Libby Asbestos Superfund Site

Operable Unit 3
2011 Phase IV Part B Remedial Investigation Field Sampling Summary Report

January 2013

MWH

FIELD SAMPLING SUMMARY REPORT

2011 PHASE IV PART B
REMEDIAL INVESTIGATION
OPERABLE UNIT 3

SURFACE WATER SAMPLING

LIBBY ASBESTOS SUPERFUND SITE

January 2013

Prepared by:

MWH Americas, Inc.
2890 East Cottonwood Parkway, Suite 300
Salt Lake City, Utah 84121

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW 1-1

1.1 Background Summary 1-1

1.1.1 Phase I Remedial Investigation 1-2

1.1.2 Phase II Remedial Investigation 1-3

1.1.3 Phase III Remedial Investigation 1-4

1.1.4 2010 Phase IV Remedial Investigation 1-4

1.1.5 2011 Phase IV Part B Remedial Investigation 1-4

1.2 Purpose of the 2011 Phase IV Part B Remedial Investigation 1-5

1.3 Purpose of This Document 1-5

1.4 Project Organization 1-6

1.4.1 Project Management 1-6

1.4.2 Technical Support 1-6

1.4.3 Phase IV Part B Field Sampling Activities 1-7

1.4.4 Sample Preparation and Analysis 1-7

1.4.5 Data Management 1-8

2.0 2011 PHASE IV PART B SURFACE WATER SAMPLING 2-1

2.1 Summary of the 2011 Phase IV PART B Sampling Program 2-1

2.2 Sample Locations and Frequency 2-2

2.3 Sampling Protocols and Procedures 2-2

2.3.1 Syringe Field-Filtration Sampling 2-2

2.3.2 Grab Aqueous Surface Water Sampling and field Parameters 2-3

2.3.3 Continuous Flow Monitoring 2-3

2.4 Sampling Equipment and Instrumentation 2-3

2.5 Sampling Methods 2-4

2.6 Quality Control Samples 2-5

2.6.1 Field Duplicate Samples 2-5

2.6.2 Field Blank Samples 2-5

2.7 Sampling Handling 2-5

2.7.1 Sample Preservation and Storage 2-5

2.8 Training and Proficiency Demonstration 2-6

2.9 Sample Documentation and Identification 2-6

2.10 Sample Chain of Custody 2-7

2.11 Sample Analysis 2-7

2.12 Health and Safety 2-7

TABLE OF CONTENTS (cont.)

LIST OF TABLES
(Tables follow their respective section)

Table No.	Title
2-1	Phase IV Part B Surface Water Sampling Summary

LIST OF FIGURES
(Figures follow their respective section)

Figure No.	Title
1-1	Location of Mine Site and Preliminary OU3 Study Boundaries
2-1	Surface Water Sample Locations
2-2	Phase IV Stream Flow Data

LIST OF APPENDICES
(Appendices on CD in pocket)

Appendix A	Field Modification Approval Forms
Appendix B	Field Sample Data Sheet Scans
Appendix C	Field Logbook Scans
Appendix D	Chain-of-Custody Scans
Appendix E	ISCO Flow Data in Excel Format

LIST OF ACRONYMS AND ABBREVIATIONS

µm	micrometer/micron
ABS	activity-based sampling
AOC	Administrative Order on Consent
CCI	Chapman Construction, Inc
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	contaminant(s) of concern; chain-of-custody
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
FB	field blank
FD	field duplicate
FSDS	field sample data sheet
FSSR	Field Sampling Summary Report
gpm	gallon per minute
GIS	geographic information system
GPS	global positioning system
HDR	HDR, Inc. (oversight contractor)
HEPA	high-efficiency particulate-air
Index ID	index identification number
ISO	International Organization for Standardization
KDC	Kootenai Development Corporation
LA	Libby Amphibole
MDEQ	Montana Department of Environmental Quality
mL	milliliter
mm	millimeter
MWH	MWH Americas, Inc.
OU	Operable Unit
ORP	oxidation reduction potential
PAPR	powered air-purifying respirator
PPE	personal protective equipment
QC	quality control
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager

LIST OF ACRONYMS AND ABBREVIATIONS (cont.)

SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SRC	Syracuse Research Corporation
TEM	transmission electron microscopy
USFS	United States Forest Service

1.0 PROJECT OVERVIEW

1.1 BACKGROUND SUMMARY

The vermiculite deposit at Vermiculite Mountain, six miles northeast of Libby, Montana, contains veins of asbestiform amphibole minerals (e.g., winchite, richterite and tremolite). The asbestiform amphibole minerals that occur at Vermiculite Mountain are collectively termed "Libby Amphibole" (LA) by the U.S. Environmental Protection Agency (EPA). Historic mining, milling, and processing of vermiculite from the former W.R. Grace mine at Vermiculite Mountain released LA fibers to the environment. Long-term exposure to LA fibers associated with the vermiculite is known to have caused adverse health effects in some workers at the mine and processing facilities and EPA suspects others in Libby.

In 2000, EPA began cleanup actions at Libby under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA; also known as Superfund) to eliminate sources of LA exposure to residents and workers. Initial efforts were focused mainly on wastes remaining at former vermiculite processing areas. As work progressed, action shifted to cleanup of homes and workplaces in the residential/commercial areas of Libby, designated by EPA as Operable Unit 4 (OU4) of the Libby Asbestos Site.

As part of the Superfund designation of the Libby Asbestos Site, the former mine and environs at Vermiculite Mountain were designated OU3. OU3 includes the property in and around the former vermiculite mine and forest areas surrounding the mine that may have been impacted by releases and subsequent migration of contaminants from the mine. The mine site and the preliminary study area boundary of OU3 are shown on **Figure 1-1**. EPA established the preliminary study area boundary for the purpose of planning and developing the scope of the Remedial Investigation/Feasibility Study (RI/FS) for OU3. This study area boundary may be revised as data are obtained on the nature and extent of environmental contamination, if any, associated with releases that may have occurred from the mine site.

1.1.1 Phase I Remedial Investigation

In September 2007, EPA initiated a RI/FS of OU3 and produced the *Phase I Sampling and Analysis Plan for Operable Unit 3, Libby Asbestos Superfund Site* (OU3 Phase I SAP) to begin the characterization of environmental conditions at OU3. The OU3 Phase I SAP contains information on the history and operations of the former mine and discussions on general site geography, geology, hydrology and other relevant background information. The SAP also contains the preliminary sampling locations and the Standard Operating Procedures (SOPs) that were used as guidance during the OU3 Phase I RI performed in October 2007. Phase I included sampling and analysis of soil, mine wastes, sediment, surface water, and ambient air at the former mine site, and tree bark, duff and mineral soil on the mine site and in surrounding forested areas within an eight-mile radius of the mine site. The field sampling performed as part of the Phase I RI is summarized in the *Phase I Field Sampling Summary Report* (Phase I FSSR), which documents the sampling locations and procedures employed during the Phase I RI at OU3.

Prior to implementing the OU3 Phase I RI, EPA had collected very limited information to evaluate contaminants of potential concern at the former Vermiculite Mountain mine property and potential releases to adjacent forest lands, surface water and groundwater. Areas outside the former mine property are of potential concern because they are used by the public for recreation, by logging companies for timber harvesting, and by wildlife as habitat. Contaminants of potential concern at OU3 include not only LA, but other mining-related contaminants that may have been released to the environment. Therefore, the overall objective of phased-based sampling at OU3 is to collect sufficient information to allow evaluation of risks to humans and ecological receptors from exposure to mining-related releases, and to support the development and evaluation of remedial alternatives to address any unacceptable risks that are identified. This will occur over multiple, phased sampling events; the findings of each phase of sampling will be used to guide subsequent phases of investigation.

Phase I sampling and analysis was intended to provide initial information on the nature and extent of asbestiform LA and non-asbestos contamination, to identify contaminants

of potential concern to be investigated during the RI, and to begin collection of data to establish a study area boundary for subsequent phases of the RI. Phase I was not expected to provide data that would be sufficient to fully characterize the nature and extent of contamination or to support a risk assessment. Rather, the results of Phase I were intended to provide sufficient information so that a more detailed and extensive sampling effort (Phase II) could be designed for implementation during the 2008 field season.

1.1.2 Phase II Remedial Investigation

The Phase II RI was performed from early April through October 2008 and consisted of three parts: Part A (surface water and sediment sampling), Part B (groundwater and ambient air sampling), and Part C (ecological sampling). Part A field sampling was performed in accordance with the *Phase II Sampling and Analysis Plan for Operable Unit 3, Libby Asbestos Superfund Site; Part A: Surface Water and Sediment* (Phase IIA SAP). Part B field sampling was performed in accordance with the *Phase II Sampling and Analysis Plan for Operable Unit 3, Libby Asbestos Superfund Site; Part B: Ambient Air and Groundwater* (Phase IIB SAP). Part C was performed in accordance with the *Phase II Sampling and Analysis Plan for Operable Unit 3, Libby Asbestos Superfund Site; Part C: Ecological Data* (Phase IIC SAP).

Parts A and B of the Phase II RI focused on mine-site media sampling (surface water, groundwater, sediments and ambient air) to more fully characterize the nature, extent, and seasonal variation of contamination on the former mine property. Field activities performed under Parts A and B of the Phase II SAP are summarized in the *Phase II Field Sampling Summary Report, Parts A and B.* Part C of the Phase II RI included ecological sampling performed in late September and early October 2008, and is summarized in separate documents.

1.1.3 Phase III Remedial Investigation

The Phase III RI at OU3 began in early June 2009. Activity-based sampling (ABS) was

conducted in accordance with the *Remedial Investigation for Operable Unit 3, Libby Asbestos Superfund Site Phase III Sampling and Analysis Plan* (Phase III SAP), as amended by field modifications issued by EPA. ABS activities during Phase III focused on simulating the activities of recreational visitors to the forest lands in the vicinity of the former mine. The ABS scripts included ATV riding, hiking, fire-pit preparation, wood gathering, and building and moving about a campfire. Field activities performed under Phase III SAP are summarized in the *Phase III Field Sampling Summary Report* (Phase III FSSR). Ecological sampling performed at OU3 during the 2009 field season is discussed in a separate document.

1.1.4 2010 Phase IV Remedial Investigation

The 2010 Phase IV RI began in June 2010 with site selection and U.S. Forest Service (USFS) approval of trees to be harvested during ABS. ABS was conducted in accordance with the *Remedial Investigation for Operable Unit 3, Libby Asbestos Superfund Site Phase IV Sampling and Analysis Plan* (Phase IV SAP). The 2010 Phase IV focused on sampling potential exposures of forest users and USFS personnel downwind (northeast) of the former mine operations. The 2010 Phase IV ABS activities included timber harvesting, limbing and cutting felled trees into fireplace lengths, trail clearing and thinning, tree thinning, timber inspection, fireline cutting by both hand and machine and shed elk horn hunting along Rainy Creek. Field activities performed under Phase IV SAP are summarized in the 2010 *Phase IV Field Sampling Summary Report* (Phase IV FSSR). Ecological sampling performed at OU3 during the 2010 field season is discussed in a separate document.

1.1.5 2011 Phase IV Part B Remedial Investigations

The Phase IV RI continued during the field season of 2011. Tasks performed in 2011, under Phase IV Part B, included syringe-surface water sampling as well as annual ISCO surface water monitoring. Sampling performed during the 2011 Phase IV Part B was conducted in accordance with the *Phase IV Sampling and Analysis Plan Part B: 2011 Surface Water Study (Phase IV Part B SAP*, dated April 4, 2011, *SOP 3A (Rev.0) Water Sampling with Syringe Filters*, dated March 18, 2011, and other applicable SOPs.

Surface water sampling was performed on a weekly schedule during the time period of April to July 2011 and bi-weekly thereafter through September 2011. Data collected will be used to support the ecological risk assessment. Ecological sampling performed during the 2011 field season is discussed in a separate document.

1.2 PURPOSE OF THE 2011 PHASE IV PART B REMEDIAL INVESTIGATION

Data generated during the 2011, Phase IV Part B Sampling may be used to characterize LA concentrations, as well as to further characterize the habitat suitability of site streams for fish. The 2011 Phase IV Part B investigation was performed in accordance with the *Phase IV Part B SAP, SOP 3A (Rev.0)* and other applicable SOPs.

1.3 PURPOSE OF THIS DOCUMENT

This 2011 Phase IV Part B FSSR is a summary of site activities performed in support of the RI/FS at OU3 during the 2011 field season (April through September 2011). OU3 includes the property at and around the former vermiculite mine at Vermiculite Mountain potentially impacted by releases and subsequent migration of hazardous substances from the mine site and former mine operations (the preliminary boundaries of OU3 are depicted on **Figure 1-1** of this document). The final boundaries of OU3 had not been defined prior to 2011 Phase IV Part B RI field sampling. Final boundaries for OU3 will be based primarily upon the extent of contamination associated with releases from the former mine, as determined by analytical results for samples collected during Phases I, II, III, and IV, and any subsequent phases of the RI. The final boundary of OU3 will be defined in the final EPA-approved RI/FS report.

This FSSR is a summary of sampling activities, locations and methods employed during the 2011 Phase IV Part B RI at OU3. Analytical results for samples collected during the Phase IV RI are not presented in this document; analytical data and interpretations are summarized as part of Sampling and Analysis Plans (SAPs), which heretofore have been prepared by EPA for implementation during each field season or phase of work. 2011 Phase IV Part B analytical results will be part of the basis for the data-gathering activities

and scope of subsequent phases of RI at OU3. After all RI activities have been completed, a comprehensive RI Report will be prepared. The RI Report will contain all analytical results, interpretations and conclusions for the OU3 Remedial Investigation.

1.4 PROJECT ORGANIZATION

1.4.1 Project Management

EPA is the lead regulatory agency for Superfund activities within OU3. The EPA Remedial Project Manager (RPM) for OU3 remedial investigations addressed in this report is Ms. Christina Progess of EPA Region 8. Ms. Progess is a principal data user and decision-maker for Superfund activities within OU3.

The Montana Department of Environmental Quality (MDEQ) is the support regulatory agency for Superfund activities within OU3. The MDEQ Project Manager for OU3 is Mr. John Podolinski. EPA consults with MDEQ as provided for by CERCLA, the National Contingency Plan, and applicable guidance in conducting Superfund activities at OU3.

EPA has entered into an Administrative Order on Consent (AOC) with Respondents W.R. Grace & Co.-Conn. and Kootenai Development Corporation (KDC). Under the terms of the AOC, the Respondents implemented the Phase I, Phase II, Phase III and Phase IV SAPs at OU3. The designated Project Coordinator for the Respondents is Mr. Robert Medler of Remedium Group, Inc., a subsidiary of W.R. Grace & Co.-Conn.

1.4.2 Technical Support

EPA was supported in this project by contractors, including:

- Syracuse Research Corporation (SRC) assisted in development of the Phase IV Part B SAP and will assist in the evaluation and interpretation of the Phase IV analytical data.
- Formation Environmental, LLC, as a subcontractor to SRC, provided support

in developing the SAP and with mapping and other geographic information system (GIS) applications, and will assist in the design and evaluation of the feasibility study.

- The U.S. Department of Transportation, John A. Volpe National Transportation Systems Center implemented the laboratory quality assurance (QA) program for OU3 and provide technical support.
- HDR, Inc. provided periodic field oversight of Phase IV activities on behalf of EPA to ensure that field activities were performed in accordance with the project SAP, SOPs and Modifications.

1.4.3 Phase IV Part B Field Sampling Activities

The 2011 Phase IV Part B field sampling activities were performed by W.R. Grace & Co.-Conn. and KDC with support from MWH Americas, Inc. (MWH) and Chapman Construction, Inc. (CCI), in accordance with the *Phase IV Part B SAP, SOP 3A (Rev.0), other applicable SOPs*, and pursuant to a conference call held on 13 April 2011. The *Phase IV Part B SAP and SOP 3A (Rev.0)* are included in Appendix A of this FSSR.

Individuals responsible for implementation of the OU3 2011 Phase IV Part B field sampling program are listed below:

- MWH Project Manager/Field Supervisor: John Garr
- MWH Field quality control (QC)/Health and Safety Officer: Kaitlin Barklow
- MWH Quality Assurance Officer: Mike DeDen
- CCI Point-of-Contact: Mike Chapman

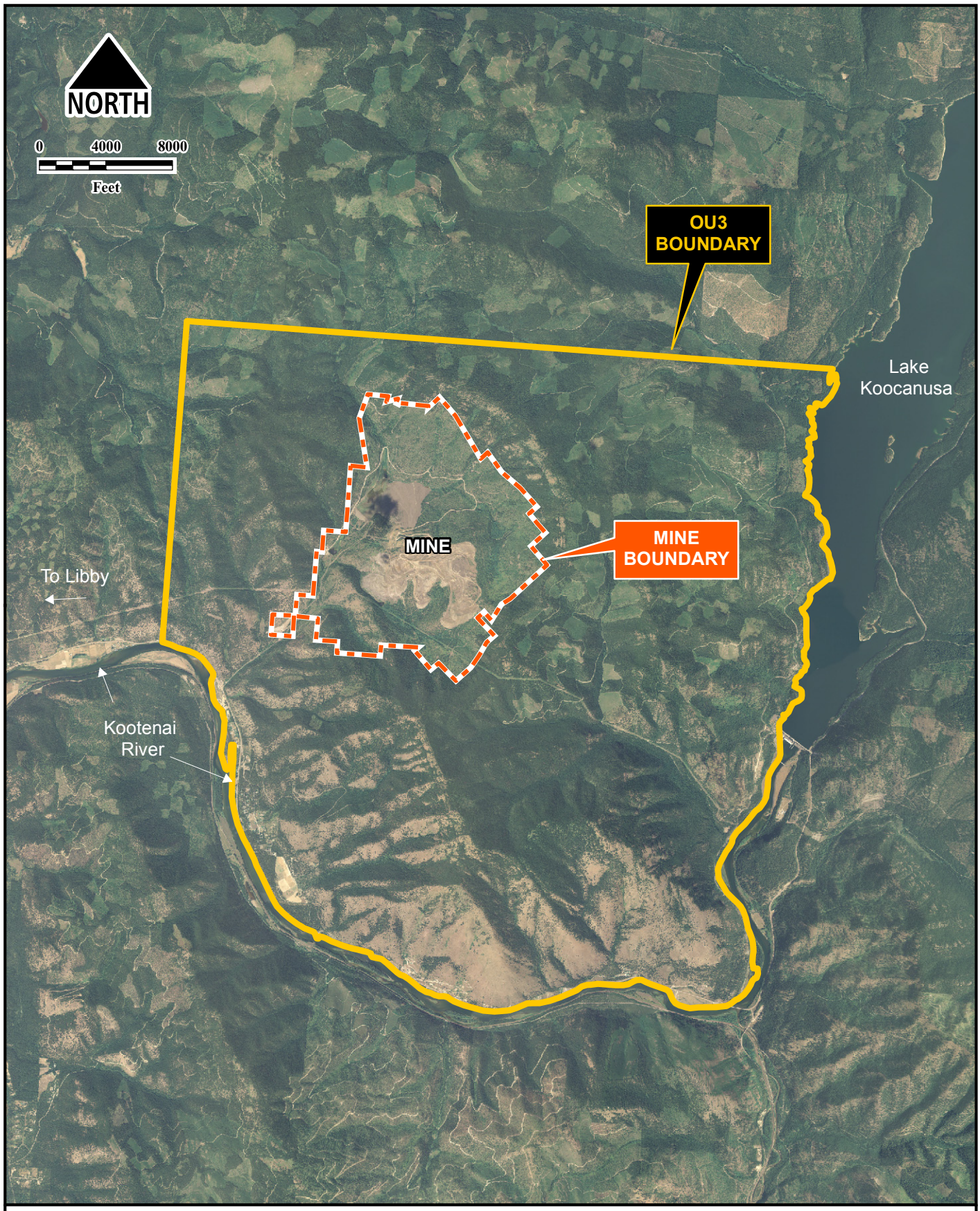
1.4.4 Sample Preparation and Analysis

All samples collected as part of the OU3 2011 Phase IV Part B RI were submitted to an EPA-selected/approved laboratory for preparation and/or analysis. All sample analyses for LA (filters) were performed by Hygeia Analytical Laboratories of Sierra Madre,

California, and analyses of aqueous surface water samples were performed by the EMSL Mobile Laboratory in Libby, MT. Analytical data validation and verification is to be performed by SRC.

1.4.5 Data Management

Administration of the OU3 master database is performed by EPA contractors. The primary database administrator is Lynn Woodbury of SRC. Ms. Woodbury is responsible for sample tracking, uploading new data, performing error checks to identify inconsistent or missing data, and ensuring that all questionable data are checked and corrected, as needed. When the OU3 database has been populated, checked and validated, relevant LA data from the 2011 Phase IV Part B RI will be transferred into the Libby2 database for final storage.



DATE: 31 Jan 2013

FILE: I:\projects\LIBBY_MONTANA\2011 FSSR\FIGURES\Fig1-1_Location of Mine Site and Pre OU3 Study Boundaries.mxd

MWH

LIBBY ASBESTOS SUPERFUND SITE

LOCATION OF MINE SITE AND PRELIMINARY OU3 STUDY BOUNDARIES

FIGURE 1-1

2.0 2011 PHASE IV PART B SURFACE WATER SAMPLING

2.1 SUMMARY OF 2011 PHASE IV PART B SAMPLING PROGRAM

Data generated during the 2011 Phase IV Part B Sampling may be used to characterize LA concentrations, as well as efforts to better characterize the habitat suitability of site streams for fish. Monitoring of stream flow and LA concentrations was performed in surface water at selected stations within the Rainy Creek watershed during the spring-season snowmelt and through the summer and fall (see **Figure 2-1**) of 2011. The objectives of OU3 2011 Phase IV Part B sampling and analysis included collection of data to assess whether field-filtration of water samples and laboratory analysis of the filters would provide comparable LA concentration data to traditional surface water sampling methodologies where filtration takes place at the laboratory. The OU3 *SOP 3A (Rev.0)* states the following:

> "When seeking to measure the concentration of free asbestos in water, the details of how the water is handled before filtration may be important. For example, if the water sample is placed in a bottle for transport to the laboratory for filtration, it is possible that additional clumping might occur and/or that binding of clumps to the bottle wall might occur before filtration occurs. If so, this could yield results that are not representative of the true concentration of free asbestos in the water at the time of sampling.
>
> One way to avoid this potential problem is to filter the water sample directly at the site of collection, and never place it in a bottle for transport to the laboratory."

Therefore, syringe field-filtration sampling was performed concurrently with standard surface water sampling. Field paremeters (e.g., in-stream temperature, pH, specific conductance, dissolved-oxygen (DO), oxidation reduction potential (ORP), and turbidity) also were collected.

In addition to the primary 2011 activities related to surface water sampling, stream flow records were collected using ISCO automated flow recorders/samples installed at LRC-06, LRC-02 and CC-02 during the freeze-free part of the year (from April through November). The flow records are presented in graphical form on **Figure 2-2** and in

Excel format in Appendix E (on CD in pocket).

The following sections of this FSSR are summaries of the sampling activities performed during the 2011 Phase IV sampling.

2.2 SAMPLE LOCATIONS AND FREQUENCY

Samples were collected at the established surface water sampling locations in Carney Creek (CC-02), Rainy Creek (LRC-02 and LRC-06) and at the Tailings Pond (TP), refer to **Figure 2-1** for sample locations. Grab samples were collected weekly during the spring run-off (April 19th through July 26th, 2011); however, no samples were collected the week of June 21st 2011). Sampling continued on a bi-weekly schedule from August 9th through September 20th 2011.

2.3 SAMPLING PROTOCOLS AND PROCEDURES

Samples collection, handling and analysis were performed pursuant to the *Phase IV Part B SAP*, *SOP 3A*, and other applicable SOPs. During each of the sampling events (i.e., weekly or bi-weekly events) samples from all locations were collected on the same day, typically the Thursday of the week. A summary of the samples collected (e.g., date, location, index identification, time, method, and type) is presented in **Table 2-1**.

2.3.1 Syringe Field-Filtration Sampling.

The syringe field-filtation sampling protocols and procedures are detailed in the *Phase IV Part B SAP* and *SOP 3A*. In summary, the protocols and procedures include collection of a grab sample [10 and 50 milliliter (mL)] from flowing water in the respective creek locations (LRC-02, LRC-06, and CC-02) typically the center of the chanel, and from the undisturbed area near the shore of the tailings impoundment (TP). The water (i.e., grab sample) was then immediately field-filtered through pre-prepared 25-millimeter (mm) filters. Once the sample water was forced through the filter, residual water was expelled from the filter and filter holder. The filter cassettes were then properly sealed, labeled, orienteted (i.e., filter-side up) and packaged, and shipped to the laboratory for analysis.

2.3.2 Grab Aqueaous Surface Water Sampling and Field Parameters.

Grab aqueous surface water samples also were collected. Concurrent with sample collection, field parameters (i.e., in-stream temperature, pH, specific conductance, DO, ORP, and turbidity) were measured using a portable field instrument (i.e., Hydrolab Quanta mulit-meter). Field parameters are documented on the FSDSs (refer to Appendix B).

2.3.3 Continuous Flow Monitoring.

Continuous flow monitoring stations (equipped with ISCO data logging samplers) were monitored at three locations; CC-2, LRC-2, and LRC-6. Flow data is presented graphically in **Figure 2-2** and in spreadsheet format in Appendix E.

2.4 SAMPLING EQUIPMENT AND INSTRUMENTATION

Sampling equipment and instrumentation used included the following:

- Syringe Sampling:
    - Plastic syringes, with Luer-Lok fitting, adequate to hold the volume of water (10-50 mL)
    - Filter holders for 25 mm diameter filter (e.g., Millipore Swinnex SX0002500, or equivalent)
    - 25-mm diameter polycarbonate filters with 0.1-micron (um) pore size
    - 25-mm diameter mixed cellulose ester filters with 5-micrometer (µm) pore size
    - 25-mm cellulose backing pads
    - 1-liter high density polyethylene (HDPE) wide-mouth bottles
    - Tweezers for handling filters
    - Filter holder trays for sample storage
    - Pre-numbered self-adhesive sample identification labels
    - Vinyl electrical tape
    - Ziploc Bags
- Aqueous Surface Water Sampling
    - Portable field parameter meter and calibration solutions
    - 1-liter HDPE wide-mouth bottles
- Field documentation
    - Surface Water Syringe Sampling FSDS
    - Chain of Custody sheets
    - Field logbook and indelible pens/markers

    - Global Positiong System (GPS) Unit
    - Digital Camera
- Sample Handling
    - Sample Storage: Vendor-supplied, partitioned filter cassette shipping boxes
    - Sample shipping: Small insulated plastic coolers with integrated handles on top to ensure the container remained upright during shipment to the laboratory
    - Custody seals
    - Shipping labels

2.5 SAMPLING METHODS

2.5.1 Sample Collection and Containers

Sampling procedures were performed following *SOP No. 3 (Rev. 0)*, the *Phase IV Part B SAP*, other applicable SOPS, and pursuent to a conference call held on April 13th, 2011. From each station (LRC-06, LRC-02, CC-02, and TP) a 50-ml syringe-filtered sample, a 10-ml syringe-filtered sample and a 1-L grab sample were collected. During each samping event, all samples were collected on the same day and sequence starting at the downstream locations and finishing at the upstream location (i.e., LRC-06, CC-02, LRC-02, and TP). All samples were collected as grab samples by dipping a laboratory-supplied clean 1-liter HDPE wide-mouth bottle into the flowing portion of the stream or into undisturbed water at TP. Aqueaous samples were sealed in the 1-liter HDPE wide-mouth bottle, and were properly labeled and handled. Immediately after collecting the grab sample in a clean 1-liter HDPE wide-mouth bottle the syringe-filtered field samples were field-processed as follows.

Water was grabbed/dipped from the water source using a clean 1-liter HDPE wide-mouth bottle; the 50-ml syringe-filtered sample and the 10-ml syringe sample were immediately collected from the 1-liter bottle. Once the approprate volume of water was collected in the syringe, the syringe was turned upward and excess air was expelled. Using the syringe, the required volume of water was then pushed through a 25-mm polycarbonate filter with a 0.1 micron (µm) pore size. Using a new syringe, approximately 20 mL of air was then pushed through the filter in order to prevent water that remained in the filter backing from draining back and potentially transporting fibers off of the filter. The filters were then sealed with electrical tape, labeled and properly handled. This included

placing the filters in the shipping container right-side-up (Luer-loc side) for shipping.

2.6 QUALITY CONTROL SAMPLES

Two types of field-based quality control (QC) samples (i.e., field duplicate and field blank) were collected during the sampling events.

2.6.1 Field Duplicate Samples

Field duplicate (FD) samples were collected for each of the sample types (i.e., aqueous and filter samples). Field duplicate samples were collected at a rate 5% or one FD per 20 environmental samples collected. Environmental and QC samples and are summarized in **Table 2-1.**

2.6.2 Field Blank Samples

Field Blank (FB) samples were collected for each of the sample types (i.e., aqueous and filter samples). Field blank samples were collected at a rate 5% or one FD per 20 environmental. Environmental and QC samples and are summarized in **Table 2-1.**

2.7 SAMPLE HANDLING

At the time of collection, each sample was labeled with a unique 5-digit sequential index identification (index ID) number. The index IDs for all samples collected as part of the 2011 Phase IV Part B sampling have a prefix of "P4" (e.g., P4-50001). Information on whether the sample was representative of a field sample or a field-based QC sample (e.g., FD or FB) was documented on the FSDS and is summarized in **Table 2-1**.

2.7.1 Sample Preservation and Storage

Filter Samples. Once the required volume of water was pushed through a 0.1 µm filter the filters were handled as follows: Using a new syringe, approximately 20 mL of air was pushed through the filter in order to prevent water that remained in the filter backing from draining back and potentially transporting fibers off of the filter. The filters were then sealed with electrical tape, labeled and properly handled. This included placing the filters in the shipping container right-side-up (Luer-loc side) for shipping.

Aqueous samples. Aqueous samples were collected by dipping a laboratory provided clean 1-liter HDPE wide-mouth bottle in to the water source. The bottle was then sealed and properly labeled, and stored in an iced cooler.

2.8 TRAINING AND PROFICIENCY DEMONSTRATION

Prior to sample collection, field personnel (i.e., sampling technicians) performed a mock sample practice round to demonstrate syringe filter sample collection proficiency following the protocols established in *SOP 3A (Rev.0)*.

2.9 SAMPLE DOCUMENTATION AND IDENTIFICATION

Field data observed during sample collection were documented on OU3 2011 Phase IV Part B RI-specific FSDS and in project field notebooks (refer to Appendices B and C, respectively). At the time of collection, each sample was assigned a unique index ID number using pre-printed adhesive labels supplied by SRC. The index ID labels were provided in quadruplicate; one label was attached to the sample, another was placed on the FSDS and a third was placed in the field logbook (the fourth label was reserved for use in re-labeling, if necessary). Index IDs for all samples collected as part of the 2011 Phase IV Sampling bear the prefix of "P4" (e.g., P4-50001). Information on whether the sample is representative of a field sample or a field-based QC sample (e.g., field blank) was documented on the FSDS and summarized in **Table 2-1**, but was not included on the chain-of-custody (COC), to ensure that the sample type was unknown to the analytical laboratory. Chain-of-custody forms are presented in Appendix D.

The field personnel maintained a field logbook with sequentially numbered, non-removable pages. Potentially relevant information not recorded on the FSDS forms was recorded in the field logbook. Scans of the logbook and FSDS forms are provided as PDF files in Appendix B and C, respectively (on CD in pocket).

2.10 SAMPLE CHAIN-OF-CUSTODY AND SHIPMENT

A COC was maintained until final disposition of the samples by the laboratory and acceptance of analytical results. A COC form for the 2011 Phase IV Part B sampling program accompanied every shipment of samples to the analytical laboratory. All corrections to the COC record were initialed and dated by the person who made the corrections. Original COCs accompanied the samples to the laboratory; copies were made and retained to document each change of custody. Samples were sent directly to the Hygeia Laboratory in Sierra Madre, CA by FedEx priority overnight service or were hand-delivered to EMSL in Libby, MT. Scans of the COCs are provided as PDF files in Appendix D (on CD in pocket).

2.11 SAMPLE ANALYSIS

All samples collected during 2011 Phase IV Part B Sampling were submitted for asbestos analysis using transmission electron microscopy (TEM) in accordance with the International Organization for Standardization (ISO) 10312:1995 method counting protocols, as modified by Libby-specific laboratory modifications. Detailed descriptions of laboratory protocols and analytical methods are provided in the 2011 Phase IV Part B SAP and associated SOPs.

2.12 HEALTH AND SAFETY

"Tailgate" safety meetings were conducted at the start of each day's work. Bear deterrent spray, first-aid kits, cooling vests (during hot weather) and water were carried in the vehicles and made available for use by field personnel during project work.

Field personnel were equipped with Level C personal protective equipment (PPE) consisting of two sets of hooded Tyvek™ coveralls, nitrile gloves, and latex boot covers, and full-face powered air-purifying respirator (PAPR) fitted with P100 high-efficiency particulate-air (HEPA) filter cartridges. Decontamination protocols were followed at the conclusion of daily field activities at the established decontamination trailer.

TABLE 2-1
PHASE IV PART B
SURFACE WATER SAMPLING SUMMARY

Sampling Date	Sampling Site	Index ID	Time	Sample Method	Sample Type
4/19/2011	LRC-06	P4-50001	8:38	Filtered, 50 mL	Field Sample
		P4-50002	8:45	Filtered, 10 mL	Field Sample
		P4-50003	8:55	Grab, 1 liter	Field Sample
	CC-02	P4-50004	9:22	Filtered, 50 mL	Field Sample
		P4-50005	9:23	Filtered, 10 mL	Field Sample
		P4-50006	9:18	Grab, 1 liter	Field Sample
	LRC-02	P4-50007	9:50	Filtered, 50 mL	Field Sample
		P4-50008	9:52	Filtered, 10 mL	Field Sample
		P4-50009	9:45	Grab, 1 liter	Field Sample
	TP	P4-50010	10:20	Filtered, 50 mL	Field Sample
		P4-50011	10:22	Filtered, 10 mL	Field Sample
		P4-50012	10:18	Grab, 1 liter	Field Sample
4/26/2011	LRC-06	P4-50013	8:28	Grab, 1 liter	Field Sample
		P4-50014	8:30	Grab, 1 liter	Field Duplicate
		P4-50015	8:38	Filtered, 50 mL	Field Sample
		P4-50016	8:38	Filtered, 50 mL	Field Duplicate
		P4-50017	9:25	Filtered, 10 mL	Field Sample
		P4-50018	9:25	Filtered, 10 mL	Field Duplicate
		P4-50019	9:33	Filtered, 50 mL	Field Blank
		P4-50020	9:35	Filtered, 10 mL	Field Blank
		P4-50021	9:43	Grab, 1 liter	Field Blank
	LRC-02	P4-50022	10:10	Grab, 1 liter	Field Sample
		P4-50023	10:20	Filtered, 50 mL	Field Sample
		P4-50024	10:21	Filtered, 10 mL	Field Sample
	CC-02	P4-50025	10:52	Grab, 1 liter	Field Sample
		P4-50026	11:01	Filtered, 50 mL	Field Sample
		P4-50027	11:02	Filtered, 10 mL	Field Sample
	TP	P4-50028	11:40	Grab, 1 liter	Field Sample
		P4-50029	11:47	Filtered, 50 mL	Field Sample
		P4-50030	11:48	Filtered, 10 mL	Field Sample
5/3/2011	LRC-06	P4-50031	8:17	Grab, 1 liter	Field Sample
		P4-50032	8:22	Filtered, 50 mL	Field Sample
		P4-50033	8:27	Filtered, 10 mL	Field Sample
	LRC-02	P4-50034	8:52	Grab, 1 liter	Field Sample
		P4-50035	8:55	Filtered, 50 mL	Field Sample
		P4-50036	9:00	Filtered, 10 mL	Field Sample
	CC-02	P4-50037	9:17	Grab, 1 liter	Field Sample
		P4-50038	9:20	Filtered, 50 mL	Field Sample
		P4-50039	9:23	Filtered, 10 mL	Field Sample
	TP	P4-50040	9:55	Grab, 1 liter	Field Sample
		P4-50041	9:58	Filtered, 50 mL	Field Sample
		P4-50042	10:00	Filtered, 10 mL	Field Sample

TABLE 2-1
PHASE IV PART B
SURFACE WATER SAMPLING SUMMARY

Sampling Date	Sampling Site	Index ID	Time	Sample Method	Sample Type
5/10/2011	LRC-06	P4-50043	8:22	Grab, 1 liter	Field Sample
		P4-50044	8:25	Filtered, 50 mL	Field Sample
		P4-50045	8:27	Filtered, 10 mL	Field Sample
		P4-50046	8:32	Grab, 1 liter	Field Duplicate
		P4-50047	8:38	Filtered, 50 mL	Field Duplicate
		P4-50048	8:40	Filtered, 10 mL	Field Duplicate
		P4-50049	8:45	Grab, 1 liter	Field Blank
		P4-50050	8:47	Filtered, 50 mL	Field Blank
		P4-50051	8:50	Filtered, 10 mL	Field Blank
	LRC-02	P4-50052	9:10	Grab, 1 liter	Field Sample
		P4-50053	9:13	Filtered, 50 mL	Field Sample
		P4-50054	9:15	Filtered, 10 mL	Field Sample
	CC-02	P4-50055	9:30	Grab, 1 liter	Field Sample
		P4-50056	9:32	Filtered, 50 mL	Field Sample
		P4-50057	9:35	Filtered, 10 mL	Field Sample
	TP	P4-50058	9:52	Grab, 1 liter	Field Sample
		P4-50059	9:55	Filtered, 50 mL	Field Sample
		P4-50060	9:57	Filtered, 10 mL	Field Sample
5/17/2011	LRC-06	P4-50061	8:17	Grab, 1 liter	Field Sample
		P4-50062	8:21	Filtered, 50 mL	Field Sample
		P4-50063	8:23	Filtered, 10 mL	Field Sample
	LRC-02	P4-50064	8:46	Grab, 1 liter	Field Sample
		P4-50065	8:50	Filtered, 50 mL	Field Sample
		P4-50066	8:52	Filtered, 10 mL	Field Sample
	CC-02	P4-50067	9:06	Grab, 1 liter	Field Sample
		P4-50068	9:10	Filtered, 50 mL	Field Sample
		P4-50069	9:12	Filtered, 10 mL	Field Sample
	TP	P4-50070	9:26	Grab, 1 liter	Field Sample
		P4-50071	9:30	Filtered, 50 mL	Field Sample
		P4-50072	9:32	Filtered, 10 mL	Field Sample
		P4-50073	9:35	Grab, 1 liter	Field Duplicate
		P4-50074	9:37	Filtered, 50 mL	Field Duplicate
		P4-50075	9:39	Filtered, 10 mL	Field Duplicate
		P4-50076	9:42	Grab, 1 liter	Field Blank
		P4-50077	9:43	Filtered, 50 mL	Field Blank
		P4-50078	9:44	Filtered, 10 mL	Field Blank
5/24/2011	LRC-06	P4-50079	7:17	Grab, 1 liter	Field Sample
		P4-50080	7:21	Filtered, 50 mL	Field Sample
		P4-50081	7:23	Filtered, 10 mL	Field Sample
	LRC-02	P4-50082	7:38	Grab, 1 liter	Field Sample
		P4-50083	7:41	Filtered, 50 mL	Field Sample
		P4-50084	7:43	Filtered, 10 mL	Field Sample
	CC-02	P4-50085	7:52	Grab, 1 liter	Field Sample
		P4-50086	7:56	Filtered, 50 mL	Field Sample
		P4-50087	7:58	Filtered, 10 mL	Field Sample
	TP	P4-50088	8:09	Grab, 1 liter	Field Sample
		P4-50089	8:11	Filtered, 50 mL	Field Sample
		P4-50090	8:12	Filtered, 10 mL	Field Sample

TABLE 2-1
PHASE IV PART B
SURFACE WATER SAMPLING SUMMARY

Sampling Date	Sampling Site	Index ID	Time	Sample Method	Sample Type
5/31/2011	LRC-06	P4-50091	8:32	Grab, 1 liter	Field Sample
		P4-50092	8:35	Filtered, 50 mL	Field Sample
		P4-50093	8:36	Filtered, 10 mL	Field Sample
	LRC-02	P4-50094	8:50	Grab, 1 liter	Field Sample
		P4-50095	8:54	Filtered, 50 mL	Field Sample
		P4-50096	8:55	Filtered, 10 mL	Field Sample
	CC-02	P4-50097	9:07	Grab, 1 liter	Field Sample
		P4-50098	9:11	Filtered, 50 mL	Field Sample
		P4-50099	9:12	Filtered, 10 mL	Field Sample
		P4-50100	9:15	Grab, 1 liter	Field Duplicate
		P4-50101	9:16	Filtered, 50 mL	Field Duplicate
		P4-50102	9:17	Filtered, 10 mL	Field Duplicate
		P4-50103	9:20	Grab, 1 liter	Field Blank
		P4-50104	9:21	Filtered, 50 mL	Field Blank
		P4-50105	9:22	Filtered, 10 mL	Field Blank
	TP	P4-50106	10:30	Grab, 1 liter	Field Sample
		P4-50107	10:34	Filtered, 50 mL	Field Sample
		P4-50108	10:35	Filtered, 10 mL	Field Sample
6/7/2011	LRC-06	P4-50109	8:12	Grab, 1 liter	Field Sample
		P4-50110	8:15	Filtered, 50 mL	Field Sample
		P4-50111	8:17	Filtered, 10 mL	Field Sample
	LRC-02	P4-50112	8:29	Grab, 1 liter	Field Sample
		P4-50113	8:31	Filtered, 50 mL	Field Sample
		P4-50114	8:32	Filtered, 10 mL	Field Sample
	CC-02	P4-50115	8:40	Grab, 1 liter	Field Sample
		P4-50116	8:44	Filtered, 50 mL	Field Sample
		P4-50117	8:45	Filtered, 10 mL	Field Sample
	TP	P4-50118	8:58	Grab, 1 liter	Field Sample
		P4-50119	9:01	Filtered, 50 mL	Field Sample
		P4-50120	9:02	Filtered, 10 mL	Field Sample
6/14/2011	LRC-06	P4-50121	8:16	Grab, 1 liter	Field Sample
		P4-50122	8:20	Filtered, 50 mL	Field Sample
		P4-50123	8:21	Filtered, 10 mL	Field Sample
	LRC-02	P4-50124	8:31	Grab, 1 liter	Field Sample
		P4-50125	8:35	Filtered, 50 mL	Field Sample
		P4-50126	8:36	Filtered, 10 mL	Field Sample
		P4-50127	8:38	Grab, 1 liter	Field Duplicate
		P4-50128	8:40	Filtered, 50 mL	Field Duplicate
		P4-50129	8:41	Filtered, 10 mL	Field Duplicate
		P4-50130	8:42	Grab, 1 liter	Field Blank
		P4-50131	8:43	Filtered, 50 mL	Field Blank
		P4-50132	8:44	Filtered, 10 mL	Field Blank
	CC-02	P4-50133	8:51	Grab, 1 liter	Field Sample
		P4-50134	8:55	Filtered, 50 mL	Field Sample
		P4-50135	8:56	Filtered, 10 mL	Field Sample
	TP	P4-50136	9:05	Grab, 1 liter	Field Sample
		P4-50137	9:09	Filtered, 50 mL	Field Sample
		P4-50138	9:10	Filtered, 10 mL	Field Sample

TABLE 2-1
PHASE IV PART B
SURFACE WATER SAMPLING SUMMARY

Sampling Date	Sampling Site	Index ID	Time	Sample Method	Sample Type
6/28/2011	LRC-06	P4-50139	8:15	Grab, 1 liter	Field Sample
		P4-50140	8:19	Filtered, 50 mL	Field Sample
		P4-50141	8:20	Filtered, 10 mL	Field Sample
	LRC-02	P4-50142	8:32	Grab, 1 liter	Field Sample
		P4-50143	8:36	Filtered, 50 mL	Field Sample
		P4-50144	8:37	Filtered, 10 mL	Field Sample
	CC-02	P4-50145	8:45	Grab, 1 liter	Field Sample
		P4-50146	8:48	Filtered, 50 mL	Field Sample
		P4-50147	8:49	Filtered, 10 mL	Field Sample
	TP	P4-50148	8:57	Grab, 1 liter	Field Sample
		P4-50149	9:00	Filtered, 50 mL	Field Sample
		P4-50150	9:01	Filtered, 10 mL	Field Sample
7/5/2011	LRC-06	P4-50151	9:13	Grab, 1 liter	Field Sample
		P4-50152	9:18	Filtered, 50 mL	Field Sample
		P4-50153	9:20	Filtered, 10 mL	Field Sample
		P4-50154	9:22	Grab, 1 liter	Field Duplicate
		P4-50155	9:24	Filtered, 50 mL	Field Duplicate
		P4-50156	9:26	Filtered, 10 mL	Field Duplicate
		P4-50157	9:29	Grab, 1 liter	Field Blank
		P4-50158	9:31	Filtered, 50 mL	Field Blank
		P4-50159	9:32	Filtered, 10 mL	Field Blank
	LRC-02	P4-50160	9:42	Grab, 1 liter	Field Sample
		P4-50161	9:48	Filtered, 50 mL	Field Sample
		P4-50162	9:49	Filtered, 10 mL	Field Sample
	CC-02	P4-50163	10:03	Grab, 1 liter	Field Sample
		P4-50164	10:10	Filtered, 50 mL	Field Sample
		P4-50165	10:11	Filtered, 10 mL	Field Sample
	TP	P4-50166	10:25	Grab, 1 liter	Field Sample
		P4-50167	10:31	Filtered, 50 mL	Field Sample
		P4-50168	10:32	Filtered, 10 mL	Field Sample
7/12/2011	LRC-06	P4-50169	8:15	Grab, 1 liter	Field Sample
		P4-50170	8:19	Filtered, 50 mL	Field Sample
		P4-50171	8:20	Filtered, 10 mL	Field Sample
	LRC-02	P4-50172	8:38	Grab, 1 liter	Field Sample
		P4-50173	8:42	Filtered, 50 mL	Field Sample
		P4-50174	8:43	Filtered, 10 mL	Field Sample
	CC-02	P4-50175	8:50	Grab, 1 liter	Field Sample
		P4-50176	8:54	Filtered, 50 mL	Field Sample
		P4-50177	8:55	Filtered, 10 mL	Field Sample
	TP	P4-50178	9:12	Grab, 1 liter	Field Sample
		P4-50179	9:16	Filtered, 50 mL	Field Sample
		P4-50180	9:17	Filtered, 10 mL	Field Sample

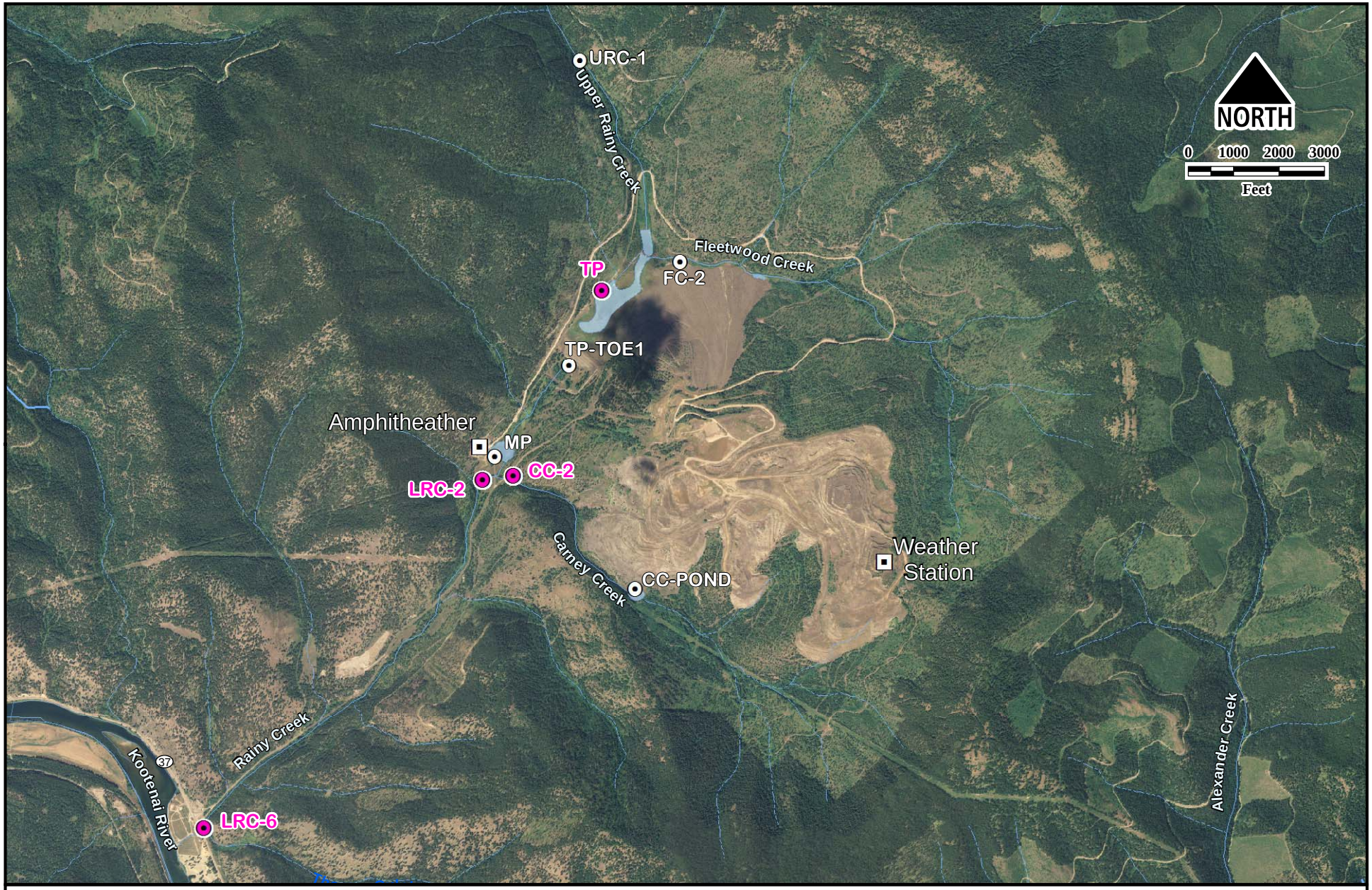
TABLE 2-1
PHASE IV PART B
SURFACE WATER SAMPLING SUMMARY

Sampling Date	Sampling Site	Index ID	Time	Sample Method	Sample Type
7/19/2011	LRC-06	P4-50181	8:13	Grab, 1 liter	Field Sample
		P4-50182	8:17	Filtered, 50 mL	Field Sample
		P4-50183	8:18	Filtered, 10 mL	Field Sample
		P4-50184	8:22	Grab, 1 liter	Field Duplicate
		P4-50185	8:23	Filtered, 50 mL	Field Duplicate
		P4-50186	8:24	Filtered, 10 mL	Field Duplicate
		P4-50187	8:27	Grab, 1 liter	Field Blank
		P4-50188	8:28	Filtered, 50 mL	Field Blank
		P4-50189	8:29	Filtered, 10 mL	Field Blank
	LRC-02	P4-50190	8:43	Grab, 1 liter	Field Sample
		P4-50191	8:47	Filtered, 50 mL	Field Sample
		P4-50192	8:48	Filtered, 10 mL	Field Sample
	CC-02	P4-50193	8:57	Grab, 1 liter	Field Sample
		P4-50194	9:01	Filtered, 50 mL	Field Sample
		P4-50195	9:02	Filtered, 10 mL	Field Sample
	TP	P4-50196	9:13	Grab, 1 liter	Field Sample
		P4-50197	9:17	Filtered, 50 mL	Field Sample
		P4-50198	9:18	Filtered, 10 mL	Field Sample
7/26/2011	LRC-06	P4-50199	8:18	Grab, 1 liter	Field Sample
		P4-50200	8:20	Filtered, 50 mL	Field Sample
		P4-50201	8:22	Filtered, 10 mL	Field Sample
	LRC-02	P4-50202	8:39	Grab, 1 liter	Field Sample
		P4-50203	8:42	Filtered, 50 mL	Field Sample
		P4-50204	8:43	Filtered, 10 mL	Field Sample
	CC-02	P4-50205	8:52	Grab, 1 liter	Field Sample
		P4-50206	8:56	Filtered, 50 mL	Field Sample
		P4-50207	8:58	Filtered, 10 mL	Field Sample
	TP	P4-50208	9:11	Grab, 1 liter	Field Sample
		P4-50209	9:15	Filtered, 50 mL	Field Sample
		P4-50210	9:17	Filtered, 10 mL	Field Sample
		P4-50211	9:18	Grab, 1 liter	Field Duplicate
		P4-50212	9:20	Filtered, 50 mL	Field Duplicate
		P4-50213	9:22	Filtered, 10 mL	Field Duplicate
		P4-50214	9:24	Grab, 1 liter	Field Blank
		P4-50215	9:25	Filtered, 50 mL	Field Blank
		P4-50216	9:27	Filtered, 10 mL	Field Blank
8/9/2011	LRC-06	P4-50217	8:06	Grab, 1 liter	Field Sample
		P4-50218	8:10	Filtered, 50 mL	Field Sample
		P4-50219	8:12	Filtered, 10 mL	Field Sample
	LRC-02	P4-50220	8:26	Grab, 1 liter	Field Sample
		P4-50221	8:26	Filtered, 50 mL	Field Sample
		P4-50222	8:28	Filtered, 10 mL	Field Sample
	CC-02	P4-50223	8:36	Grab, 1 liter	Field Sample
		P4-50224	8:42	Filtered, 50 mL	Field Sample
		P4-50225	8:44	Filtered, 10 mL	Field Sample
	TP	P4-50226	8:49	Grab, 1 liter	Field Sample
		P4-50227	8:55	Filtered, 50 mL	Field Sample
		P4-50228	8:57	Filtered, 10 mL	Field Sample

TABLE 2-1
PHASE IV PART B
SURFACE WATER SAMPLING SUMMARY

Sampling Date	Sampling Site	Index ID	Time	Sample Method	Sample Type
8/23/2011	LRC-06	P4-50229	8:19	Grab, 1 liter	Field Sample
		P4-50230	8:24	Filtered, 50 mL	Field Sample
		P4-50231	8:25	Filtered, 10 mL	Field Sample
	LRC-02	P4-50232	8:34	Grab, 1 liter	Field Sample
		P4-50233	8:39	Filtered, 50 mL	Field Sample
		P4-50234	8:41	Filtered, 10 mL	Field Sample
	CC-02	P4-50235	8:46	Grab, 1 liter	Field Sample
		P4-50236	8:51	Filtered, 50 mL	Field Sample
		P4-50237	8:53	Filtered, 10 mL	Field Sample
		P4-50238	8:54	Grab, 1 liter	Field Duplicate
		P4-50239	8:56	Filtered, 50 mL	Field Duplicate
		P4-50240	8:58	Filtered, 10 mL	Field Duplicate
		P4-50241	8:59	Grab, 1 liter	Field Blank
		P4-50242	9:01	Filtered, 50 mL	Field Blank
		P4-50243	9:03	Filtered, 10 mL	Field Blank
	TP	P4-50244	9:09	Grab, 1 liter	Field Sample
		P4-50245	9:13	Filtered, 50 mL	Field Sample
		P4-50246	9:15	Filtered, 10 mL	Field Sample
9/6/2011	LRC-06	P4-50247	8:49	Grab, 1 liter	Field Sample
		P4-50248	8:53	Filtered, 50 mL	Field Sample
		P4-50249	8:55	Filtered, 10 mL	Field Sample
	LRC-02	P4-50250	9:07	Grab, 1 liter	Field Sample
		P4-50251	9:10	Filtered, 50 mL	Field Sample
		P4-50252	9:12	Filtered, 10 mL	Field Sample
	CC-02	P4-50253	9:17	Grab, 1 liter	Field Sample
		P4-50254	9:20	Filtered, 50 mL	Field Sample
		P4-50255	9:22	Filtered, 10 mL	Field Sample
	TP	P4-50256	9:32	Grab, 1 liter	Field Sample
		P4-50257	9:35	Filtered, 50 mL	Field Sample
		P4-50258	9:37	Filtered, 10 mL	Field Sample
9/20/2011	LRC-06	P4-50259	6:50	Grab, 1 liter	Field Sample
		P4-50260	6:53	Filtered, 50 mL	Field Sample
		P4-50261	6:55	Filtered, 10 mL	Field Sample
	LRC-02	P4-50262	7:08	Grab, 1 liter	Field Sample
		P4-50263	7:10	Filtered, 50 mL	Field Sample
		P4-50264	7:13	Filtered, 10 mL	Field Sample
		P4-50265	7:14	Grab, 1 liter	Field Duplicate
		P4-50266	7:15	Filtered, 50 mL	Field Duplicate
		P4-50267	7:17	Filtered, 10 mL	Field Duplicate
		P4-50268	7:18	Grab, 1 liter	Field Blank
		P4-50269	7:19	Filtered, 50 mL	Field Blank
		P4-50270	7:21	Filtered, 10 mL	Field Blank
	CC-02	P4-50271	7:28	Grab, 1 liter	Field Sample
		P4-50272	7:31	Filtered, 50 mL	Field Sample
		P4-50273	7:33	Filtered, 10 mL	Field Sample
	TP	P4-50274	7:40	Grab, 1 liter	Field Sample
		P4-50275	7:43	Filtered, 50 mL	Field Sample
		P4-50276	7:45	Filtered, 10 mL	Field Sample

FILE: \\Uss\c1netapp1\ifo_cad\projects\LIBBY_MONTANA\OU3_Spring_Sampling_2011\Fig_1_SamplingLocations_1210.mxd



EXPLANATION

Creeks/river outline

Intermittent streams

Water sample locations

Ponds

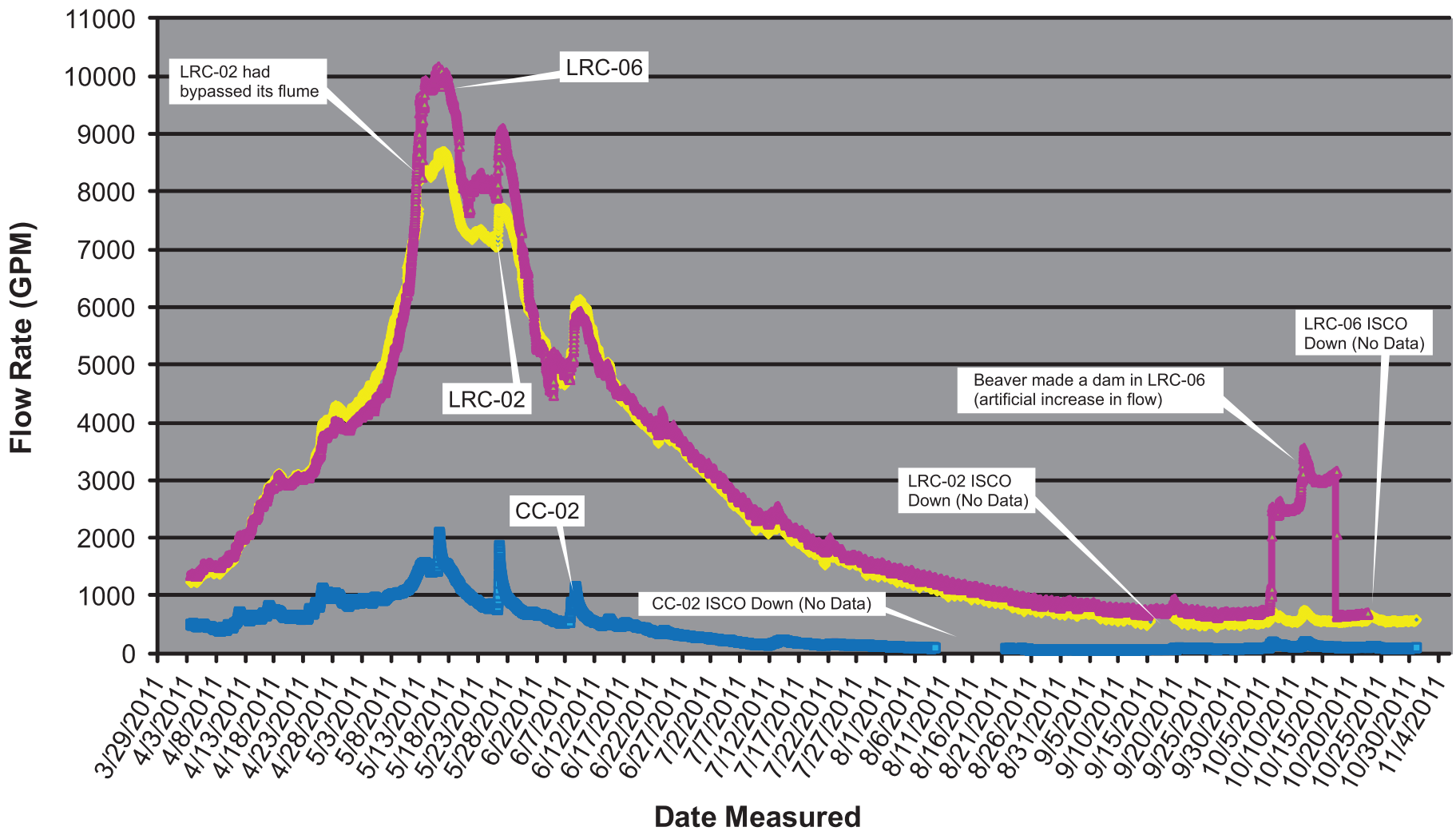
MWH

LIBBY ASBESTOS SUPERFUND SITE

SURFACE WATER SAMPLE LOCATIONS

FIGURE 2-1

FILE: Fig 2-2_Stream Flow Data 2011_Oct_8x11.ai 31 Jan 2013



FLOW STATIONS

CC-02 LRC-02 LRC-06

MWH

LIBBY ASBESTOS SUPERFUND SITE

OU3 PHASE IV
STREAM FLOW DATA

FIGURE 2-2