010

Professional Experience

October 2009-Present: Login prep/Login technician-Energy Laboratories, Inc., Helena, MT
Responsible for receiving, prepping and logging in analyses for samples received from clients via UPS, USPS, FedEx and walk-in's. Responsible for maintaining supplies for login/shipping department and office. Provide customer service by answering phones, creating bottle orders, processing credit card payments and invoicing client payments made at lab. Create and update client accounts in Omega. Ship via UPS or USPS as necessary.

October 2012-Present: Login/Shipping Supervisor-Energy Laboratories, Inc., Helena, MT
Supervise all aspects of login and shipping departments daily. Ensure accurate preparation of samples for analysis and login. Ensure accurate preparation of bottle orders for clients and shipment of inter-lab samples in a timely and efficient manner.

KATHERINE J. WIEGAND

Organics Supervisor

Proficient at organics analysis of soil, water, and air matrices. Supervises the operation of daily organics testing.

Academic Training

Bachelor of Arts in Environmental Studies with a Concentration in Science, Carroll College, Helena, MT. June, 2007

Minor in Chemistry
Minor in Biology from Carroll College, Helena, MT. June, 2007.

Agilent "Practical Steps in GC Troubleshooting" eSeminar, January 22, 2014.

Experience

Energy Laboratories, Helena, 2007

Proficient in organics analysis for the determination of petroleum hydrocarbons using multiple methods including EPH, VPH, and currently training on 8260. Skilled in gas chromatography, purge and trap concentration, and a variety of GC systems.

Review final data for EPH screens and Afterscreens.

Primary analyst for e-coli and fecal membrane filtration testing of domestic and wastewater samples.

Reporting work orders for bacteria clients.

Receiving and logging in of chemicals, standards, plastic ware, and glassware including the scanning of Certificates of Analysis for chemicals into Omega for reliable standards traceability for the entire lab.

Certifications

Certified in CPR
Licensed First Responder.
Member of Lewis and Clark Search and Rescue
Certified Rope Technician (NFPA 1006 Compliant).

APPENDIX F

Equipment and Methods List

Equipment	Quantity	Methods
Gas Chromatograph-FID with auto sampler	2	DRO, EPH (Mass. Method), TPH as Diesel
Gas Chromatograph-PID/FID with purge and trap and auto sampler	2	GRO, VPH (Mass. Method), TPH as Gasoline, E602, 8020
Gas Chromatograph-Mass Spectrometer with purge and trap and auto sampler	1	524.2, 624, 8260B
Inductively Coupled Argon Plasma Spectrophotometer	2	200.7, 6010
ICP-MS Collision Cell	1	200.7.8, 6010.20
Leco Sulfur Analyzer	1	ASA29-3, E3.2.3
Lachat Flow Analyzer	2	E350.1, E353.2, ASA38-3, ASA10-3, E365.1
Fisher Distillation Unit 100	1	ASA31-3, E351.2
Incubator	2	SM9223
TDS/TSS Oven	3	SM2540 C, E160.2
UV-Visual Spectrophotometer	1	E410.4
Dionex Ion Chromatograph with autosampler	3	300.0
CVAA PSA with Autosampler	1	CVAA 3114
CeTac with Autosampler	2	CVAA-Hg 7470, 3112
Autotitrator	2	SM2320B, SM4500-H B, SM2510 B, USDA23c
Hach 2100N Turbidimeter	1	E180.1
HPLC	2	As Speciation, SM10200 H
Quanti-Tray Sealer	1	SM9223 B
Digestion Blocks	4	3050, 3010, 200.2
SampleTek Extractor	1	various
Skalar Robot	1	SM5210B
Gas Chromatograph-Mass Spectrometer with Thermal Desorption	1	TO-17
3-bar, 15 bar	1	

ATTACHMENT 1

Record of Revision Form

RECORD OF REVIEW/REVISION
Helena, Montana
Quality Assurance Manual

Date of Review/ Revision	Revision Number	Performed By	Action (Review with no changes/ Detailed modifications)
2/7/14	1.4.13	Janel Weidemoyer	QA Manual Reviewed-not updated
1/7/15	January 5, 2015	Amanda Blackburn	Used Energy Laboratories Billings current updated to QAM (reviewed by Andy Valkenburg, Bill Brown, Lisa Bradley, Tracy Dangerfield, Cindy Rohrer and Greg Waring). Significant revisions from previous Helena QAM.
5/18/15	May, 5, 2015	Amanda Blackburn	Removed references to ELI SOP Lab Policies and Roles and Responsibilities. Changed references from Branch Manager to Laboratory Manager and QA Manager to QA officer. Added Chapter 12, Management of Change.

Appendix D
Upper Lake Drawdown Test Technical Memorandum
(Hydrometrics, 2012)

Hydrometrics, Inc.
consulting scientists and engineers

M E M O R A N D U M

DATE: September 20, 2012

TO: Jim Ford, Montana Environmental Trust Group

FROM: Bob Anderson, Hydrometrics, Inc.
Mark Walker, Hydrometrics, Inc.

SUBJECT: Upper Lake Drawdown Test Technical Memorandum –DRAFT

EXECUTIVE SUMMARY

The Montana Environmental Trust Group is conducting an Upper Lake drawdown test at the former Asarco smelter site (the plant site) in East Helena, Montana. Upper Lake is a relatively large surface water feature at the south (topographically and hydrologically upgradient) margin of the plant site. Leakage from Upper Lake has long been recognized as a source of recharge to the plant site groundwater system, where the interaction of groundwater with metals-contaminated soils has negatively impacted groundwater quality. The purpose of the Upper Lake drawdown test is to simulate, at least partially, the effects of eliminating recharge from Upper Lake on plant site groundwater levels, flow rates, and contaminant loading to groundwater. This information is being used in planning and implementation of remedial measures for the site.

The Upper Lake drawdown test has involved three distinct phases, including passive lake dewatering achieved by shutting off the diversion inflow from Prickly Pear Creek, lowering Prickly Pear Creek adjacent to the plant site, and pumping from the lake to expedite lake level drawdown. The first phase of the test began on 11/1/2011 and continued through 3/26/12. The creek lowering phase overlapped with the passive dewatering phase and occurred from 12/21/11 through 2/24/12. The third (lake pumping) phase was initiated on 3/26/12 and continues to date. Data collection during the test has included continuous water level monitoring at a total of 35 groundwater and surface water sites instrumented with pressure sensitive transducers, and manual measurements at an additional 20 sites. The water level data is intended to quantify the groundwater level declines across the plant site, and determine effects of the lake drawdown on hydraulic gradients and groundwater flow rates across the plant site.

As of September 13, 2012, the water level in Upper Lake had declined by 4.9 feet since the November 1, 2011 test startup. Groundwater levels during this time have declined by four to

five feet in the south portion of the plant site, three to four feet in the central plant site, and four to six feet in the northwest portion of the plant site. Water level declines in the south plant site are attributable to the proximity of this area to Upper Lake while the larger declines in the northwest plant site are attributable to the Upper Lake drawdown, as well as a lack of flow in Wilson Ditch. The lack of ditch flow in 2012 is related to the Upper Lake drawdown test as Wilson Ditch is fed by a headgate on Upper Lake. Water levels in the northeast portion of the plant site (beneath the slag pile) declined by less than one foot, suggesting the shallow groundwater system in this area has limited interaction with water levels in Upper Lake and the south plant area.

Current plans for the East Helena Smelter site include permanent elimination or reduction of recharge from Upper Lake to the plant site groundwater system, lowering the water level in Prickly Pear Creek adjacent to the plant site by removing a small dam, excavation of contaminated soils in the south plant area, placement of a low permeability zone to further limit groundwater flow through the plant site, and possible elimination of Wilson Ditch. Collectively, these actions are referred to as the South Plant Hydraulic Control (SPHC) project. In order to assess the effectiveness of the proposed SPHC, information gained from the Upper Lake drawdown test to date was used to estimate total declines in groundwater levels expected through implementation of the SPHC. Projected water level declines range from approximately ten feet in the south plant area, four to five feet in the central plant area, and up to six feet in the northwest plant area. Groundwater levels in the northeast plant area (beneath the slag pile), are expected to decline by two feet or less. Lowering the water table will not only reduce the total groundwater flow rate or flux through the plant site, but will also significantly reduce the magnitude of groundwater interaction with the most highly contaminated soils on the plant site. These two effects should combine to reduce the load (pounds/day) of contaminants in plant site and downgradient groundwater

Additional information gained from the Upper Lake drawdown test to date includes identification of potential preferential groundwater flow paths through the plant site, portions of the plant site where groundwater is more closely connected to Prickly Pear Creek, and general groundwater flow patterns through the site. Following completion of the water level recovery phase of the test (Fall 2012), effects of the Upper Lake drawdown test and projected effects of the SPHC on groundwater levels, flow rates and patterns, and groundwater quality will be evaluated further.

1.0 INTRODUCTION

Upper Lake has previously been identified as a source of recharge to the Upper Aquifer, or unconfined groundwater system overlying the Tertiary ash/clay layer at the former East Helena smelter site (the plant site). Indications that Upper Lake provides recharge to the plant site groundwater system include its location at the extreme southern (upgradient) end of the plant site, and the elevated lake level resulting from construction of raised ground levels and berms around the lake perimeter. Although these physical attributes indicate that Upper Lake increases recharge to the plant site Upper Aquifer (as compared to pre-lake conditions), the magnitude of recharge attributable to Upper Lake has not previously been quantified. In order to assess the rate of groundwater recharge from Upper Lake to the plant site groundwater system, METG initiated an Upper Lake drawdown test to document the plant site groundwater system response to variations in the Upper Lake water level. The Upper Lake drawdown test was initiated in fall 2011 and continues to date. This technical memorandum describes the Upper Lake drawdown testing procedures and results to date. Interpretation of the test results is also presented along with preliminary implications of the potential effectiveness of the proposed South Plant Hydraulic Control (SPHC) interim measures. Additional data review and interpretation will occur following the water level recovery (partial lake refilling) phase of the test, scheduled to begin in October 2012.

1.1 DRAWDOWN TEST OBJECTIVES

Design and planning of the Upper Lake drawdown test is covered in two memoranda submitted to METG by Hydrometrics (dated August 5, 2011 and October 19, 2011), with subsequent input from the project team. Besides quantifying effects of Upper Lake dewatering on plant site groundwater levels, the drawdown test is also intended to provide additional information on the overall plant site hydrogeologic system. Specific objectives of the drawdown test as outlined in the August 5th memorandum include:

1. Quantify the Plant Site groundwater system response to lowering of the Upper Lake water level.

2. Identify potential preferential groundwater flow paths through the plant site based on the magnitude and timing of groundwater level responses in individual wells.

3. Refine plant site aquifer hydraulic conductivity estimates based on the groundwater level response to lake dewatering in various portions of the site, if test data allows.

This memorandum focuses on objective #1 to aid in planning and implementation of the SPHC activities. Objectives 2 and 3 are also discussed as relevant to the SPHC project, and will be evaluated further in support of other interim and corrective measures activities and as available information allows.

1.2 BACKGROUND

Upper Lake lies within the Prickly Pear Creek floodplain at the south end of the former smelter or plant site (Figure 1). The lake area and associated marsh system to the immediate south lie within an area of recent active channel migration, resulting in the lake/marsh area being largely underlain by alluvial sands and gravels. Based on available information, the sand/gravel is overlain by 2 to 5 feet of silt/clay. Since the lake/marsh area is part of the active creek floodplain, Prickly Pear Creek has meandered through the area in the recent past. Based on review of historic aerial photos and observations of the lake at its current drawn down level, two former creek channels are evident in the lake/marsh area as shown on Figure 1. Due to the relatively high permeability of former channel sediments, the channels may represent preferential flow paths for shallow groundwater through the lake/marsh area and northward through the plant site. One of these channels extends through the west half of the lake and projects northwestward through the west plant site while the second former channel traverses the east half of the lake and projects through Tito Park (Figure 1).

Upper Lake was initially formed by diversion of water from Prickly Pear Creek into what originally was most likely a large marsh complex with limited open water. The original lake was considerably smaller in size than its present day configuration, with the lake area (and elevation) increased through continued placement of fill north of the lake (Tito Park area), and construction of an earthen berm (east berm) between the lake and Prickly Pear Creek around 1985. These “improvements” were implemented in part to provide a suitable water source for operation of the Acid Plant and other facility processes. The Upper Lake water level is controlled by two large outlet culverts in the east berm, with outflow through the culverts returning to Prickly Pear Creek. During the irrigation season, lake water typically is also diverted into Wilson Ditch through a headgate on the west side of the lake. Figure 1 shows the present-day (pre-drawdown test) Upper Lake configuration and various features relevant to this discussion.

With enlargement and raising of the lake level during (and prior to) the mid-1980s, leakage from the lake to the plant site is expected to have increased due to the greater hydraulic gradient and wetted surface area of the lake. Regular dredging of sediments from the northwest portion of the lake (to facilitate pumping for plant make-up water) would also have increased the leakage rate as compared to current conditions. Since the 2001 plant shutdown, Upper Lake has partially filled in with fine grained (low permeability) sediments, reducing the rate of leakage as compared to pre-2001 conditions. Thus, the rate of leakage and groundwater recharge from Upper Lake to the plant site groundwater system has most likely varied over time.

1.3 DEVELOPMENT OF UPPER AND LOWER LAKE

The earliest records uncovered to date regarding Upper Lake include reference to 1938 and 1959 measurements of the lake depth, and various activities associated with sediment control from upstream placer mining activities. At that time, Upper Lake and Lower Lake were physically connected as one lake with the two sections referred to as the south and north lakes, respectively. In the 1930s, upstream placer mining operations on Prickly Pear Creek caused turbidity problems in the creek and the plant site water system. In 1934, a ten-foot wide ditch was excavated from Prickly Pear Creek to the south end of Upper Lake to utilize the lake as a settling basin. This resulted in infilling of Upper Lake with sediment and a reduction in the lake depth and area. This information shows that Upper Lake was a significant water feature as far back as the 1930s with the lake depth, surface area and lakebed conditions varying over time. These variations in lake conditions would have affected leakage from the lake to the plant site groundwater system over the past several decades.

In 1985, the inlet channel and diversion structure on Prickly Pear Creek were improved by Asarco to better control inflow to Upper Lake. The east berm and outflow culverts were also constructed at that time resulting in an increase in the normal operating level of the lake, and presumably increased leakage from the lake to the plant site groundwater system. With shutdown of the smelter in 2001 and cessation of lake dredging, siltation of the lake bottom increased, thereby causing a reduction in the rate of leakage from the lake.

Figure 2 includes a sequence of aerial photographs from 1955 to 2011 showing the Upper Lake expansion over time. Key points of interest in the photos include:

- In 1955, Upper Lake and Lower Lake were connected by a narrow channel. Upper Lake was significantly smaller in size and restricted to the far western portion of the current lake area as compared to the later photos.
- By 1964, the area between the two lakes had been filled in. The Upper Lake surface area is notably larger than in 1955.
- The 1976, 1978 and 1980 photos look very similar to 1964 with no significant changes apparent in Upper or Lower Lake.
- Between 1980 and 1987, the enlarged inlet channel and east berm become evident and the Upper Lake level increases as shown by the expanded surface area.
- Between 1987 and 2011 the surface area (and water level) in Upper Lake shows a steady increase, possibly due to siltation of the lake bottom after the 2001 plant shutdown.

This evolution of the Upper (and Lower) Lake surface area and water level has undoubtedly affected groundwater flow through the plant site over the past several decades.

1.4 GENERAL LAKE HYDROLOGY

Figure 3 shows the three general flow paths by which seepage exits Upper Lake. The first flow path is located in the northwest corner of the lake upgradient of the former acid plant. This location corresponds to one of the former creek channels noted in Figure 1 and is

believed to represent a preferential flow path from Upper Lake to the plant site. Lake seepage along this flow path flows northwestward through the former acid plant area and associated contaminated soils. The second flow path occurs northward through Tito Park to Lower Lake. Although flow between the two lakes most likely occurs throughout Tito Park, the rate of flow is probably greatest along any preferential flow paths, such as the former creek channel shown in Figure 1, and in the eastern part of Tito Park where the hydraulic gradient would be greatest due to the shorter distance between the two lakes. Installation of the acid plant sediment drying area (APSD) slurry wall (Figure 3) has undoubtedly altered the direction and possibly the rate of recharge from Upper Lake to the plant site since construction of the slurry wall in 2006.

The third main route for seepage out of the lake is through the east berm to Prickly Pear Creek. Seepage through this area is potentially significant due to the presumably coarse and permeable nature of the fill material used to construct the berm, and the potentially high gradient from the lake to the creek. Under normal conditions, The Upper Lake water level is three to five feet higher than the adjacent creek level, resulting in hydraulic gradients on the order of 0.1 feet/feet from Upper Lake to the creek. Based on the east dike dimensions (350 feet long and 3 feet high below the water level) and an assumed hydraulic conductivity of 200 ft/day, seepage rates through the dike may be on the order of 100 gallons per minute (gpm) or more when the lake is at full pool, or about 3920 feet elevation. An additional component of direct seepage from the lake when at full pool is westward seepage into the tertiary sediments forming the west lake shoreline. This seepage component is expected to be relatively small due to the lower hydraulic conductivity of the tertiary sediments as compared to the alluvial sediments or fill material present in the other seepage areas.

Figure 4 shows a schematic cross section from south to north through the Upper Lake area (see cross section trace on Figure 3). Key points on this figure include the alluvial (Qal) gravel underlying Upper Lake, and the continuous silt/clay layer (lake sediments) separating Upper Lake from the underlying gravels. The documented thickness of the silt/clay layer ranges from about 60 inches at the deeper north end of the lake, to about 40 inches at piezometer ULM-PZ-1 near the head of Upper Lake. Based on available information, the low permeability lakebed sediments are believed to inhibit downward leakage of the lake water to the underlying groundwater system, or upward seepage into the lake. Therefore, recharge from the lake to the plant site groundwater system occurs primarily via seepage through the north lake shoreline. As shown in Figure 4, the composition of the lake shoreline varies from relatively high permeability fill material on the upper bank, to low permeability silt/clay on the lower portion of the bank. This causes the rate of leakage to decrease as the lake level drops below the fill/silt contact.

The lack of subsurface leakage into or out of Upper Lake (at least at lower lake levels) is confirmed by measurements recorded on July 11, 2012. At that time, the lake water level was relatively stable at 3915.75 feet, similar to that shown for 7/24/12 on Figure 4. Upper Lake was being dewatered through pumping at that time with the pumping rate at 30 gpm. Surface water inflow from a small creek into the south end of the lake was measured at 36 gpm. The close correlation between the creek inflow rate and the pumping outflow rate under steady state water level conditions suggests minimal seepage into or out of the lake

was occurring at that time (evaporation is assumed to be negligible given the small surface area of the lake at that time). Based on the saturated conditions in the alluvial gravels immediately north of Upper Lake (i.e., well DH-20 in Figure 4), this information suggests that groundwater underflow through the alluvial gravels underlying Upper Lake may persist even after Upper Lake has been permanently dewatered.

2.0 UPPER LAKE DRAWDOWN TEST PROCEDURES

The Upper Lake drawdown test involved three distinct phases, including passive lake dewatering achieved by shutting off the diversion inflow from Prickly Pear Creek, temporarily lowering Prickly Pear Creek adjacent to the plant site, and pumping from the lake to expedite lake level drawdown. The drawdown test schedule and monitoring program are summarized below.

2.1 UPPER LAKE DRAWDOWN TEST SCHEDULE

The Upper Lake Drawdown Test was initiated in fall 2011 with background (pre-drawdown) water level monitoring conducted in October. Following background data collection, the "passive" dewatering phase of the test began on 11/01/11 when the inlet diversion from Prickly Pear Creek to Upper Lake was shut off. Immediately prior to closing the diversion gates, measured inflow to Upper Lake from the creek was 30 cfs (13,440 gpm), which represents about half of the creek flow above the diversion gate at that time. Following closure of the diversion gates about 20 gpm flow remained in the Upper Lake inlet channel due to minor leakage around the gates. The diversion gates have remained closed with about 20 gpm leakage or less since 11/01/11 (Table 1).

The second phase of the test included lowering the Prickly Pear Creek stage above the Smelter Dam to assess the plant site groundwater and Upper Lake level response. The creek level was lowered by as much as eight feet (3915 feet to 3907 feet elevation) by incrementally opening the lower gates on the smelter dam. The creek lowering phase began on 12/21/11 and ended (by closing the lower gates) on 2/24/12. The creek level at the smelter dam has remained at 3915 to 3916 feet since 2/24.

The third phase of the drawdown test involved pumping water from Upper Lake to expedite the lake drawdown. After several months of passive dewatering, the rate of lake level decline slowed considerably leading to the need for pumping. Pumping was initiated on March 26, 2012 with the primary pump intake located in the west half of Upper Lake and a secondary pump located in the east half of the lake. The primary pump has operated more or less continuously since 3/26/12 with relatively few interruptions. The secondary pump was operated on a periodic schedule (typically during normal working hours each day) from 3/26/12 through 4/9/12, after which use of the secondary pump was discontinued. For the

TABLE 1. UPPER LAKE DRAWDOWN TEST SCHEDULE

Test Phase/Milestone	Begin	End	Comments
Background Monitoring	10/1/11	10/31/11	Documents background water level trends leading up to test.
Shut Off Prickly Pear Creek Inflow	11/01/11		Closed PP Ck diversion to Upper Lake inlet channel
Passive Drawdown Phase	11/01/11	3/26/12	Prickly Pear Ck inlet diversion shut off and lake allowed to passively dewater through seepage to subsurface.
Prickly Pear Creek Drawdown Phase	12/21/11	2/24/12	Prickly Pear Creek stage lowered at smelter dam on 12/21/11 to assess effect on groundwater levels. Creek level raised back up on 2/24/12. PP Ck diversion inlet remains closed.
Upper Lake Pumping	3/26/12	Ongoing	Includes continuous pumping from Upper Lake to expedite lake dewatering with diversion inlet remaining closed.

majority of the pumping period, each pump typically discharged between 80 to 120 gpm, with the discharge water piped to an infiltration basin near Prickly Pear Creek. Currently, the primary pump is operating continuously at approximately 15 gpm to maintain a steady state lake level.

2.2 MONITORING PROGRAM

The drawdown test monitoring program is focused primarily on measurement of water levels throughout and peripheral to the plant site. Water levels are measured continuously at a total of approximately 35 groundwater and surface water sites instrumented with pressure sensitive transducers. The continuous water level data is augmented with bi-weekly manual measurements at an additional 20 sites. The water level data is intended to quantify the groundwater level declines across the plant site, and determine effects of the lake drawdown on hydraulic gradients and groundwater flow rates across the plant site. Figure 5 shows the drawdown test monitoring network.

3.0 DRAWDOWN TEST RESULTS

The drawdown test water level monitoring results (to date) are summarized below, with data evaluation and interpretation presented in the following section (Section 4.0). For discussion purposes, the water level data are discussed separately by area, including the south plant area or south zone (Tito Park, Upper Lake, Lower Lake and Phase I/II CAMU area), the central plant zone, and the north plant zone (Figure 5). Water level declines measured during the course of the drawdown test (10/31/11 to 9/13/12) are discussed for each area. The plant site

water level changes measured since the start of the test are referred to as water level declines as opposed to water level drawdown, since the measured water level changes likely include some component of seasonal (and potentially longer-term) water level trends, in addition to any lake drawdown-induced water level changes. As discussed in the following section, water level data from late summer/fall 2012 as well as water level recovery data will be required prior to full evaluation of lake drawdown-induced groundwater level changes on portions of the plant site.

3.1 SOUTH PLANT AREA

Primary water level monitoring sites in the south plant area include Upper and Lower Lake, Prickly Pear Creek at (immediately upstream of) the smelter dam, and nine monitoring wells in and around Tito Park. In addition, all 11 CAMU monitoring wells (MW wells on Figure 5) are included in the south plant area for discussion purposes. The primary water level monitoring sites are described in Table 2.

Water level declines measured between 11/01/11 (when diversion inflow to Upper Lake was shut off) through 9/13/12 in the south plant area ranged from 5.10 feet at well APSD-9 (located immediately north of Upper Lake), to 0.93 feet at well APSD-8 (between Lower Lake and Prickly Pear Creek). Water level declines at other notable sites include 4.84 feet at Upper Lake, 3.46 feet at Lower Lake, 3.58 feet at well DH-20 (between Upper Lake and the Acid Plant area), and 3.29 feet in well DH-3 (west of Upper Lake). Hydrographs for select south zone wells are included in Figure 6.

As shown on Figure 6, south plant water levels responded very quickly to the onset of Upper Lake dewatering, especially at wells APSD-9 and APSD-10 along the north Upper Lake shoreline. By mid-November, the Upper Lake water level stabilized at about 3918 feet and remained stable through December, while Lower Lake and groundwater levels throughout the south plant area continued to decrease.

Lowering Prickly Pear Creek above the smelter dam as of 12/20/11 had a notable effect on water levels. Most notable is well APSD-8 (located between Lower Lake and the creek, Figure 5), which dropped about 3.5 feet during the creek lowering phase of the test and fully recovered within about a week after the creek level was raised back up on 2/24/12. As shown on Figure 6, water levels at all other sites were influenced by the creek lowering including well DH-20, located on the west side of the plant site. Interestingly, the Upper Lake water level showed very little response to creek lowering, indicating leakage from the lake to the creek through the east berm is minimal, at least at reduced lake levels of about 3918 feet or lower.

The Upper Lake water level was generally stable from mid-November (about two weeks after inflow to the lake was shut off) through mid-March. With the onset of pumping from the lake on March 26, 2012, the Upper Lake level again began to drop, followed by similar declines in Lower Lake and the south plant monitoring wells. As shown on Figure 6, Upper Lake, Lower Lake and groundwater within Tito Park (APSD wells on Figure 6) have all

TABLE 2. DRAWDOWN TEST WATER LEVEL MONITORING SITES AND WATER LEVEL DECLINES FROM 10/31/11 THROUGH 9/13/12

Monitoring Site	Location	Depth Below Ground Surface (feet)	Net Water Level Decline (feet) 10/31/11 -9/13/12
South Plant Site			
Upper Lake	South Plant Area	NA	4.84
Lower Lake	South Plant Area	NA	3.46
APSD-8	Between Lower Lake and PP Ck	15	0.93
APSD-9	Tito Park	16	5.10
APSD-10	Tito Park	16	4.99
APSD-12	Tito Park	15.5	3.79
DH-3	West of Upper Lake	54	3.29
DH-20	Northwest of Upper Lake	31	3.58
MW-6	Between Plant Site and Phase I CAMU	40	3.88
MW-11	West of Phase II CAMU	70	0.38
Central Plant Site			
DH-19R	Former Acid Plant	25	3.35
DH-4	North of Lower Lake	23	0.95
DH-42	Former Acid Plant	34	3.55
DH-2	West of Plant Site	65.5	3.62
DH-71	North of Former Acid Plant	34	3.78
DH-73	Former Zinc Plant area	48	3.52
DH-68	South end of slag pile	50	0.42
EH-204	West of Plant Site	65	5.48
North Plant Site			
DH-17	Northcentral Plant Site	41	5.18
DH-66	NW of Ore Storage Building	48	5.50
DH-49	North Plant Site	34	5.55
DH-51	North Plant Site	34	5.02
DH-6	Between slag pile and Highway 12	25	3.65
DH-15	Between slag pile and Highway 12	50	3.65

NA-Not Applicable

converged to a similar elevation of about 3915 feet. This convergence of water levels has greatly reduced the hydraulic gradient, and thus groundwater flow, through Tito Park.

3.2 CENTRAL PLANT AREA

The central plant area covers the majority of the former plant site including the acid plant, speiss-dross plant, and the majority of the slag pile (Figure 5). Primary water level monitoring sites in this area are listed in Table 2 with hydrographs for select sites shown in Figure 7. Water level declines between 10/31/11 and 9/13/12 in this area ranged from 5.48 feet at well EH-204 (west of the Lower Ore Storage area), to 0.42 feet at DH-68 (south end of slag pile). Significant water level declines were also recorded at well DH-71 (3.78 feet)

located between the acid plant and lower ore storage area, DH-2 (3.62 feet), completed in tertiary sediments west of the plant site, and DH-42 (3.55 feet) completed in the former acid plant area. Generally, water level declines are greatest on the west side of the plant site compared to the east side (beneath the slag pile). In fact, the water level at slag pile well DH-68 showed virtually no response to the Upper Lake or Prickly Pear Creek drawdown (Figure 7). Likewise, water levels at well DH-4, also located on the east side of the plant and only a few tens of feet north of Lower Lake, has also shown minimal response to the Upper Lake dewatering although DH-4 did show some response to the creek lowering phase of the test (Figure 7). The general lack of water level response at DH-4 and DH-68 suggests limited hydraulic interaction between the south plant groundwater system and the east side of the plant site. The lack of hydraulic continuity to the north of Lower Lake has previously been noted by the steep hydraulic gradients mapped in this area. These results suggest that the SPHC may have a lesser impact on groundwater levels beneath the east portion of the site (beneath the slag pile) as compared to the south and west portions of the plant site.

Groundwater levels in the former acid plant area (DH-19R and DH-42, Figure 7) have declined about 3.5 feet as of 9/13/12 and continue to decline to date. Post-SPHC groundwater levels in this area are of particular interest since the former acid plant contains some of the highest subsurface soil contaminant concentrations on the site.

3.3 NORTH PLANT AREA

North zone wells are shown on Figure 5 and listed in Table 2. Hydrographs for select wells are shown in Figure 8. Groundwater levels in the northern portion of the plant site show a steady decline from prior to the onset of the Upper Lake drawdown through mid-September 2012, although water levels at all sites increased temporarily in June in response to spring runoff. Overall water level declines in this area range from 3.30 feet at wells DH-6/15 near Prickly Pear Creek, to 5.55 feet at DH-49 in the northwest corner of the site.

Besides being some of the largest water level declines recorded during the lake drawdown test, the 2012 north plant site water level trends are notable in their contrast from previous years. Figure 9 shows long-term water level trends at north plant site wells DH-66 and DH-17. Water levels in these wells, and throughout the northwest portion of the site, have historically been lowest in winter and spring, and highest during late summer and fall. In contrast, water levels on the east side of the plant site are typically highest in spring and early summer, consistent with Prickly Pear Creek water levels. Continuous water level hydrographs from several wells located immediately north and west of the plant site, including EH-205/210, SP-4, EH-60/61/103 (Figure 5), show a definite correlation in groundwater levels and the presence or absence of flow in Wilson Ditch (Figure 10). Therefore, the lack of a late summer water level rise in in the northwest plant site wells in 2012 is attributable to the lack of flow in Wilson Ditch. Thus, in evaluating results of the Upper Lake drawdown test and ramifications of the SPHC, the effects of lake removal and creek lowering as well as possible elimination of flow in Wilson Ditch must be taken into account.

One other potential influence on the 2012 water level trends and drawdown test results is the lack of precipitation during summer 2012. The lack of precipitation has undoubtedly had

some influence on groundwater levels, along with dewatering of Upper Lake and Wilson Ditch. To assess the possibility that climatic conditions are a primary cause of the significant water level declines in the northwest plant site, long-term water levels from north plant site well DH-66 were plotted against corresponding water levels from County monitoring well "Airport N-N" located north of the plant site near the Helena Airport. The Airport N-N well is located near the Helena Valley irrigation canal and historically has exhibited similar summer season water level increases as the northwest plant site wells. As shown in Figure 11, 2012 water level trends at the Airport N-N well exhibit the same summer season increase as seen in previous years, while the DH-66 trend does not. The consistent trends at Airport N-N in 2012 suggest that climatic conditions have not significantly affected seasonal trends at this well, and climatic conditions most likely are not responsible for the lack of late summer water level increases in DH-66 and other northwest plant site wells. Thus, the Upper Lake drawdown and lack of flow in Wilson Ditch are the most likely causes of the significantly lower northwest plant site groundwater levels in 2012.

Groundwater levels in the north plant site showed no apparent response to lowering of Prickly Pear Creek above the smelter dam, although they do correlate closely with creek levels downstream of the dam. Wells DH-6/DH-15 exhibit a strong correlation with the Prickly Pear Creek water level due to their proximity to the creek. As shown in Figure 8, all the north area wells correlate fairly well with DH-6/15. For example, an increase in the creek level during January 2012 due to an ice jam just upstream of Highway 12 caused water levels to rise about one foot in DH-6/15, with a similar although more subdued response apparent in all the north plant site wells. The groundwater level response to spring runoff (June) is also apparent in the north plant site hydrographs. This information shows the close interaction of the north plant site groundwater with the segment of Prickly Pear Creek downstream of the Smelter Dam.

Figure 12 shows the magnitude of measured water level declines as of 9/13/12 throughout the plant site. As presented above, water level declines have been greatest (4 to 5 feet) in the south plant site (due to the proximity to Upper Lake), and in the north plant site (up to 6 feet) due in part to the lack of flow in Wilson Ditch. Water level declines in the 3 to 4-foot range extend from Lower Lake and Tito Park on the east, westward through the acid plant area and west of the plant site. Conversely, measured water level declines are less than one foot in the east plant site beneath the slag pile. With the possible exception of the north plant site, the water level patterns shown on Figure 12 highlight those areas most sensitive to the Upper Lake drawdown. These areas, namely the south and west portions of the plant site, are expected to show the greatest response in water level drawdown from the SPHC. Water level declines will also be greatest in the northwest portion of the site if recharge from Wilson Ditch is eliminated through the SPHC. The water level declines plotted on Figure 12 reflect the net change in water levels between 10/31/11 and 9/13/12. As such, effects of lowering Prickly Pear Creek at the smelter dam, which ended on 2/24/12, are not reflected in Figure 12. If the creek had remained at the lowered stage, measured water declines would have been greater than the currently measured levels.

4.0 EVALUATION OF TEST RESULTS

The drawdown test data collected to date has undergone a preliminary evaluation with respect to insights into the plant site groundwater system and implications for the SPHC activities. Projections of plant site groundwater levels under permanent lake dewatering and Prickly Pear Creek relocation/lowering as proposed under the SPHC program have been made, and possible effects on groundwater flow rates and patterns through the plant site assessed.

4.1 PROJECTED WATER LEVELS

Relocation and lowering of Prickly Pear Creek through removal of the smelter dam is a key component of the SPHC and will have significant impacts on south plant site groundwater levels. Although the creek lowering phase of the Upper Lake drawdown test lasted for only about two months (from 12/20/11 through 2/24/12), information obtained during that period provided insight into the combined effects of lake dewatering and creek lowering on groundwater levels. Figure 13 shows the south plant site hydrographs along with the Prickly Pear Creek stage at the smelter dam from 12/20/11 (start of creek lowering) through 7/24/12. During the latter half of the creek lowering phase (1/30/12 through 2/20/12), the creek level was maintained at a relatively steady elevation of about 3911 feet. Water levels at well APSD-8, located between the creek and Lower Lake, stabilized around 3913 feet during this period, or about 2 feet higher than the creek. Based on this relationship, it can be assumed that the APSD-8 water level will stabilize about 2 feet higher than the post-SPHC creek level of 3906 feet at the current dam location, or at about 3908 feet. In actuality, the APSD-8 water level may stabilize less than 2 feet above the creek level since the 2-foot difference recorded during the drawdown test was most likely affected by water levels in adjacent Lower Lake. With elimination of Lower Lake, water levels at APSD-8 will most likely stabilize less than 2 feet above the creek level. Therefore, the groundwater level at APSD-8 is estimated to be between 3906 and 3908 feet following lake dewatering and permanent creek lowering.

After raising the creek level back to normal dam operating levels (about 3915.5 feet), water levels in Lower Lake and the Tito Park wells continued to decline in response to the Upper Lake drawdown. As of July 2012, groundwater levels in the Tito Park area had all fallen to within 0.5 feet of the creek level (Figure 13). Therefore, with long-term elimination of groundwater recharge from Upper and Lower Lake, groundwater levels throughout the Tito Park area are expected to stabilize close to or slightly higher than the final Prickly Pear Creek water level. Projected overall post-SPHC water level declines are shown for select sites on Figure 12.

Figures 14 and 15 show two east-west schematic cross sections through the south plant area. Both cross sections show the site stratigraphy, the pre-drawdown test (10/31/11) groundwater levels, the 7/24/12 groundwater levels, and the range of projected post-SPHC groundwater levels. Figure 14 also shows total arsenic and selenium (where available) soil concentrations with depth. As shown on Figure 14 (and discussed above), groundwater levels to date have declined on the order of five feet from Upper Lake dewatering alone, with an additional five

feet of decline expected from permanent lowering of the creek. The water level declines measured to date have already lowered the groundwater table below the zone of highest soil contaminant concentrations, and achieving the final projected groundwater levels would further dewater the contaminated soils. The Figure 15 cross section lies slightly north of Figure 14 and includes Lower Lake (note that cross section traces for Figures 14 through 17 are shown on an inset map on Figure 14). Following the Prickly Pear Creek relocation and lowering, groundwater levels are expected to stabilize near the bottom of Lower Lake.

It is important to note that the projected post-SPHC water levels in the south plant area are based on preliminary post-SPHC creek channel locations and elevations upstream of the current dam location. If final creek elevations or locations change appreciably from the preliminary plans, the post-SPHC groundwater levels may be affected. Also, water level drawdown in response to the temporary bypass channel may be different from that estimated for the final creek relocation. The greater distance of the proposed bypass channel from the plant site, as compared to the final creek channel location, may reduce the observed level of groundwater drawdown on the plant site while the temporary bypass is in operation.

Figure 16 shows similar information along a cross section extending from Upper Lake northwestward through the west side of the plant and the former acid plant. As expected, projected post-SPHC water level declines will be greatest in the south plant area and are expected to decrease overall to the north. Water level declines as of 9/13/12 have already dewatered some of the most highly contaminated soils in the acid plant area (see abandoned well DH-19, Figure 16), with additional water level declines expected in this area. As mentioned in the previous section, post-SPHC water levels in the northwest plant site will depend on the presence or absence of flow in Wilson Ditch in the future.

Figure 17 includes a cross section extending due north from Upper Lake through Lower Lake and the slag pile. In contrast to the significant drawdown projected in the south plant area, this figure also shows the lack of measured and projected groundwater drawdown on the east plant site beneath the slag pile. Also of note is the very steep hydraulic gradient between Lower Lake and well DH-4 to the immediate north. As previously mentioned, a zone of low permeability material is believed to be present in this area restricting northward flow from Lower Lake towards DH-4.

It should be noted that the projected water levels through the west side of the plant site and through the acid plant do not take into account potential effects of a low permeability zone or cutoff wall around the south plant area as proposed in the SPHC plans. Placement of a cutoff wall downgradient of the south plant could further reduce groundwater flow rates and water levels in the acid plant area depending on the system design, and on the magnitude of groundwater underflow from the Upper Lake area towards the plant site.

4.2 EFFECTS ON GROUNDWATER FLOW PATTERNS

In addition to changes in groundwater levels, potential alterations in groundwater flow patterns and rates have been evaluated from the preliminary drawdown test data. Figures 18 and 19 present the plant site groundwater potentiometric surface for October 2010 and July 24, 2012, respectively. Although the two maps show a similar overall pattern to the potentiometric surface, a few key differences are apparent. As expected, the most obvious differences occur in the south plant site. For instance, the 3920 foot potentiometric contour on the October 2010 map extends northward around the north shoreline of Upper Lake with the Upper Lake water level at 3920.6 feet (Figure 18). In July 2012 (Figure 19) the 3920 contour is located approximately 1700 feet further south. This change alone has resulted in a significant decrease in the hydraulic gradient through Tito Park and an apparent corresponding decrease in the groundwater flux.

Although much less dramatic, the potentiometric contours on the west plant site have also shifted southward from October 2010 to July 2012 due to the water level declines documented in this area. This pattern is evident in the 3900 and 3905 potentiometric contours. Although subtle, these patterns do reflect real changes in the acid plant area groundwater levels. Also of note is the lack of change in the potentiometric surface in the eastern portion of the plant site beneath the slag pile. This is consistent with previous observations suggesting relatively little change in groundwater levels in this area in response to the lake dewatering and creek lowering.

It should be noted that the July 2012 potentiometric surface only reflects the effects of partial dewatering of Upper Lake, and does not account for future creek lowering and placement of a low permeability zone downgradient of the south plant area. These components of the SPHC program will result in significant differences in the post-SPHC potentiometric surface as compared to the July 2012 surface. As previously noted, groundwater levels in the south plant area are expected to closely approximate the final creek levels following permanent lowering of the creek. This will effectively eliminate the northward “bulge” in the potentiometric surface caused by Upper and Lower Lake and the elevated creek level behind the smelter dam.

Another possible effect of the SPHC on plant site groundwater flow patterns is a more westward component of groundwater flow through the northern portion of the plant site. Currently, groundwater flows in a northwesterly direction beneath the slag pile and northwest portion of the site. With little impact expected for water levels in the eastern portion of the site and additional drawdown expected for the western portion of the site, groundwater flow in the north plant area may assume a more westerly orientation. Indications of an increased gradient towards the west can already be seen in the current drawdown test results. As shown on Figure 7, water level declines on the west plant site (see well DH-42, Figure 7), and the lack of response in well DH-68 located on the south portion of the slag pile, have resulted in a reversal in hydraulic gradients between these areas.

A third possible effect of the SPHC is a decrease in apparent westward flow from the south plant area towards the Phase I CAMU. Drawdown test water level trends at CAMU wells

MW-6, MW-2 and MW-3 correlate closely with those at south plant site monitoring well DH-20, while other CAMU wells (with the possible exception of MW-10) show no correlation. Figure 20 shows this relationship for select CAMU wells. Lowering the south plant groundwater levels should reduce or possibly eliminate potential westward flow in this area, depending on the post-SPHC groundwater levels on the south plant site.

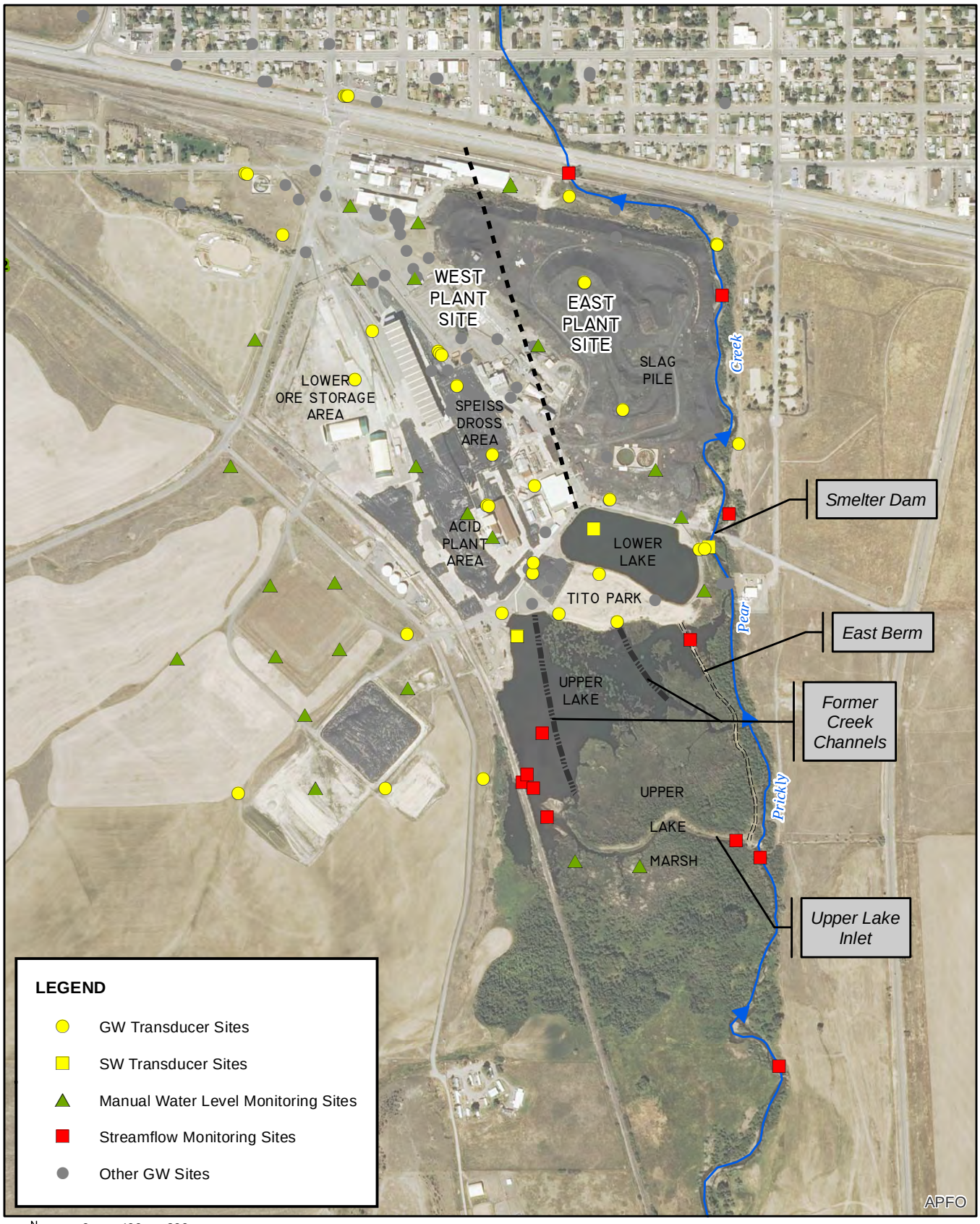
5.0 SUMMARY AND RECOMMENDATIONS

The Upper Lake drawdown test results to date show groundwater levels have declined on the order of 3 to 5 feet in the south, west and northwest plant areas, and less than a foot on the east side of the plant beneath the slag pile. As of mid-September, water levels continue to decline across the site. Water level declines of an additional five feet or more are expected in the south plant area in response to dewatering of Upper Lake and permanent lowering of Prickly Pear Creek under the SPHC project. The groundwater level declines already realized through the lake drawdown test have dropped the water table below the zone of highest soil contaminant levels in certain areas, with post-SPHC water level drawdown expected to further dewater contaminated soils in the south plant and acid plant areas. Lowering of the water table is not only expected to reduce contact between the plant site groundwater and soil contaminants, but should also reduce the rate of groundwater flow, or flux, through the plant site. Together, these two factors should result in a reduction of contaminant leaching to groundwater and contaminant loads, in pounds per day, emanating from the plant site.

Dewatering of Upper Lake/Lower Lake and lowering the Prickly Pear Creek level by approximately 8 feet at the current smelter dam location as proposed under the SPHC project will result in a more uniform potentiometric surface through the south plant area and eliminate the northward “bulge” in the potentiometric surface caused by Upper and Lower Lake. The result will be a reduction in seepage from the northwest portion of Upper Lake to the west plant site, and a reduction in seepage from the east and west ends of Lower Lake which currently provides recharge to Prickly Pear Creek and the west plant site, respectively. Other potential changes in the plant site groundwater flow patterns include an increased westerly component to groundwater flow in the northern portion of the site (due to greater effect on groundwater levels in the west plant area than the east), and a reduction in potential westward flow from the south plant site towards the Phase I CAMU cell. Effects on northwest plant site groundwater levels will depend in large part on future flow conditions in Wilson Ditch.

One outstanding question related to the Upper Lake drawdown test is the volume and fate of groundwater underflow beneath Upper Lake onto the plant site. The rate of groundwater underflow from beneath Upper Lake towards the plant site should be evaluated further to determine how this source may affect post-SPHC groundwater flow through the plant site. Depending on the results, appropriate measures could be incorporated into design of the low permeability zone/groundwater cutoff wall proposed in the SPHC to further reduce groundwater flow through the plant site, if necessary. Gaining a better understanding of this groundwater underflow component will also prove useful in assessing construction dewatering requirements for the SPHC.

Based on the findings to date, continuation of the pumping phase of the Upper Lake drawdown test through September 2012 is recommended. Continuing the test through September will provide a full year of drawdown test data, which will aid in discerning seasonal (and longer-term) water level trends from lake drawdown-induced effects. With cessation of pumping, the Upper Lake water level should recover from the current 3916 level to about 3918 feet. Plant site groundwater levels should be recorded during the lake recovery period to provide additional information on the groundwater response to lake dewatering. Groundwater level trends recorded during both the lake drawdown and recovery phase of the test will help delineate possible areas of increased permeability, preferential groundwater flow paths, and post-SPHC hydraulic gradients and groundwater fluxes through the site. Information presented in this memorandum can be updated following the water level recovery phase of the test. Based on information collected to date however, the Upper Lake drawdown test results indicate that the SPHC project will effectively lower plant site groundwater levels, thus reducing potential leaching of contaminants from soils to groundwater, and will most likely reduce overall groundwater flow rates through the plant site.



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Hydrometrics, Inc.
Consulting Scientists and Engineers

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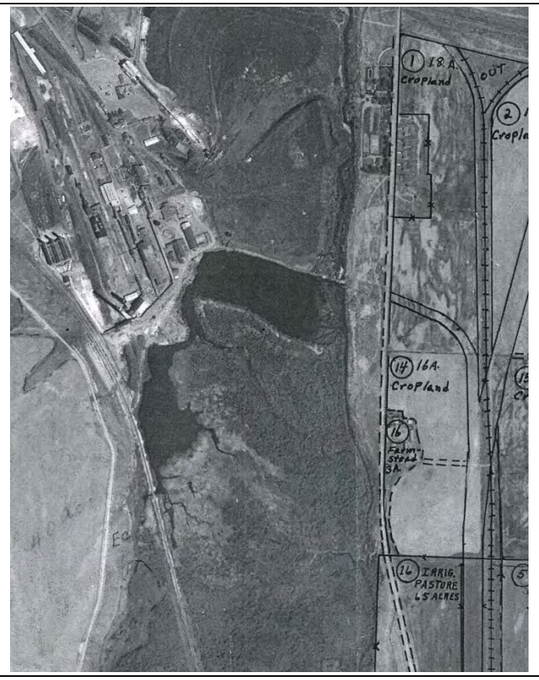
PRIMARY SITE FEATURES FOR UPPER LAKE DRAWDOWN TEST EAST HELENA FACILITY

FIGURE

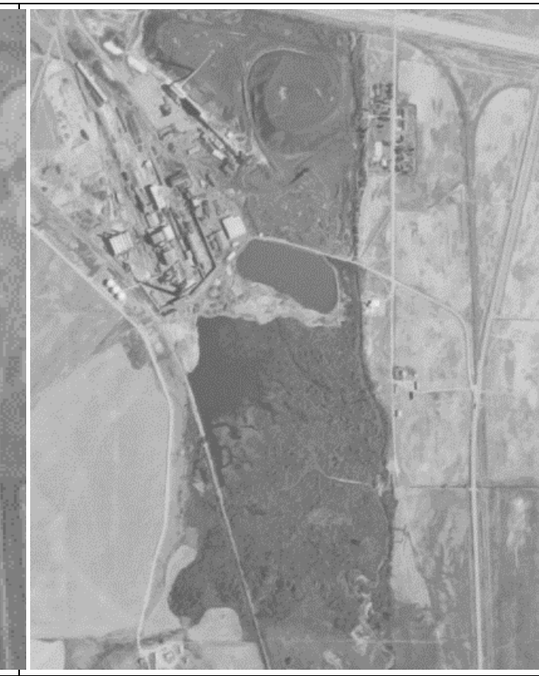
1



1955

1964

1976



1978

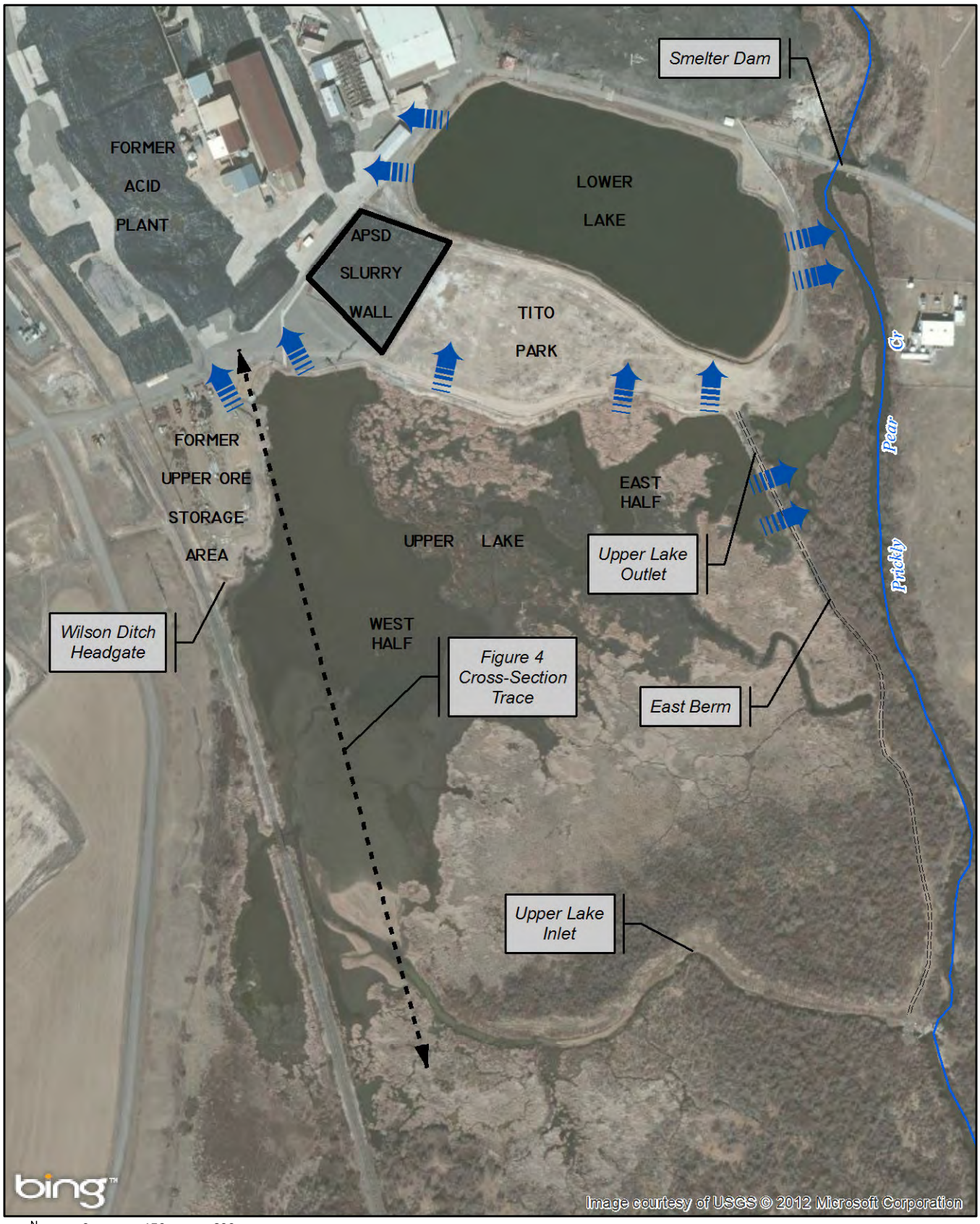
September 25, 1980

September 8, 1987

November 3, 2003

July 16, 2011

FIGURE 2. PROGRESSION OF UPPER LAKE EXPANSION SINCE 1955.



N

0 150 300

Scale in Feet

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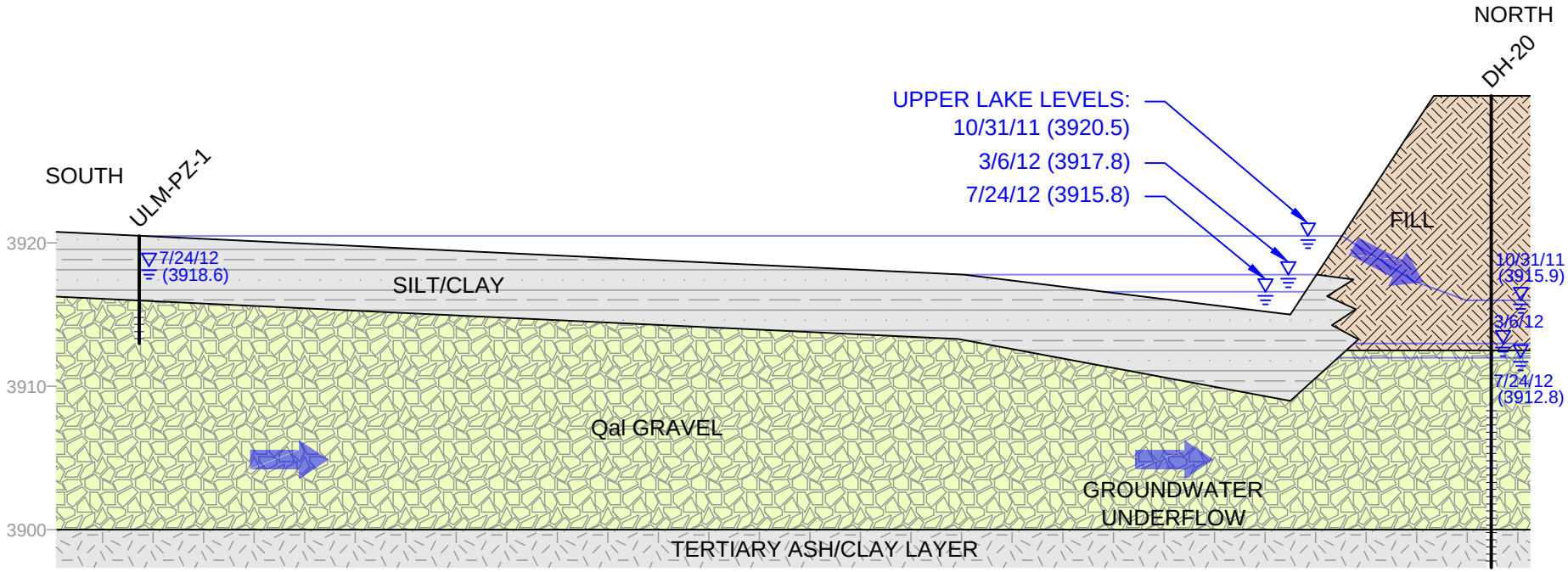
PRIMARY UPPER (AND LOWER) LAKE LEAKAGE PATHWAYS AT MAXIMUM LAKE LEVELS EAST HELENA FACILITY

FIGURE

3



LEGEND

- FILL
- SILT/CLAY
- GRAVEL/COBBLE
- ASH/CLAY

GROUNDWATER FLOW DIRECTION

HORIZONTAL SCALE 1"=200'

SCHEMATIC CROSS SECTION THROUGH UPPER LAKE - WEST HALF

FIGURE **4**

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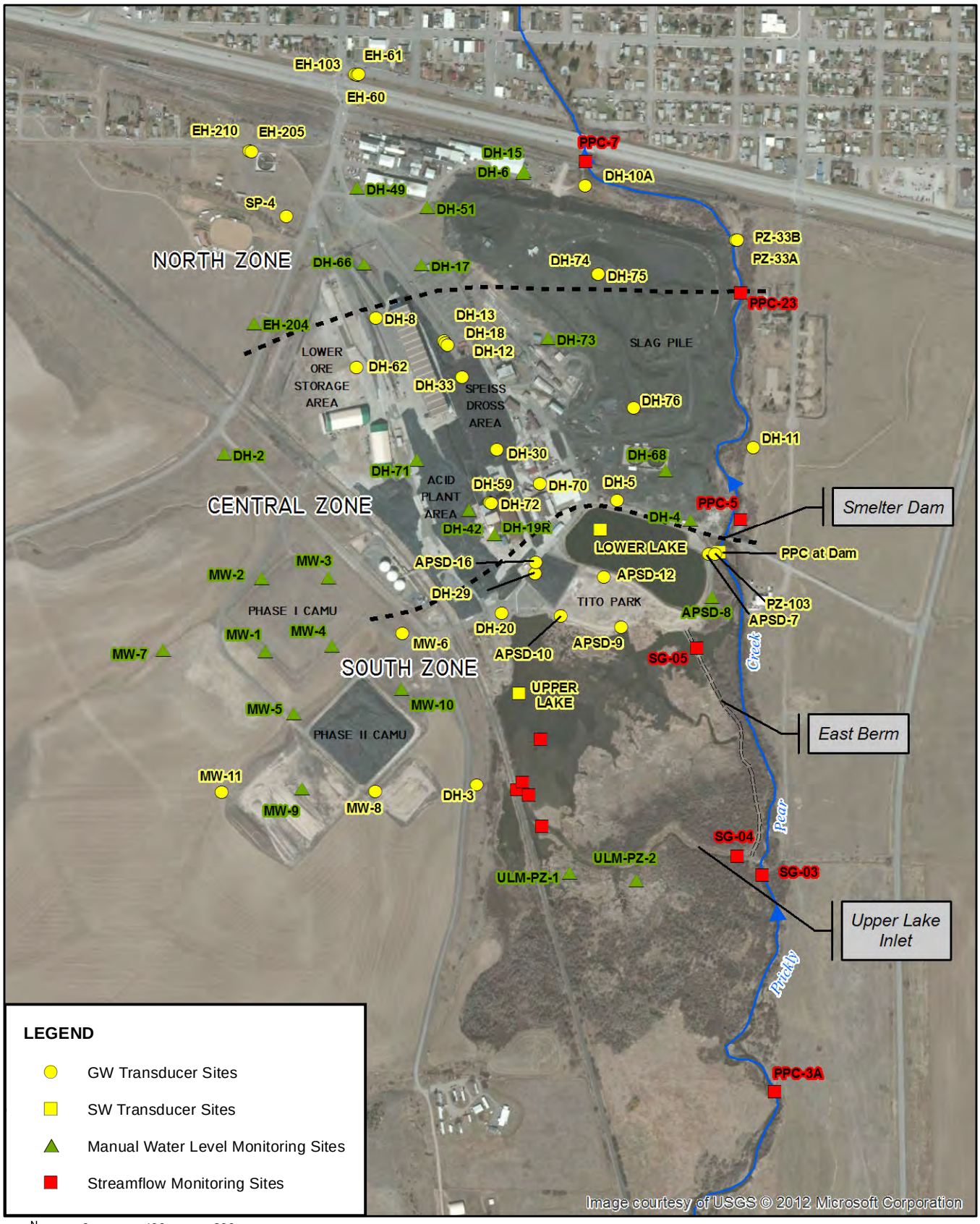
Hydrometrics, Inc.
Consulting Scientists and Engineers



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WATER LEVEL MONITORING SITES FOR UPPER LAKE DRAWDOWN TEST EAST HELENA FACILITY

FIGURE

5

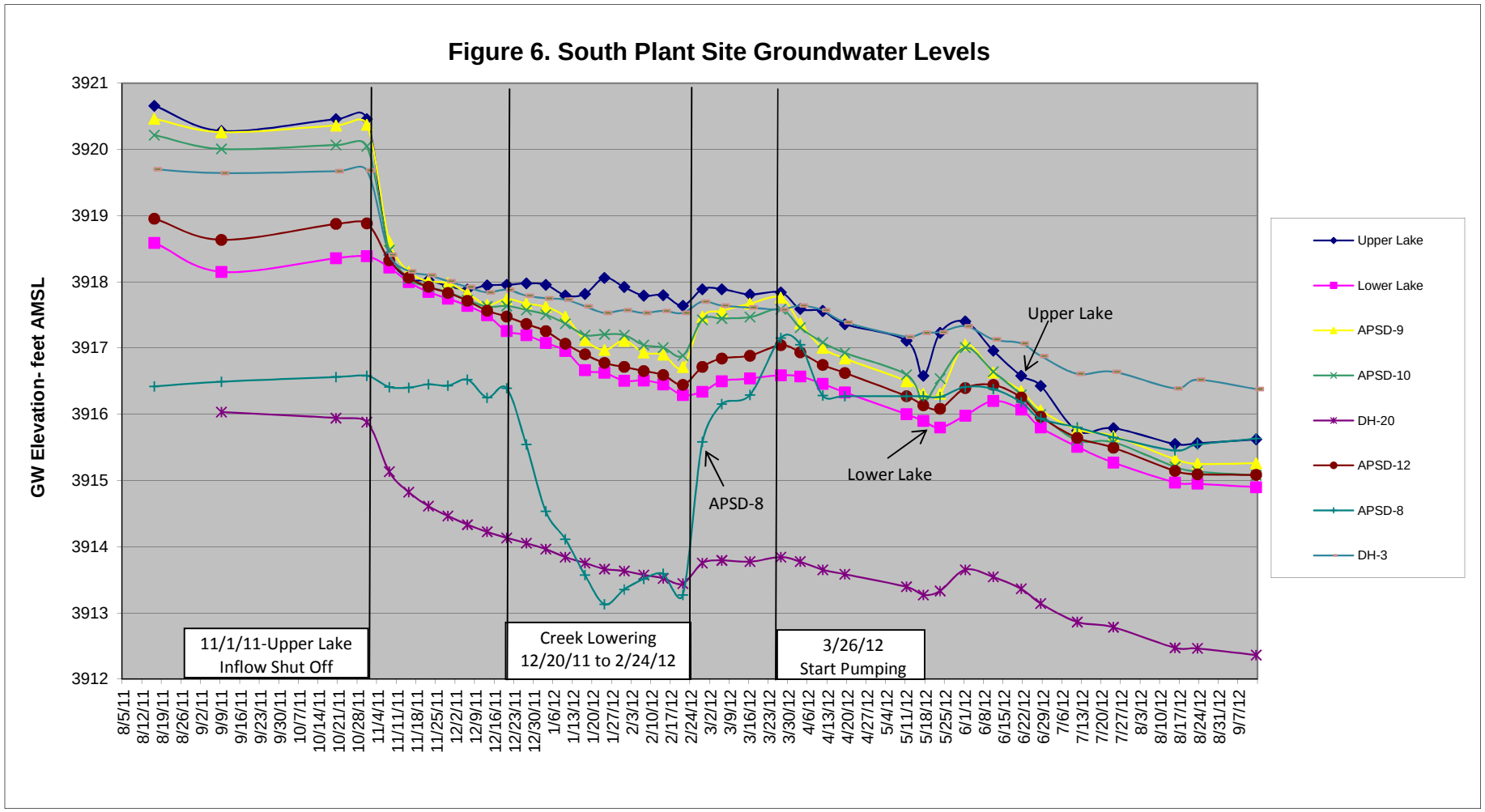
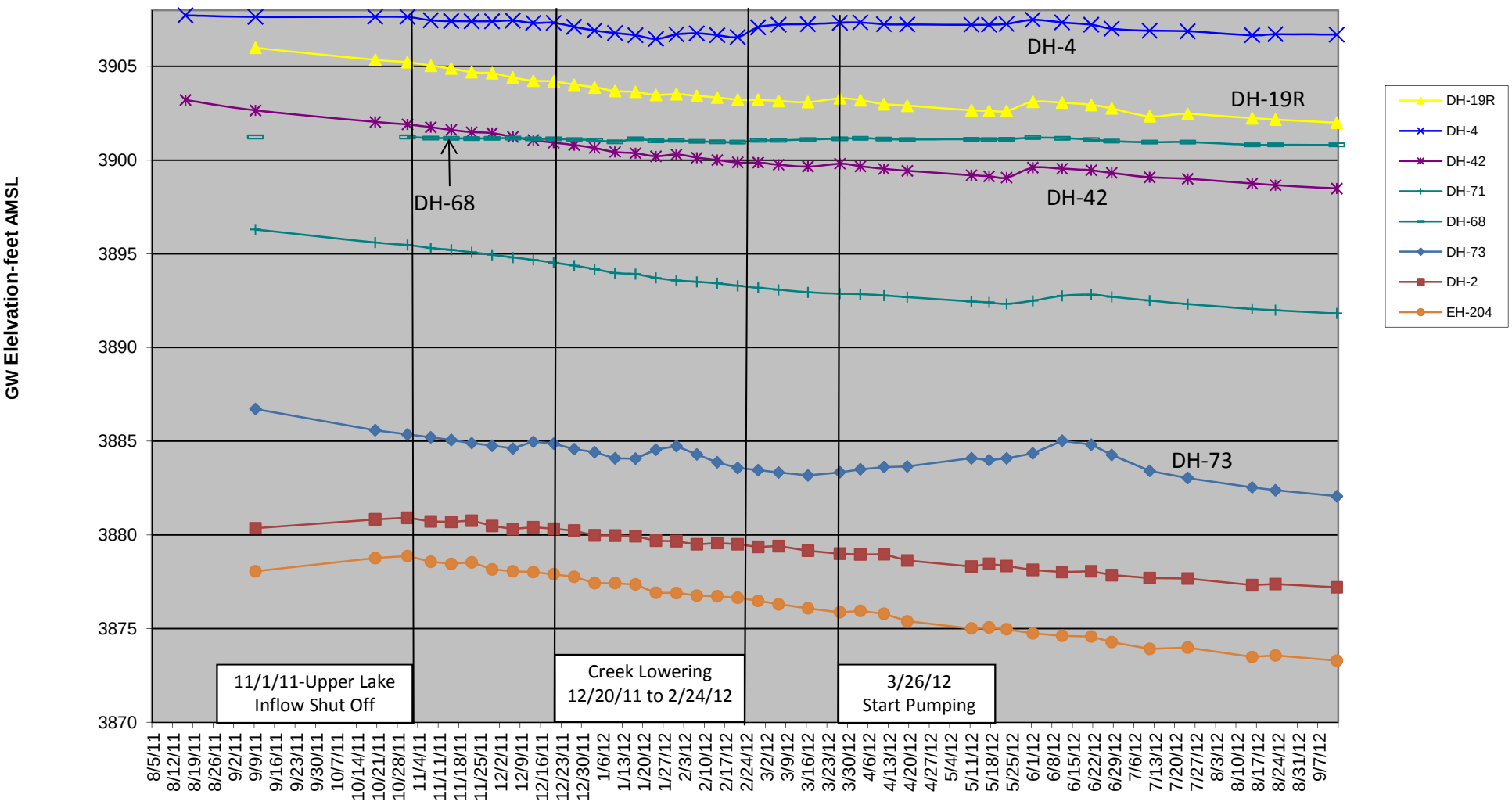


Figure 6. South Plant Site Groundwater Levels
GW Elevation- feet AMSL
3921
3920
3919
3918
3917
3916
3915
3914
3913
3912
8/5/11
8/12/11
8/19/11
8/26/11
9/2/11
9/9/11
9/16/11
9/23/11
9/30/11
10/7/11
10/14/11
10/21/11
10/28/11
11/4/11
11/11/11
11/18/11
11/25/11
12/2/11
12/9/11
12/16/11
12/23/11
12/30/11
1/6/12
1/13/12
1/20/12
1/27/12
2/3/12
2/10/12
2/17/12
2/24/12
3/2/12
3/9/12
3/16/12
3/23/12
3/30/12
4/6/12
4/13/12
4/20/12
4/27/12
5/4/12
5/11/12
5/18/12
5/25/12
6/1/12
6/8/12
6/15/12
6/22/12
6/29/12
7/6/12
7/13/12
7/20/12
7/27/12
8/3/12
8/10/12
8/17/12
8/24/12
8/31/12
9/7/12
11/1/11-Upper Lake Inflow Shut Off
Creek Lowering 12/20/11 to 2/24/12
3/26/12 Start Pumping
Upper Lake
Lower Lake
APSD-8
Upper Lake
Lower Lake
APSD-9
APSD-10
DH-20
APSD-12
APSD-8
DH-3

Figure 7. Central Plant Site Groundwater Levels



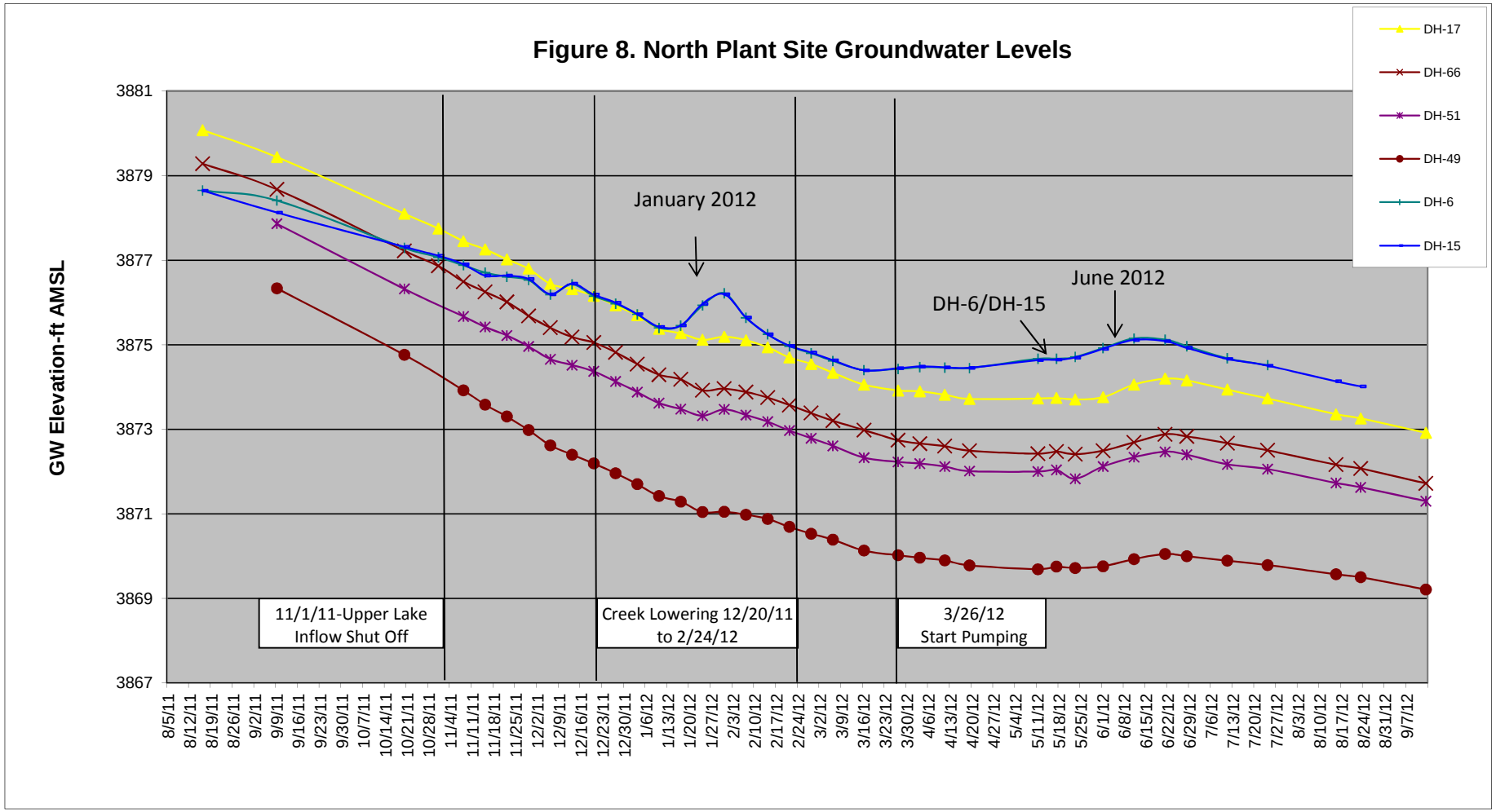


Figure 8. North Plant Site Groundwater Levels
GW Elevation-ft AMSL
3881
3879
3877
3875
3873
3871
3869
3867
January 2012
June 2012
DH-6/DH-15
11/1/11-Upper Lake Inflow Shut Off
Creek Lowering 12/20/11 to 2/24/12
3/26/12 Start Pumping
DH-17
DH-66
DH-51
DH-49
DH-6
DH-15
8/5/11
8/12/11
8/19/11
8/26/11
9/2/11
9/9/11
9/16/11
9/23/11
9/30/11
10/7/11
10/14/11
10/21/11
10/28/11
11/4/11
11/11/11
11/18/11
11/25/11
12/2/11
12/9/11
12/16/11
12/23/11
12/30/11
1/6/12
1/13/12
1/20/12
1/27/12
2/3/12
2/10/12
2/17/12
2/24/12
3/2/12
3/9/12
3/16/12
3/23/12
3/30/12
4/6/12
4/13/12
4/20/12
4/27/12
5/4/12
5/11/12
5/18/12
5/25/12
6/1/12
6/8/12
6/15/12
6/22/12
6/29/12
7/6/12
7/13/12
7/20/12
7/27/12
8/3/12
8/10/12
8/17/12
8/24/12
8/31/12
9/7/12

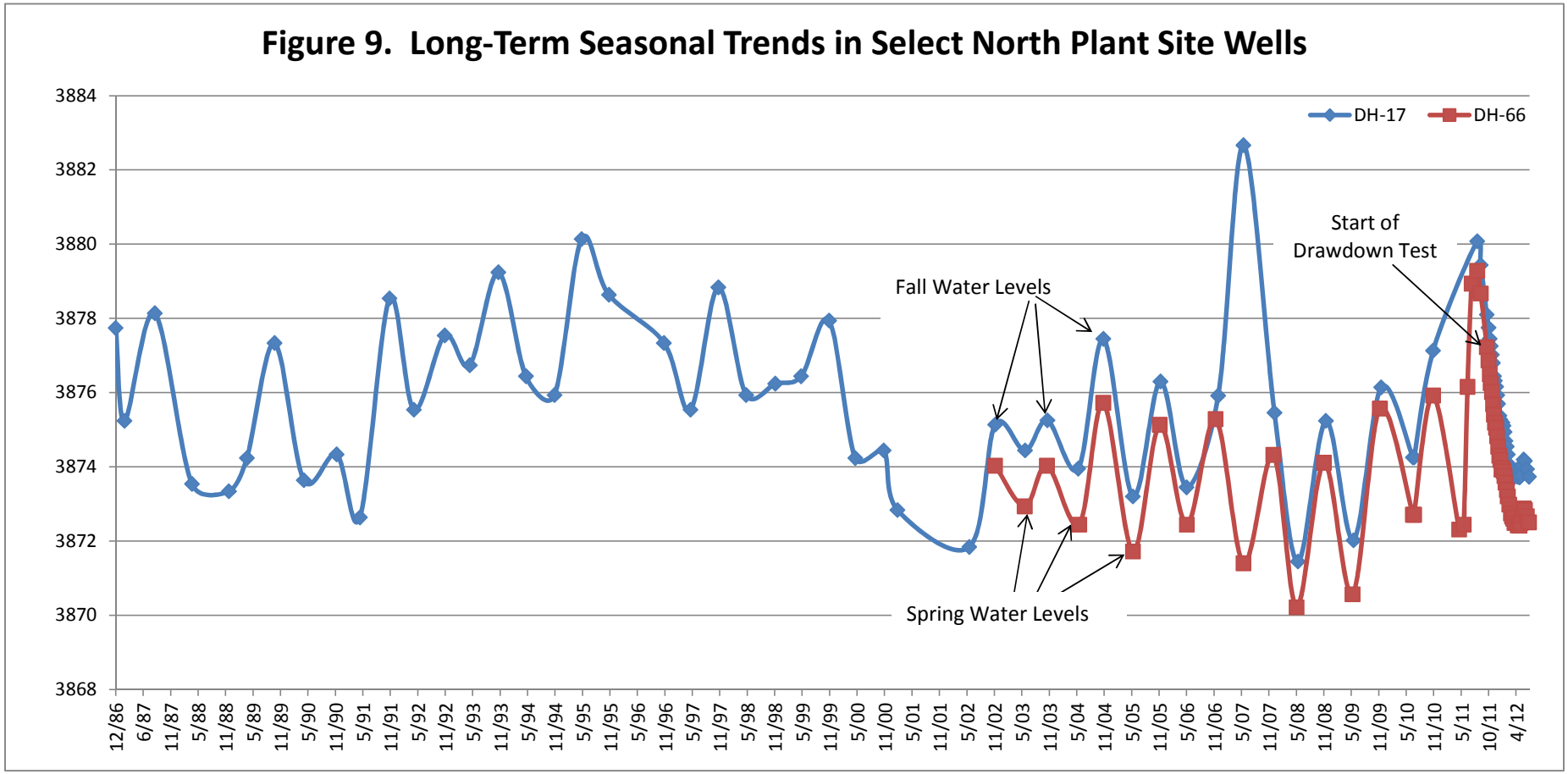


Figure 9. Long-Term Seasonal Trends in Select North Plant Site Wells
DH-17
DH-66
Start of Drawdown Test
Fall Water Levels
Spring Water Levels
3884
3882
3880
3878
3876
3874
3872
3870
3868
12/86
6/87
11/87
5/88
11/88
5/89
11/89
5/90
11/90
5/91
11/91
5/92
11/92
5/93
11/93
5/94
11/94
5/95
11/95
5/96
11/96
5/97
11/97
5/98
11/98
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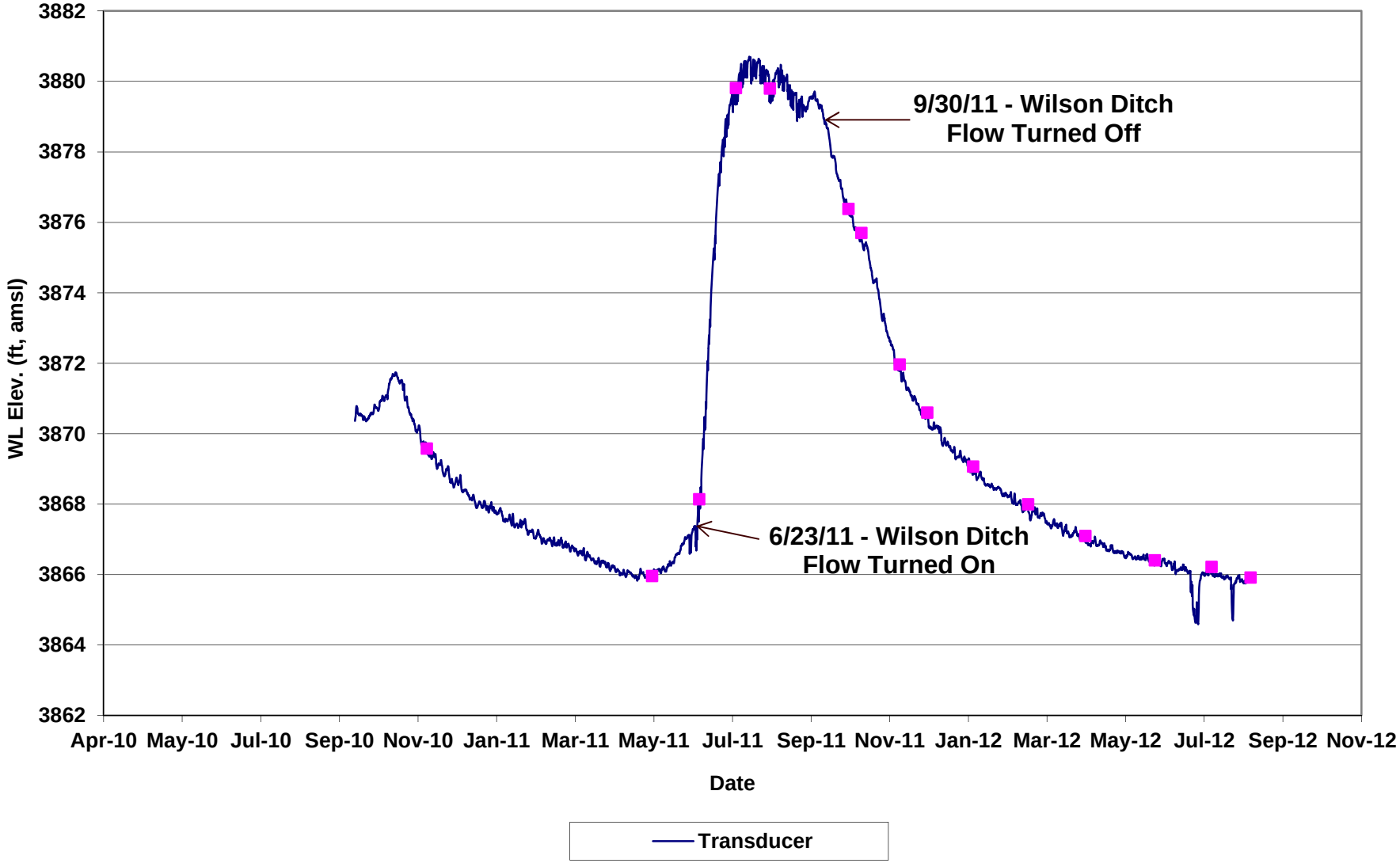
11/99
5/00
11/00
5/01
11/01
5/02
11/02
5/03
11/03
5/04
11/04
5/05
11/05
5/06
11/06
5/07
11/07
5/08
11/08
5/09
11/09
5/10
11/10
5/11
10/11
4/12

FIGURE 10. CONTINUOUS WATER LEVEL HYDROGRAPH FOR MONITORING WELL EH-210



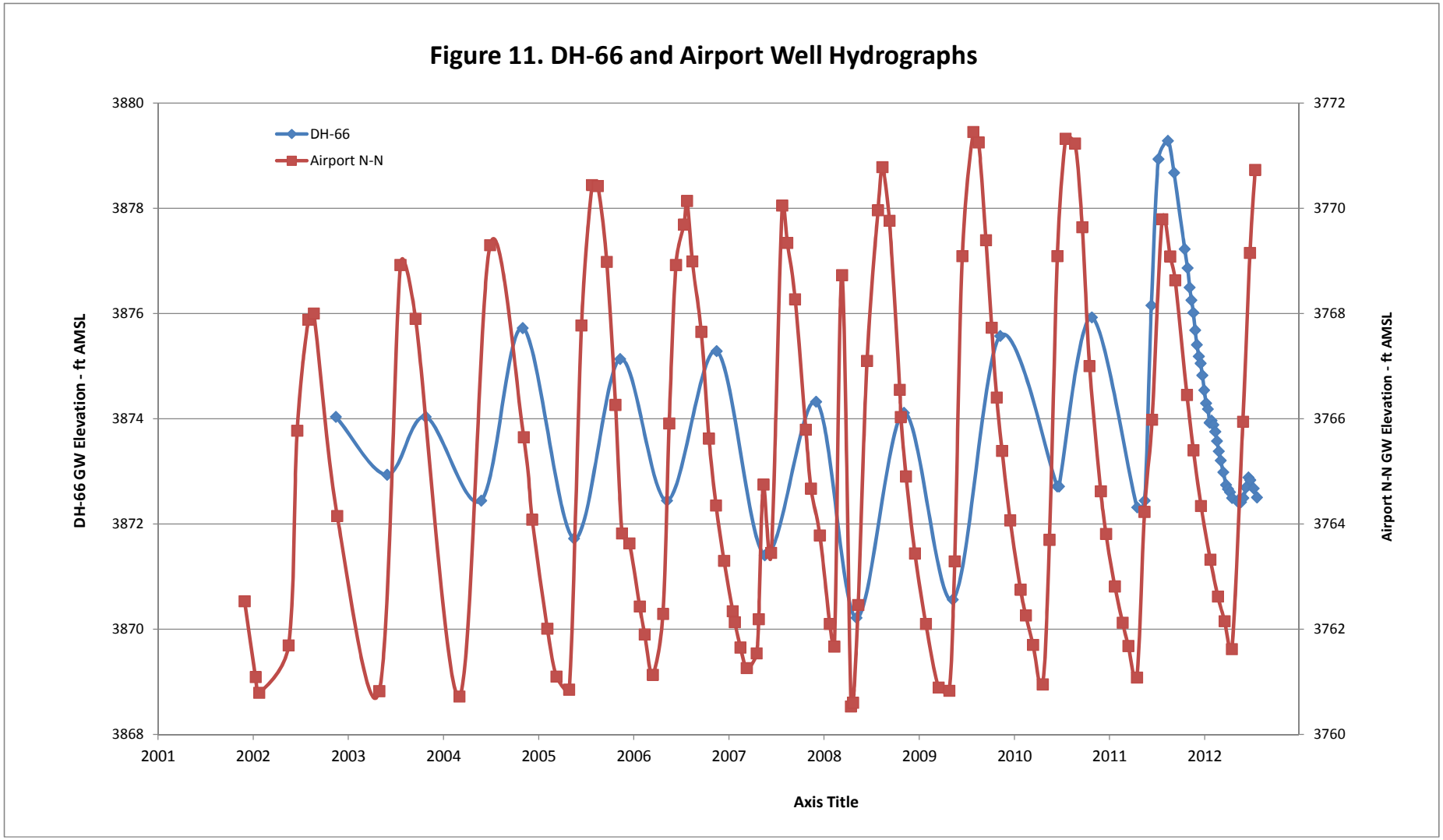
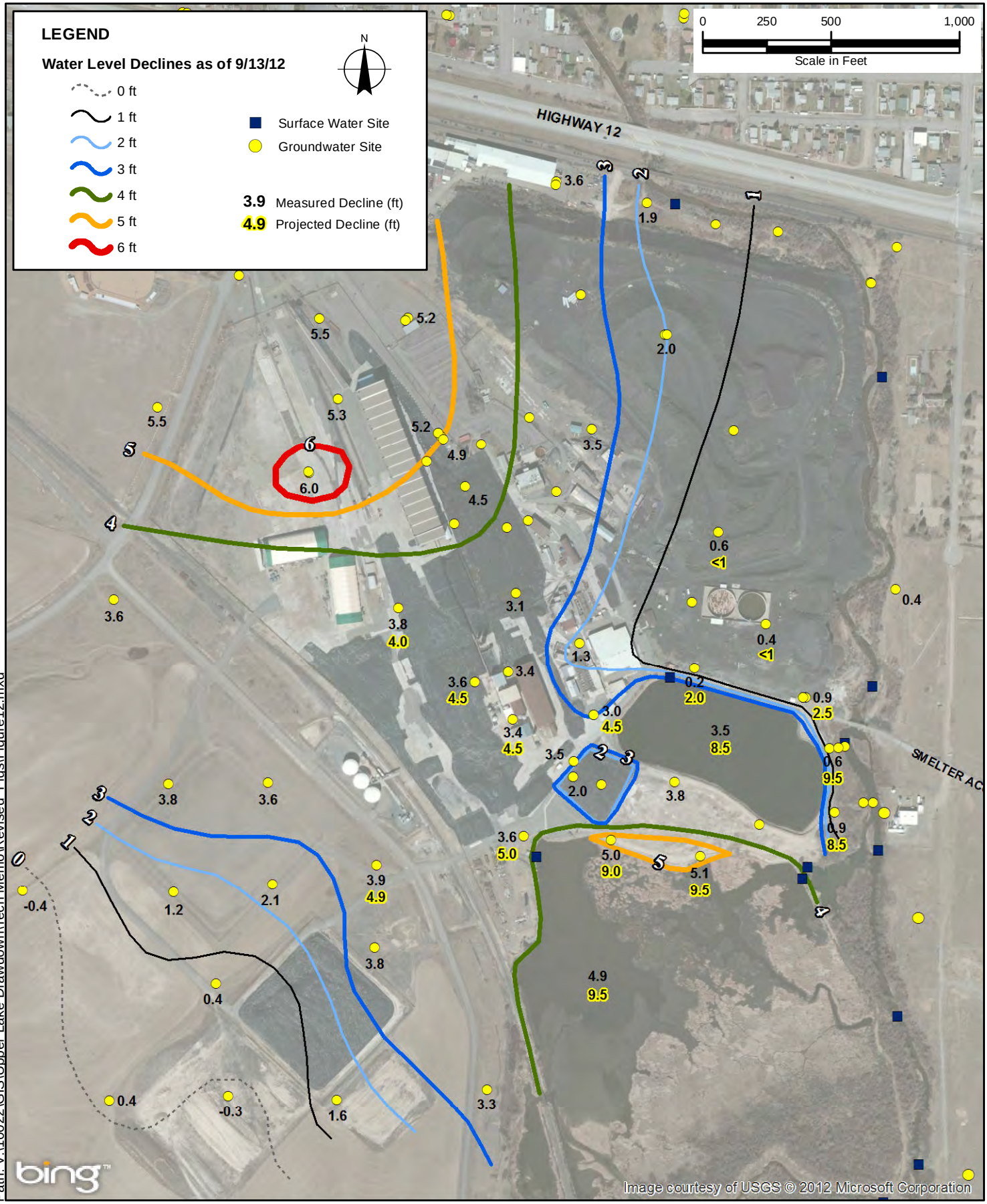


Figure 11. DH-66 and Airport Well Hydrographs
DH-66
Airport N-N
DH-66 GW Elevation - ft AMSL
Airport N-N GW Elevation - ft AMSL
3880
3878
3876
3874
3872
3870
3868
3772
3770
3768
3766
3764
3762
3760
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Axis Title



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MEASURED WATER LEVEL DECLINES AS OF 9/13/12 AND PROJECTED DECLINES WITH PERMANENT CREEK LOWERING AND UPPER LAKE REMOVAL UPPER LAKE DRAWDOWN TEST - EAST HELENA FACILITY

FIGURE

12

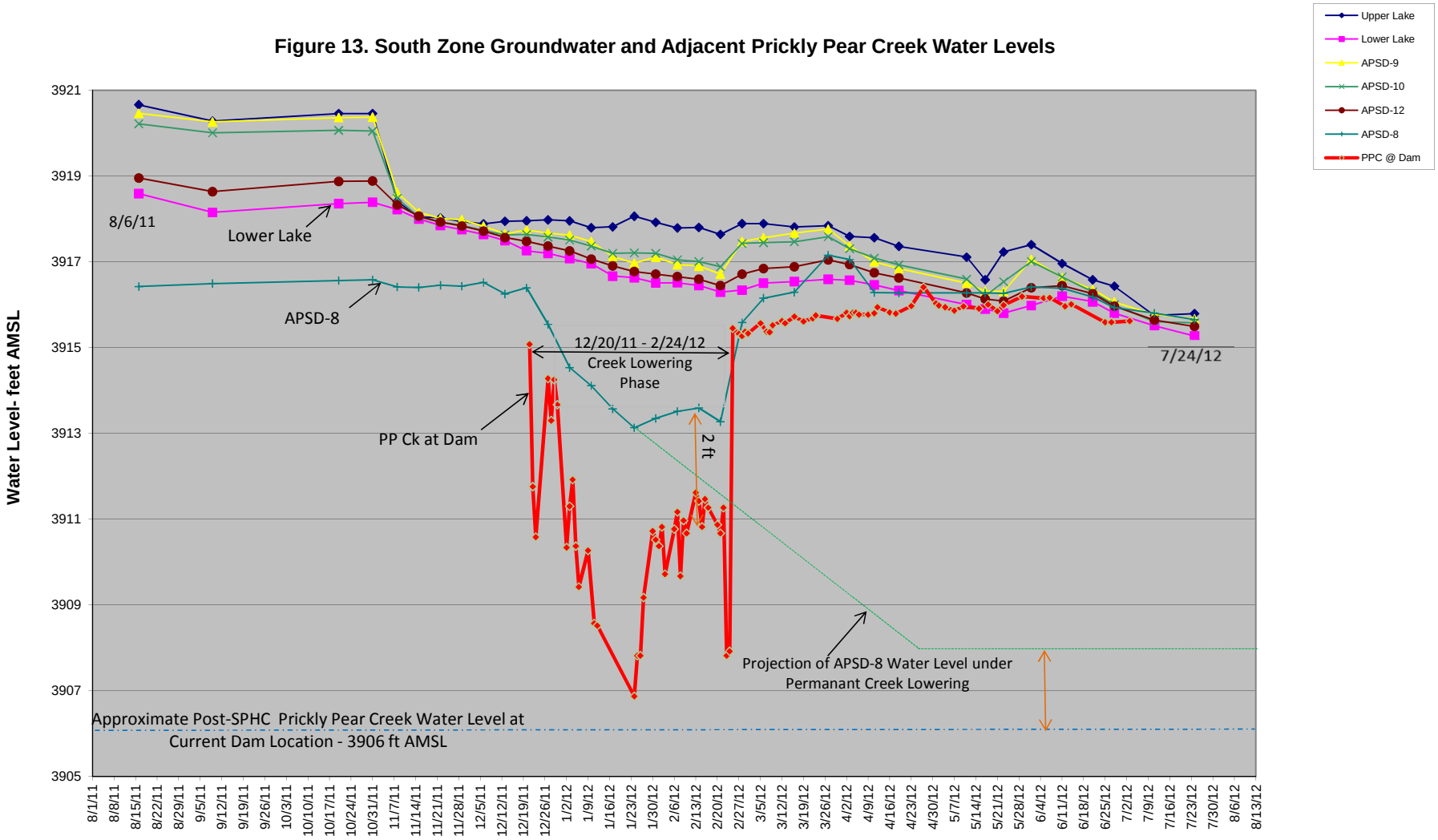
Figure 13. South Zone Groundwater and Adjacent Prickly Pear Creek Water Levels
Water Level- feet AMSL
3921
3919
3917
3915
3913
3911
3909
3907
3905
Upper Lake
Lower Lake
APSD-9
APSD-10
APSD-12
APSD-8
PPC @ Dam
8/6/11
Lower Lake
APSD-8
12/20/11 - 2/24/12
Creek Lowering
Phase
7/24/12
PP Ck at Dam
2 ft
Projection of APSD-8 Water Level under
Permanant Creek Lowering
Approximate Post-SPHC Prickly Pear Creek Water Level at
Current Dam Location - 3906 ft AMSL
8/1/11
8/8/11
8/15/11
8/22/11
8/29/11
9/5/11
9/12/11
9/19/11
9/26/11
10/3/11
10/10/11
10/17/11
10/24/11
10/31/11
11/7/11
11/14/11
11/21/11
11/28/11
12/5/11
12/12/11
12/19/11
12/26/11
1/2/12
1/9/12
1/16/12
1/23/12
1/30/12
2/6/12
2/13/12
2/20/12
2/27/12
3/5/12
3/12/12
3/19/12
3/26/12
4/2/12
4/9/12
4/16/12
4/23/12
4/30/12
5/7/12
5/14/12
5/21/12
5/28/12
6/4/12
6/11/12
6/18/12
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7/16/12
7/23/12
7/30/12
8/6/12
8/13/12

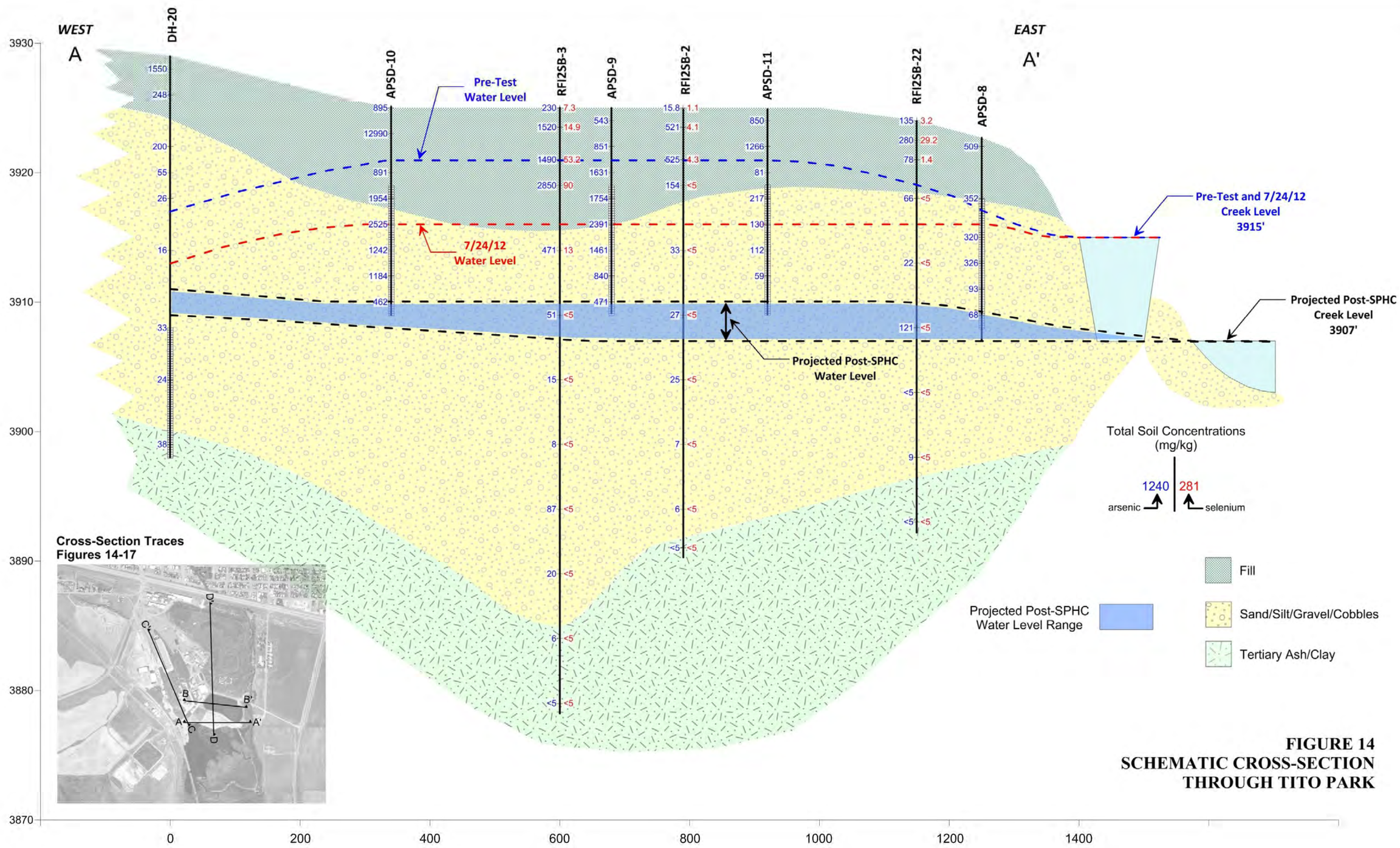

FIGURE 14
SCHEMATIC CROSS-SECTION THROUGH TITO PARK

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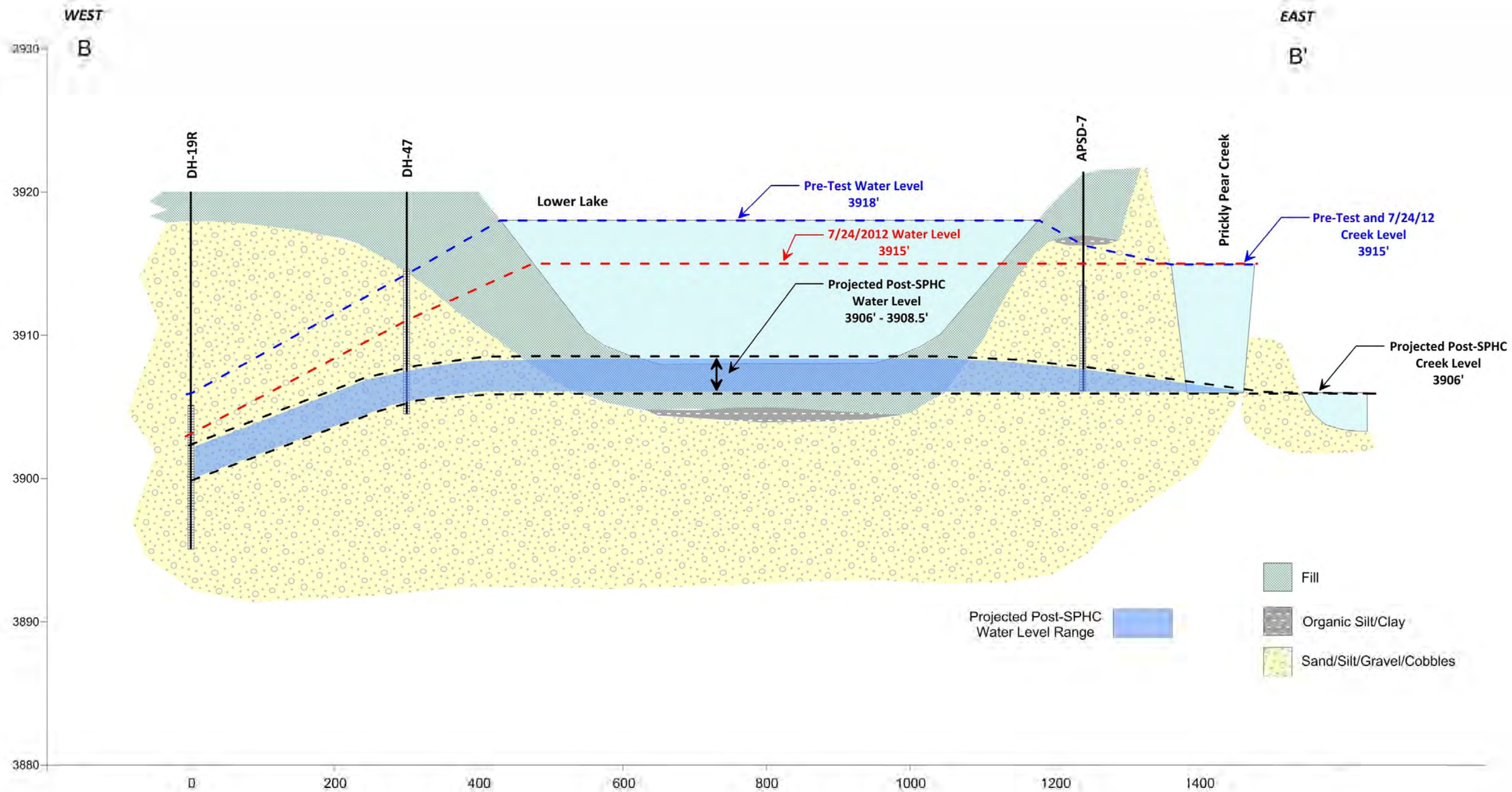

FIGURE 15
SCHEMATIC CROSS-SECTION
THROUGH LOWER LAKE

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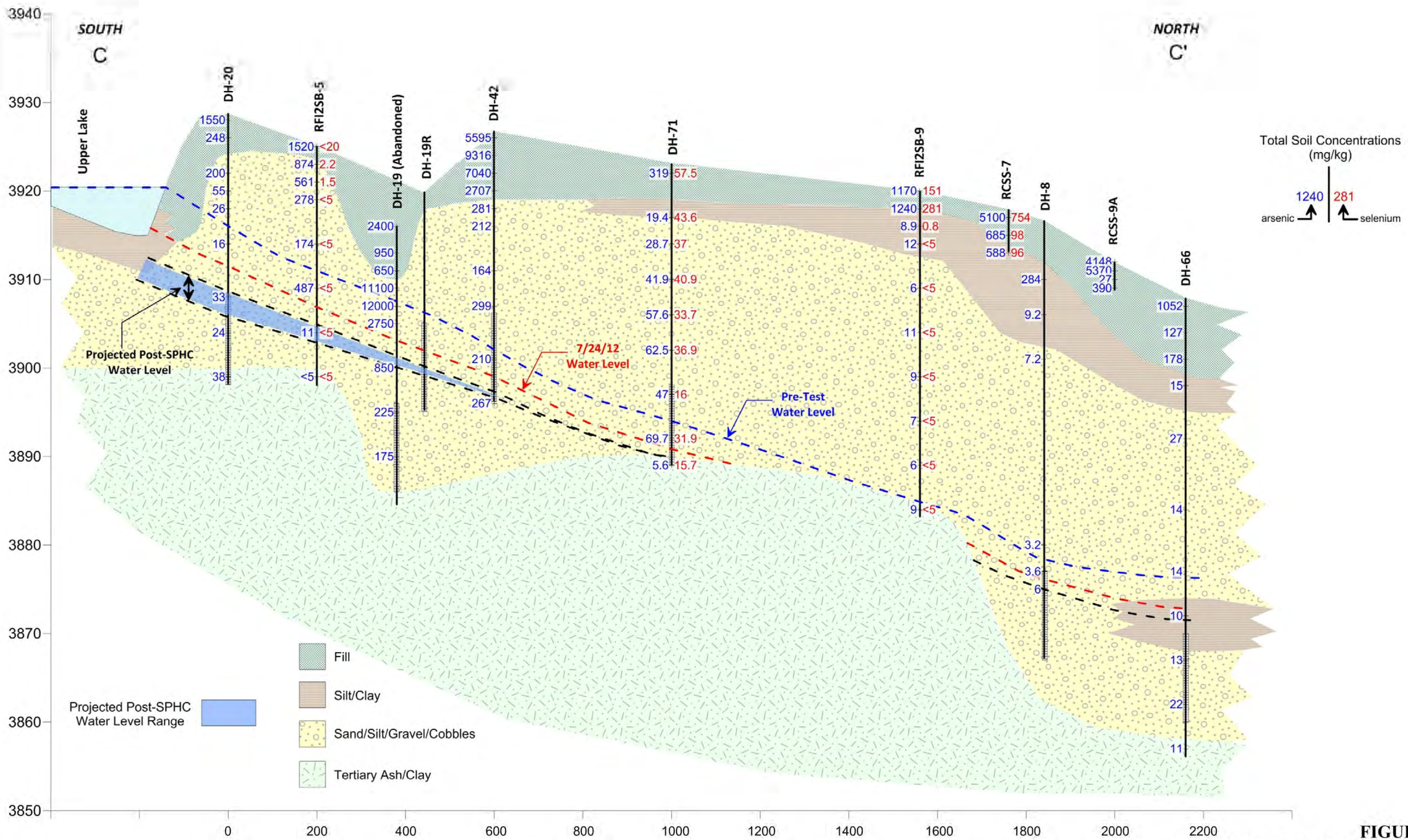


K:/PROJECT/12015/CSMs/Tito Park-UOS-LLake/ulake_northwest_xsec.srf

FIGURE 16
SCHEMATIC CROSS-SECTION
UPPER LAKE NORTHWEST
THROUGH WEST SE/LOSA AREA

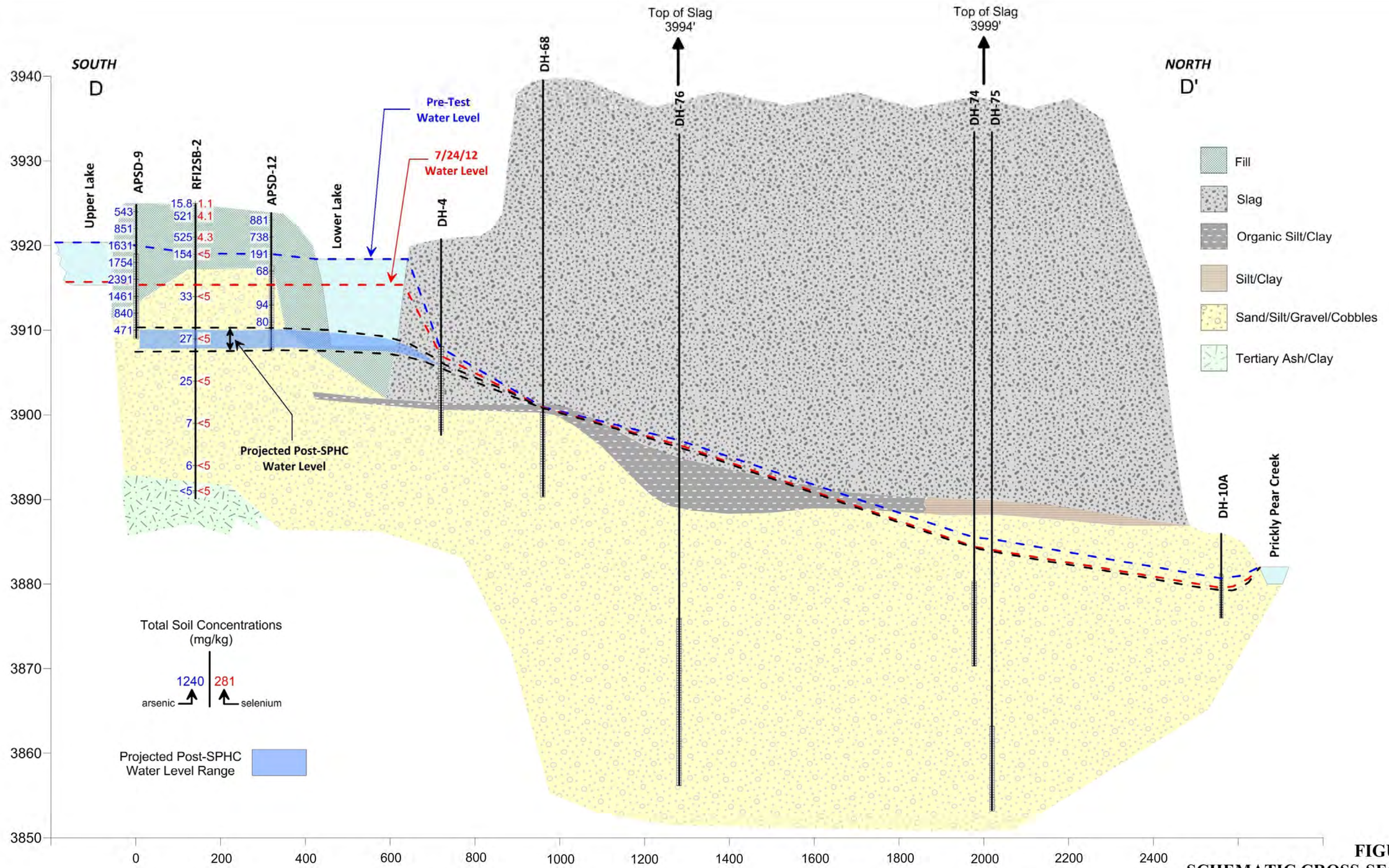
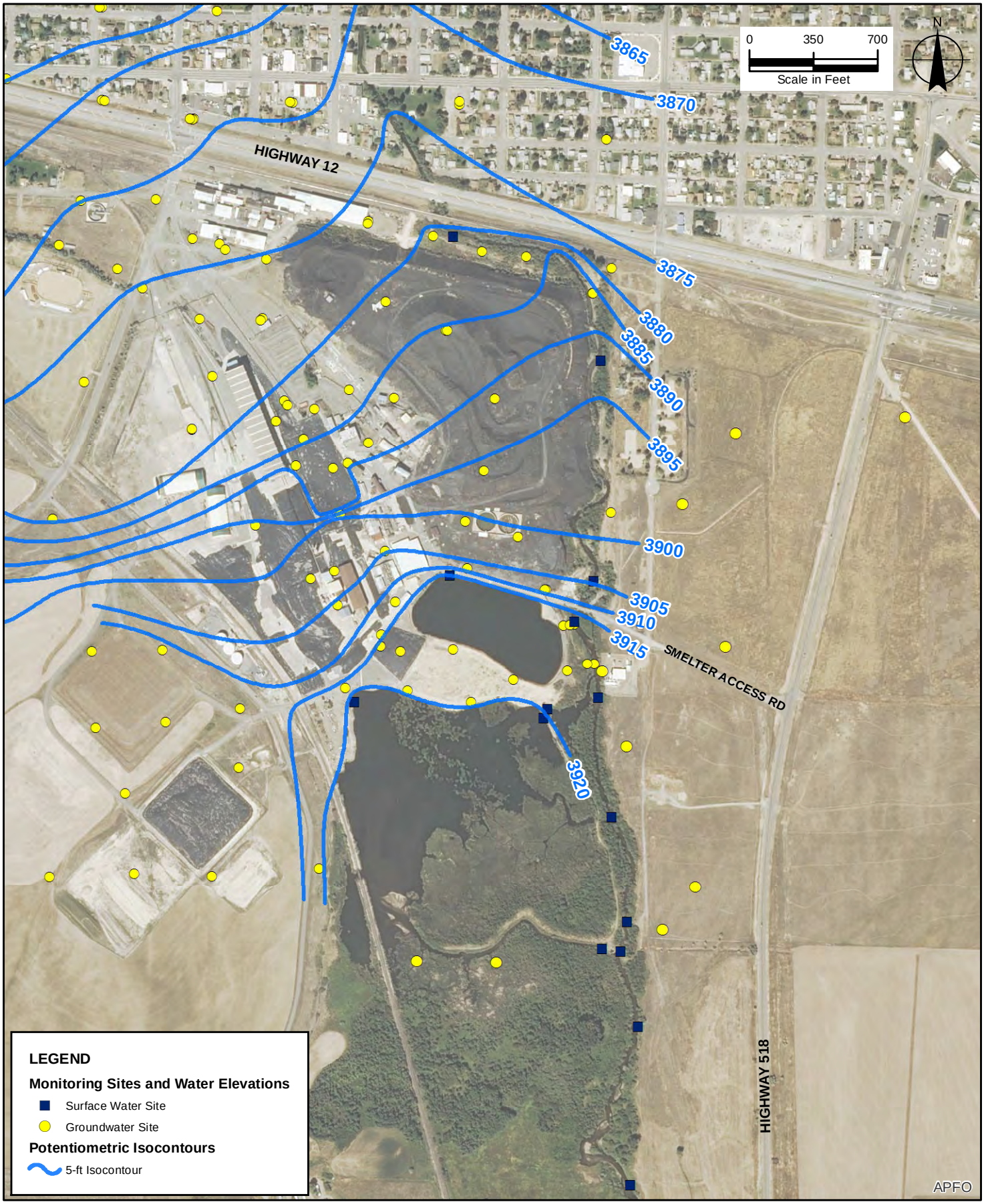


FIGURE 17
SCHEMATIC CROSS-SECTION
UPPER LAKE NORTH
THROUGH SLAG PILE

K:/PROJECT/12015/CSMs/Tito Park-UOS-LLake/ulake_north_xsec.srf



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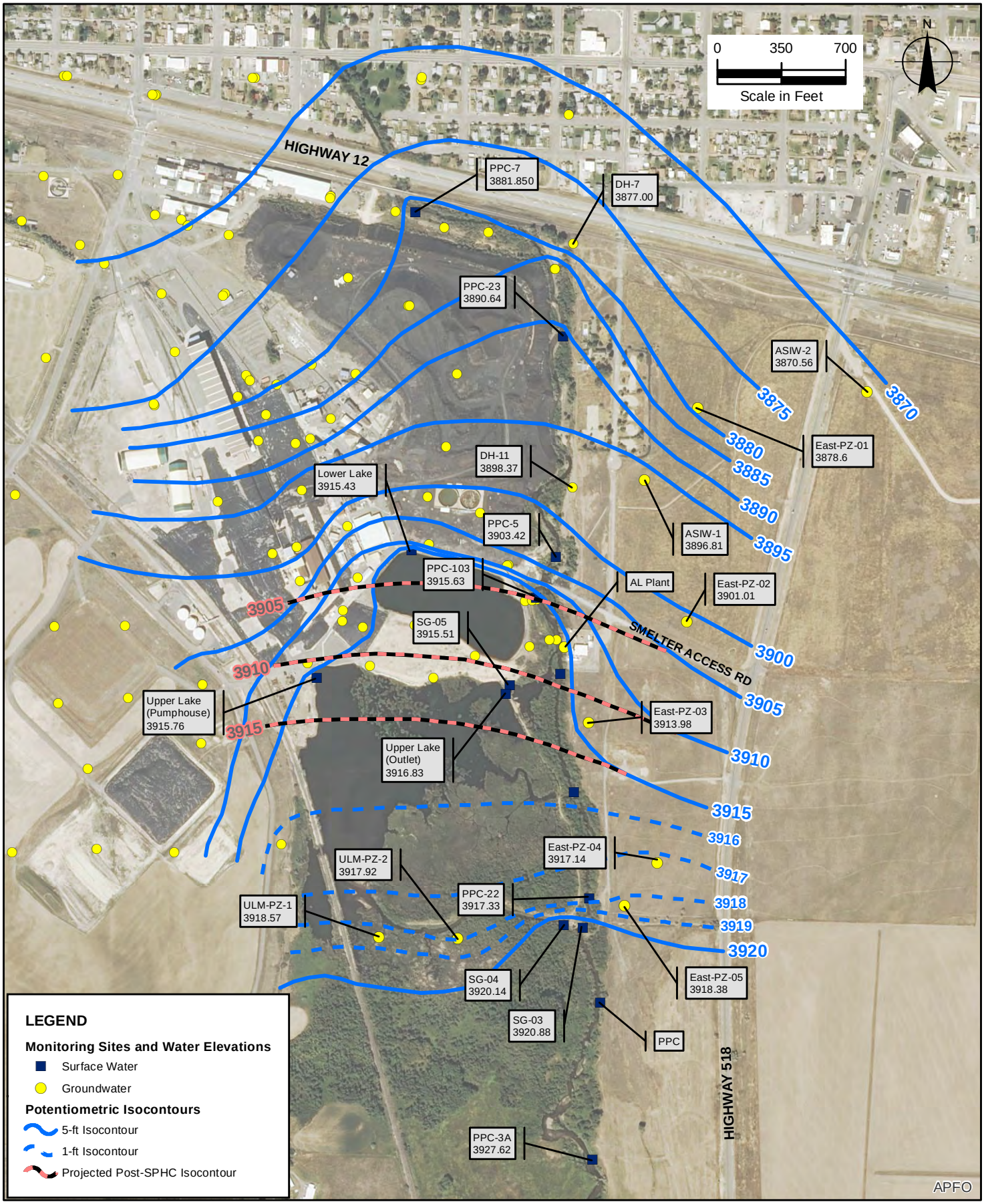
OCTOBER 2010 POTENTIOMETRIC MAP
UPPER LAKE DRAWDOWN TEST
EAST HELENA FACILITY

FIGURE
18



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JULY 24, 2012 POTENTIOMETRIC MAP
UPPER LAKE DRAWDOWN TEST
EAST HELENA FACILITY

FIGURE

19

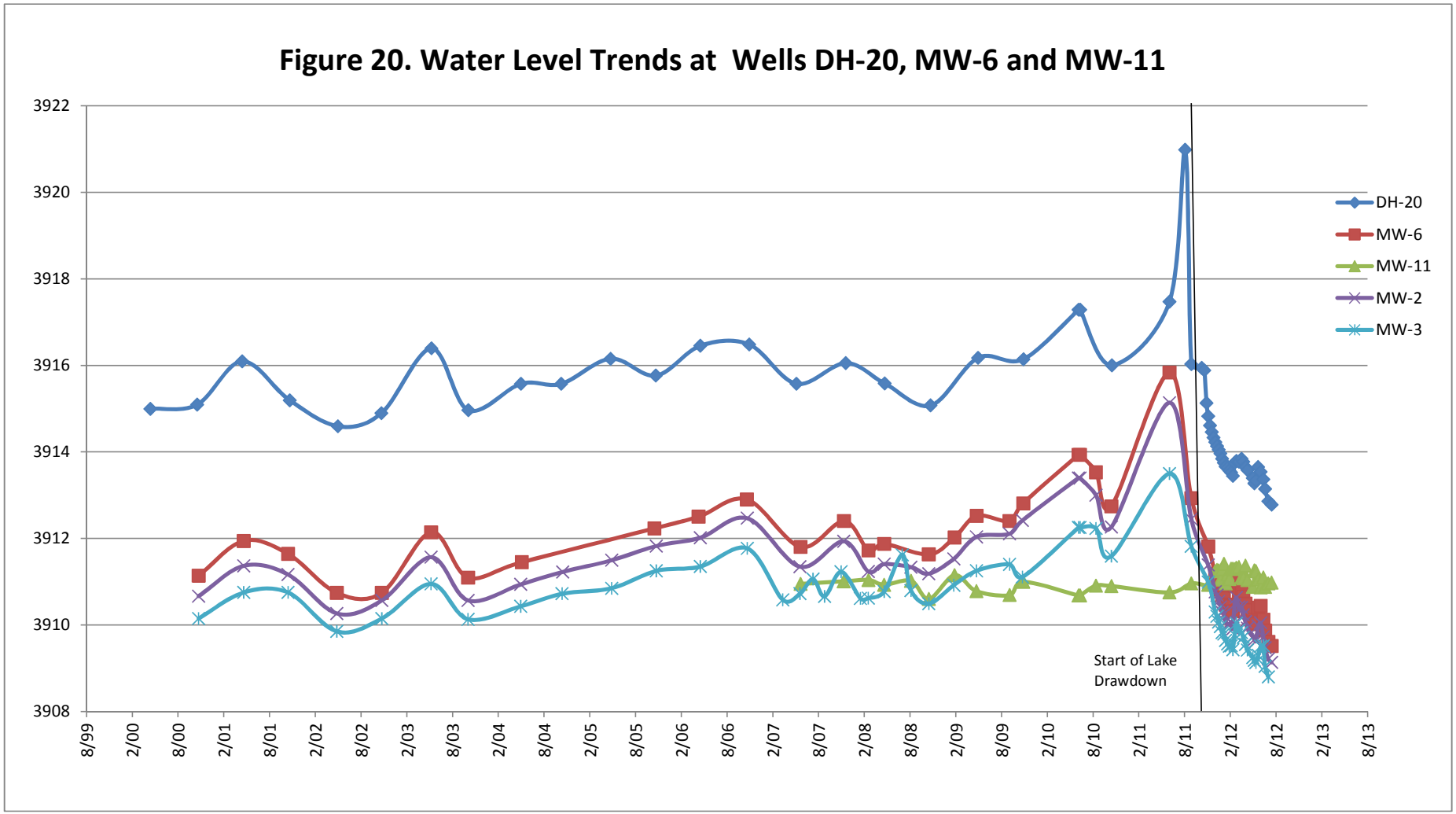
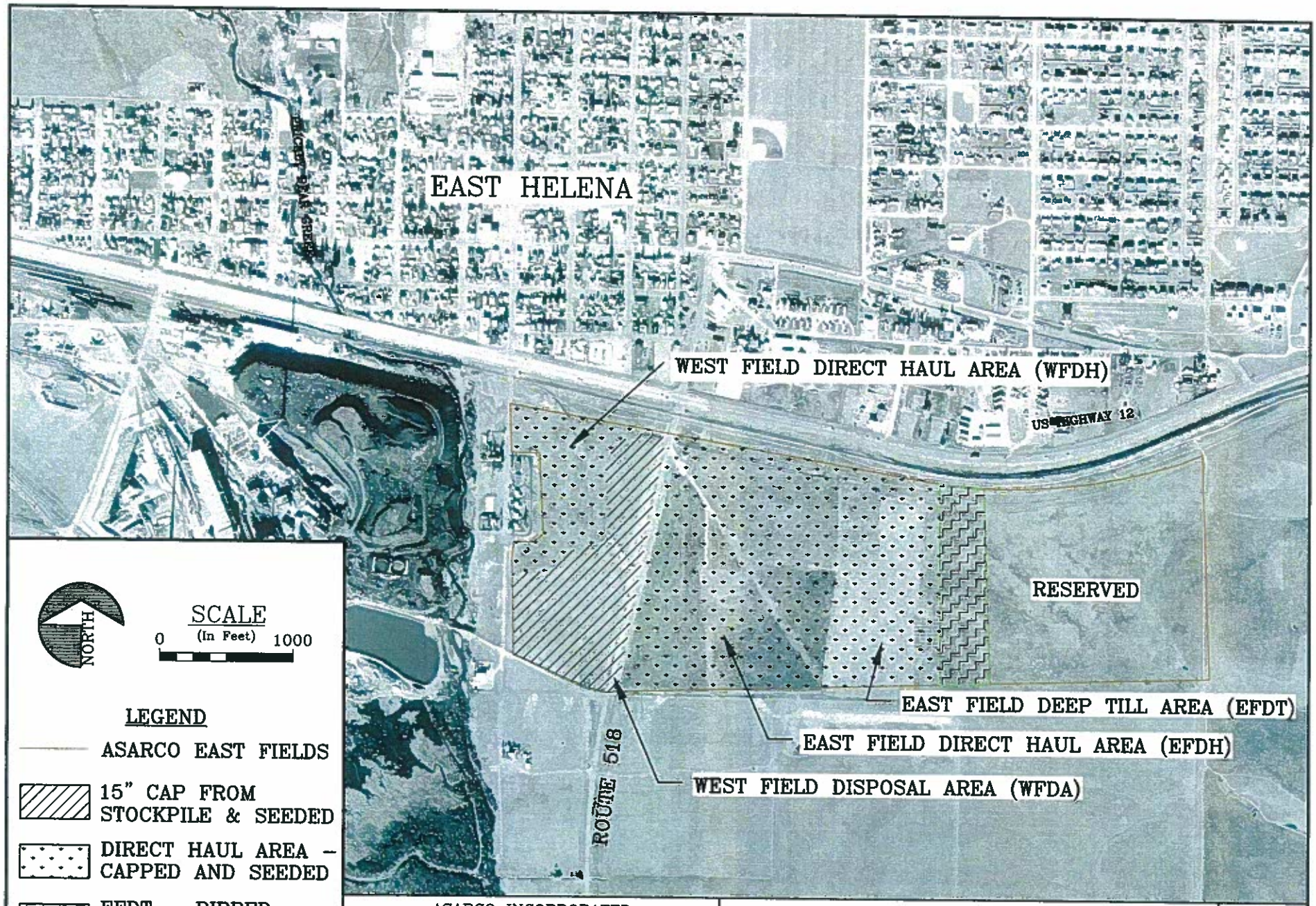


Figure 20. Water Level Trends at Wells DH-20, MW-6 and MW-11
3922
3920
3918
3916
3914
3912
3910
3908
8/99
2/00
8/00
2/01
8/01
2/02
8/02
2/03
8/03
2/04
8/04
2/05
8/05
2/06
8/06
2/07
8/07
2/08
8/08
2/09
8/09
2/10
8/10
2/11
8/11
2/12
8/12
2/13
8/13
DH-20
MW-6
MW-11
MW-2
MW-3
Start of Lake Drawdown

Appendix E
Reference Figures



ASARCO INCORPORATED
EAST HELENA RESIDENTIAL SOILS
REMOVAL ACTION 2010 YEAR END REPORT
EAST HELENA, MONTANA

EAST FIELDS
RESIDENTIAL SOIL DISPOSAL AREA

FIGURE
4-1

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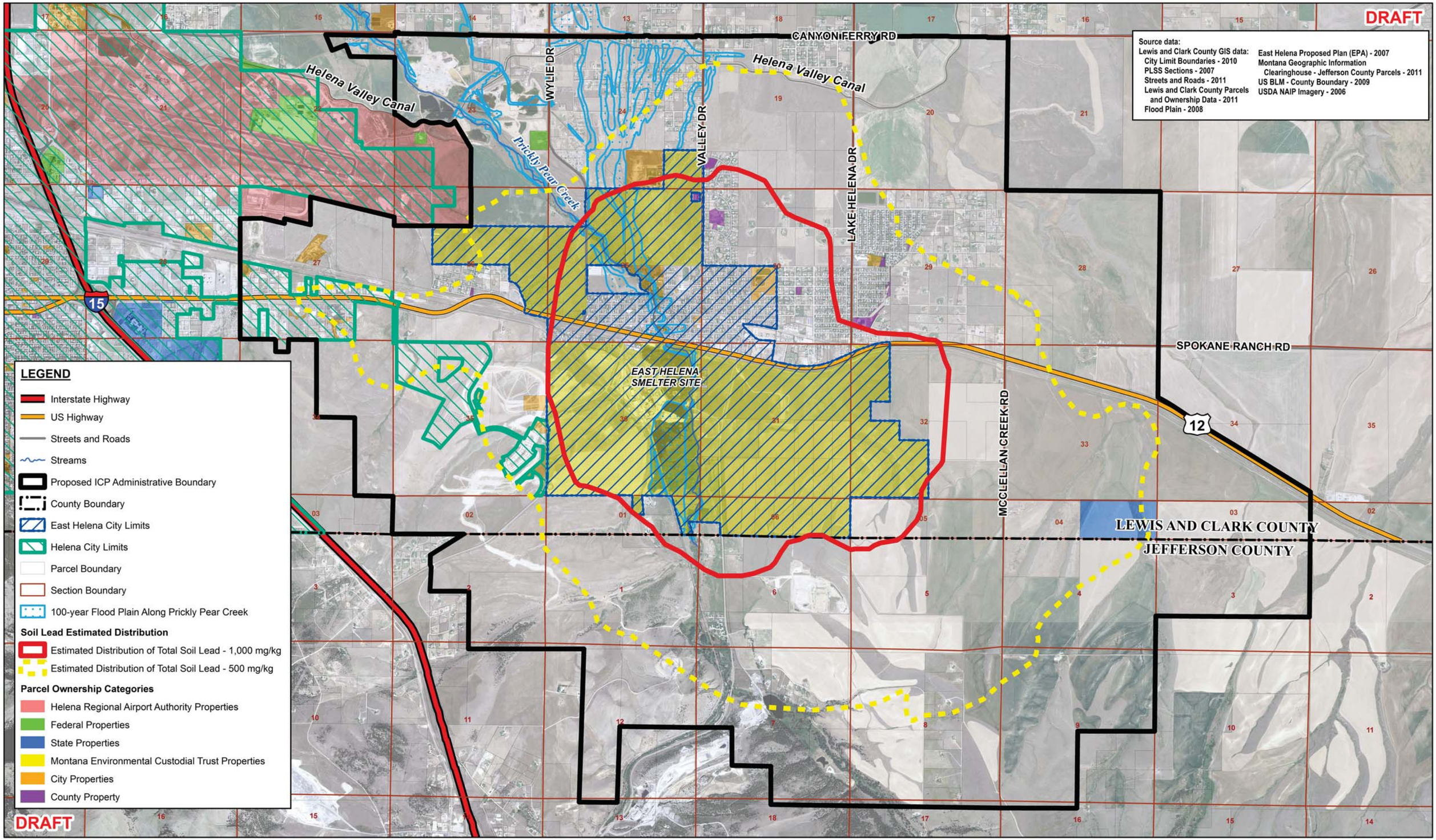

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File	Montana/LewisClark_ICP/LC_ICP_11x17_20110919a	Requestor	S. Spalinger
Print Date	September 19, 2011	Project Manager	S. Spalinger
Project Number	10097	Cartographer	B. Bailey

Project Name: Lewis and Clark County, Montana Institutional Controls Program

This map was produced using information obtained from several different sources that have not been independently verified. These sources have also not provided information on the precision and accuracy of the data. Information on this map is not a substitute for survey data.

1:36,000
1 inch = 3,000 feet
0 2,000 4,000 Feet

Figure 1
East Helena Superfund Site (OU2)
Proposed ICP Boundary