1154081

RECORD OF DECISION
FOR
LIBBY ASBESTOS SUPERFUND SITE
THE FORMER EXPORT PLANT
OPERABLE UNIT 1
LINCOLN COUNTY, MONTANA

May 2010

RECORD OF DECISION

FOR

LIBBY ASBESTOS SUPERFUND SITE

THE FORMER EXPORT PLANT

OPERABLE UNIT 1

LINCOLN COUNTY, MONTANA

Part 1
Declaration

Site Name and Location

The Libby Asbestos Superfund Site (Libby site) (Comprehensive Environmental Response, Compensation, and Liability Information System [CERCLIS] # MT0009083840) is located in and around the Town of Libby, Montana. Libby is the county seat of Lincoln County and is in the northwest corner of Montana, about 35 miles east of Idaho and 65 miles south of Canada (Exhibit 1-1). Operable Unit 1 (OU1), also known as the former Export Plant, is one of eight OUs at the site and is located in town at the intersection of Highway 37 and the Kootenai River.

Statement of Basis and Purpose

This decision document presents the selected remedy for OU1. The remedy selected in this ROD was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). The decision is based on the administrative record file for OU1 of the site. This document is issued by the EPA Region 8, the lead agency, and the Montana Department of Environmental Quality (MDEQ). Both EPA and MDEQ concur on the selected remedy presented herein.

The remedial action selected in this ROD is necessary to protect public health and welfare and the environment from actual or threatened releases of hazardous substances at the site. It will reduce the public health risks by blocking contaminant pathways to the available receptors. However, the selected remedy must be reevaluated when the site-wide risk assessment is completed. An ecological risk assessment is being developed at the mine site, OU3. Once that work is complete, EPA will build upon information gathered during the risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at OU1.

Assessment of Site

The response action selected in this ROD is necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substances into the environment.

Description of Selected Remedy

The majority of the OU has already been remediated through past removal actions. The selected remedy will eliminate the remaining exposure pathway to the Libby amphibole asbestos (LA) contamination present at the OU by a combination of containment (with soil covers) and removal (excavation and disposal). Institutional controls (ICs) with monitoring and statutory reviews (five-year reviews and other) will provide assurance that the integrity of the remedy will be protected.

EPA will also conduct a review to evaluate effectiveness of the remedy, as soon as sufficient new information concerning toxicity factors is available. If unacceptable

exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. When the site-wide risk assessment is completed, the ICs will be revisited to determine whether any modification is needed.

Statutory Determinations

The selected remedy meets the mandates of CERCLA §121 and the National Contingency Plan. The remedy is protective of human health and the environment. It complies with all federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

The remedy does not satisfy the statutory preference for treatment as a principal element of the remedy (this preference is triggered by the presence of a principal threat waste). Treatment of LA is not viable at OU1 for several reasons:

- **High relative cost.** Thermo-chemical treatment of asbestos wastes is significantly more expensive than off-site disposal. Because the wastes must be shipped to an off-site treatment facility in another state, treated, and then shipped back to the site for disposal, transportation costs are also disproportionately high. Treatment of LA-contaminated soil increases the remedy costs by over 600% without adding significantly to protectiveness.

- **Lack of irreversibility data**. In addition to the cost issues related to treatment, the treatment technology is relatively new, so extensive data are not available to confirm long-term irreversibility of the treatment process.

- **Ongoing need for monitoring and five-year reviews**. Subsurface waste material will remain at depth at the site, so the treatment of the small amounts of remaining near surface LA would not negate the need for ongoing monitoring and five-year reviews. Thus no efficiencies or savings are gained regarding treatment in terms of long-term protectiveness.

As noted above, a statutory review will be conducted within 5 years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

Future Public Comment

When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). This determination will be published and an opportunity for public comment will be provided. Similar opportunities for public comment will be provided at the time of the subsequent five-year reviews.

ROD Data Certification Checklist

Once a quantitative site-wide risk assessment is completed and a cleanup level is established, the ROD for this OU will be modified, as appropriate. If modified, the ROD will include this new information and will incorporate all necessary remedial actions, modifications of the institutional controls, and modifications to operation and maintenance plans in order to properly manage the residual contamination in a manner that will protect human health and the environment. The following information is included in the decision summary section (Part 2) of this ROD. Additional information can be found in the administrative record file for this site.

- Contaminants of concern and their respective concentrations
- Risks represented by the contaminants of concern
- How source materials constituting principal threats are addressed
- Current and reasonably anticipated future land use assumptions used in the risk assessment
- Potential land use that will be available at the Site as a result of the selected remedy
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- Key factors that led to selecting the remedy

Cleanup criteria for levels of concern and the basis for those levels are typically included in a ROD. However, a site-wide risk assessment has not yet been completed. Although an OU-specific human health risk assessment was conducted for OU1, it did not include LA-specific toxicity values. In the absence of established quantitative, risk-based cleanup levels, EPA is removing and/or capping all visible vermiculite and any detectable LA thereby breaking complete exposure pathways and reducing future potential risk for LA exposure. Exceptions include those circumstances where vermiculite is otherwise well-contained. If LA source materials are encountered during excavation activities, removal will continue until the source material is removed (to a maximum of 3 feet). If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling. Once sufficient data are obtained to establish the LA-specific toxicity values, the site-wide risk assessment will be conducted.

Authorizing Signatures

Carol L. Campbell 5/10/10

Carol L. Campbell
Assistant Regional Administrator
Office of Ecosystem Protection and Remediation

Date

Richard H. O 5/10/10

Richard Opper, Director
Montana Department of Environmental Quality

Date

RECORD OF DECISION

FOR

LIBBY ASBESTOS SUPERFUND SITE

THE FORMER EXPORT PLANT

OPERABLE UNIT 1

LINCOLN COUNTY, MONTANA

Part 2
Decision Summary

Table of Contents

Part 1 Declaration

Part 2 Decision Summary

Section 1 Introduction 1-1

Site Name and Location 1-1
1.1 Key Features of the Libby Site and OU1 1-1
1.1.1 Site OUs 1-1
1.1.2 Site Contamination 1-3
1.2 ROD Format 1-4

Section 2 Site History and Response Activities 2-1

2.1 Site Background and History 2-1
2.1.1 Former Export Plant (Area 1) 2-2
2.1.2 Riverside Park (Area 2) 2-3
2.1.3 Embankments (Area 3) 2-4
2.2 Response Activities 2-4
2.2.1 Site-Wide EPA Activities 2-5
2.2.1.1 Activities Conducted Prior to NPL-Listing 2-5
2.2.1.2 Activities Conducted After NPL Listing 2-5
2.2.2 OU-Specific Response Activities 2-6
2.2.2.1 Area 1 Investigation and Removal Activities 2-6
2.2.2.2 Area 2 Investigation and Removal Activities 2-11
2.2.2.3 Area 3 Investigation Activities 2-12
2.2.2.4 Other OU1 Investigation Activities 2-12
2.3 Summary of Data Sources and Quality Assurance/ Quality Control 2-13

Section 3 Highlights of Community Participation 3-1

3.1 Conducted Interviews and Prepared the CIP 3-2
3.2 Established a Local Information Center and an Information Repository 3-2
3.3 Established an On-site CI Team 3-2
3.4 Provided Support to the Real Estate Community 3-2
3.5 Provided Education to Stakeholders via Classes and Workshops 3-3
3.6 Provided Support to the TAG and CAG 3-3
3.7 Developed a Site Mailing List and Prepared and Distributed Multiple Fact Sheets 3-3
3.8 Published Advertisements 3-3
3.9 Developed and Distributed Informational Brochures, Written Materials, and a Website 3-4

3.10 Held Public Meetings and Availability Sessions and Updated Commissioners ... 3-4
3.11 Implemented Targeted Informational Campaigns ... 3-4
3.12 Issued Proposed Plans, Held a Public Hearing, and Developed Responsiveness Summaries and RODs ... 3-4

Section 4 Scope and Role of Operable Unit ... 4-1

Section 5 Summary of Site Characteristics ... 5-1
5.1 Site Overview ... 5-1
5.1.1 Surface Features and Size ... 5-1
5.1.2 Climate ... 5-1
5.1.3 Areas of Archeological or Historical Importance ... 5-2
5.1.4 Geology ... 5-2
5.1.5 Soil ... 5-3
5.1.6 Surface Water Hydrology ... 5-3
5.1.7 Hydrogeology ... 5-3
5.2 Conceptual Site Model ... 5-4
5.2.1 Source Materials ... 5-5
5.2.2 Affected Media ... 5-5
5.2.3 Migration Routes and Exposure Pathways ... 5-5
5.2.4 Populations of Concern ... 5-6

Section 6 Current and Potential Future Land and Resource Uses ... 6-1
6.1 Land Use ... 6-1
6.2 Groundwater Use ... 6-2
6.3 Surface Water Use ... 6-2

Section 7 Summary of Site Risks ... 7-1
7.1 Exposure Assessment ... 7-2
7.1.1 Conceptual Site Model ... 7-2
7.1.2 Exposure Routes ... 7-2
7.1.3 Exposure Pathways ... 7-2
7.2 Toxicity Assessment ... 7-5
7.2.1 Non-Cancer Effects ... 7-5
7.2.1.1 Asbestosis ... 7-5
7.2.1.2 Pleural Abnormalities ... 7-5
7.2.1.3 Observations of Asbestos-Related Non-Cancer Diseases in People Exposed to LA ... 7-6
7.2.2 Cancer Effects ... 7-6
7.2.2.1 Lung Cancer ... 7-6
7.2.2.2 Mesothelioma ... 7-7
7.2.2.3 Other Cancers ... 7-7

7.2.2.4 Observations of Asbestos-Related Cancer Cases in Workers in Libby 7-7
7.2.3 Toxicity Values 7-7
7.3 Quantification of Exposure Risk 7-7
7.3.1 Evaluation of Risks from Breathing Ambient Outdoor Air 7-7
7.3.2 Evaluation of Risks from Indoor Exposure 7-8
7.3.3 Evaluation of Risks from Disturbing Outdoor Soil 7-8
7.3.3.1 Air Concentrations under Current Site Conditions 7-8
7.3.3.2 Consideration of Future Site Conditions 7-9
7.4 Summary of Human Health Risk 7-9
7.5 Ecological Risk 7-10
7.6 Basis of Action 7-10

Section 8 Remedial Action Objectives and Remedial Goals 8-1
8.1 Remedial Action Objectives 8-1

Section 9 Description of Alternatives 9-1
9.1.1 Alternative 1: No Action 9-2
9.1.2 Alternative 2: Institutional/Engineered Controls with Monitoring 9-2
9.1.3 Alternative 3a: In-Place Containment of Contaminated Soil, and ICs with Monitoring 9-3
9.1.4 Alternative 3b: In-Place Containment of Contaminated Soil, Partial Removal of Contaminated Soil for Utility Corridors, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring 9-4
9.1.5 Alternative 4a: Partial Removal of Contaminated Soil, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring 9-4
9.1.6 Alternative 4b: Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring 9-5
9.1.7 Alternative 5a: Partial Removal of Contaminated Soil, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, and ICs with Monitoring 9-5
9.1.8 Alternative 5b: Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, and ICs with Monitoring 9-6
9.2 Common Elements and Distinguishing Features of Each Alternative . 9-7
9.2.1 In-Place Containment of Contaminated Soil with Covers 9-7
9.2.2 Contaminant Removal (Excavation) 9-7
9.2.3 Off-Site Disposal 9-8
9.2.4 Off-Site Treatment Technology 9-8

9.2.5 ICs with Monitoring 9-8
9.2.6 Engineering Controls 9-8
9.2.7 Five-Year Reviews 9-8

Section 10 Comparative Analysis of Alternatives 10-1

10.1 Threshold Criteria 10-1
10.1.1 Overall Protection of Human Health and the Environment.. 10-1
10.1.2 Compliance with ARARs 10-2
10.2 Balancing Criteria 10-5
10.2.1 Long-Term Effectiveness and Permanence 10-5
10.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment 10-5
10.2.3 Short-Term Effectiveness 10-6
10.2.4 Implementability 10-7
10.2.5 Cost 10-7
10.3 Modifying Criteria 10-8
10.3.1 State Acceptance 10-8
10.3.2 Public Acceptance 10-8
10.3.3 Modifications Made as a Result of Comment 10-9

Section 11 Principal Threat Wastes 11-1

Section 12 Selected Remedy 12-1

12.1 Short Description of the Selected Remedy 12-1
12.2 Rationale for the Selected Remedy 12-2
12.3 Detailed Description of the Selected Remedy 12-2
12.3.1 Containment and Removal 12-3
12.3.2 ICs 12-3
12.3.3 Operations and Maintenance 12-4
12.4 Estimated Cost of the Selected Remedy 12-5
12.5 Expected Outcomes of the Selected Remedy 12-5
12.6 Performance Standards 12-5

Section 13 Statutory Determinations 13-1

13.1 Protection of Human Health and the Environment 13-1
13.2 Compliance with ARARs 13-1
13.2.1 Contaminant Sources 13-2
13.2.2 Surface Water 13-2
13.2.3 Other ARARs 13-2
13.3 Cost Effectiveness 13-3
13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable 13-3
13.5 Preference for Treatment as a Principal Element 13-4

13.6 Five-Year Reviews 13-4

Section 14 Documentation of Significant Changes 14-1

Section 15 References 15-1

Part 3 Responsiveness Summary

List of Exhibits

Exhibit 1-1 ..... Site Location Map
Exhibit 1-2 ..... OUs at The Libby Site
Exhibit 1-3 ..... Post-Removal LA Results Representing Current Status of OU1
Exhibit 1-4 ..... The Superfund Process – The Road to the ROD
Exhibit 2-1 ..... History of Mining Activities Relevant to OU1
Exhibit 2-2 ..... OU1 Site Layout
Exhibit 2-3 ..... Response and Mining/Industrial Activities at OU1
Exhibit 2-4 ..... Summary of Investigation Activities at OU1
Exhibit 2-5 ..... Summary of Response Action Removals at OU1
Exhibit 5-1 ..... Summary of Current Status of Exposure Pathways at OU1
Exhibit 7-1 ..... CSM for Current and Future Land Use at OU1
Exhibit 9-1 ..... Technologies and Process Options Used in Site Remedial Alternatives
Exhibit 10-1 ..... Summary of Comparative Analysis of Alternatives
Exhibit 12-1 ..... Cost Estimate Summary for Selected Remedy
Exhibit 13-1 ..... Evaluation of Compliance with ARARs for Selected Remedy

Appendix

A Summary of Compliance with Federal and State Applicable or Relevant and Appropriate Requirements

Acronyms

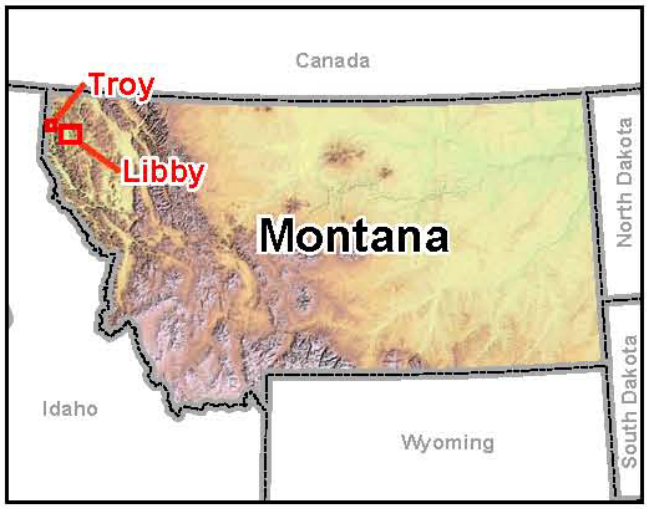
ABS ..... activity based sampling
ACM ..... asbestos containing material
ARAR ..... applicable or relevant and appropriate requirement
BMP ..... best management practices
BNSF ..... Burlington Northern Santa Fe
bgs ..... below ground surface
CAG ..... Community Advisory Group
CDM ..... CDM Federal Programs Corporation
CERCLA ..... Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS ..... Comprehensive Environmental Response, Compensation, and Liability Information System
CI ..... Community Involvement
CIC ..... Community Involvement Coordinator
CIP ..... Community Involvement Plan
CSM ..... conceptual site model
CTE ..... central tendency exposure
CSS ..... Contaminant Screening Study
cy ..... cubic yards
DQO ..... data quality objective
EPA ..... United States Environmental Protection Agency
ERS ..... Environmental Resource Specialist
FS ..... feasibility study
Grace ..... W.R. Grace and Company
HEPA ..... high efficiency particulate air
Libby site ..... Libby Asbestos Superfund Site
LA ..... Libby amphibole asbestos
MDEQ ..... Montana Department of Environmental Quality
MDT ..... Montana Department of Transportation
NCP ..... National Oil and Hazardous Substances Pollution & Contingency Plan
ND ..... non-detect
NPL ..... National Priorities List
O&M ..... operation and maintenance
OU ..... Operable Unit
PLM ..... polarized light microscopy
PLM-VE ..... polarized light microscopy visual area estimation method
PV ..... present value
QA/QC ..... quality assurance/quality control
RAO ..... remedial action objective
RA ..... remedial action
RG ..... remedial goal

RME ..... reasonable maximum exposure
RI ..... remedial investigation
ROD ..... record of decision
s/cc ..... structures per cubic centimeter
s/cm^2 ..... structures per square centimeter
TAG ..... Technical Assistance Group
TEM ..... transmission electron microscopy
UAO ..... unilateral administrative order
°F ..... degrees Fahrenheit
< ..... less than
% ..... percent

Section 1 Introduction

Site Name and Location

Exhibit 1-1. Site Location Map



The Libby site (CERCLIS # MT0009083840) is located in and around the Town of Libby, Montana. Libby is the county seat of Lincoln County and is in the northwest corner of Montana, about 35 miles east of Idaho and 65 miles south of Canada (Exhibit 1-1). The town lies in a picturesque valley carved by the Kootenai River and framed by the Cabinet Mountains to the south. The community's assets include clean water, beautiful scenery, and recreational opportunities such as fishing, hiking, hunting, boating and skiing. OU1, also known as the former Export Plant, is located in town near the intersection of Highway 37 and the Kootenai River.

1.1 Key Features of the Libby Site and OU1

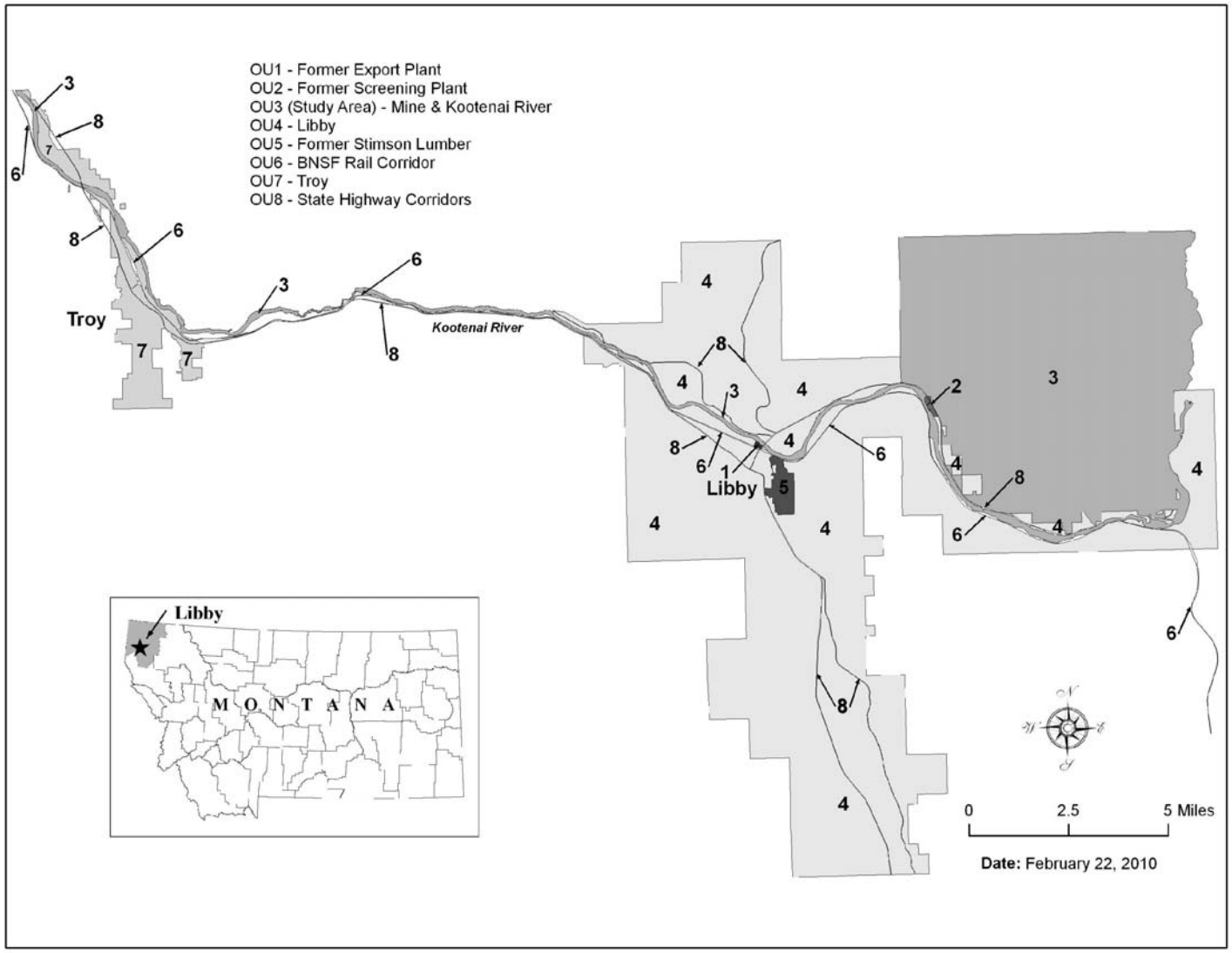
1.1.1 Site OUs

To facilitate a multi-phase approach to remediation of the Libby site, eight separate OUs have been established. These OUs are shown on Exhibit 1-2 and include:

- **OU1**. The former Export Plant is situated on the south side of the Kootenai River, just north of the downtown area of the City of Libby, Montana. OU1 includes the embankments of Montana Highway 37, the former Export Plant, and Riverside Park. The property is bounded by the Kootenai River on the north, Highway 37 on the east, the BNSF railroad thoroughfare on the south, and State of Montana property on the west.

- **OU2**. OU2 includes areas impacted by contamination released from the former Screening Plant. These areas include the former Screening Plant (Subarea 1), the Flyway property (Subarea 2), a privately-owned property (Subarea 3), and the Rainy Creek Road Frontage and Highway 37 right-of-way adjacent to Rainy Creek Road (Subarea 4).

Exhibit 1-2 OUs at the Libby Site



- **OU3.** The mine OU includes the former vermiculite mine and the geographic area (including ponds) surrounding the former vermiculite mine that has been impacted by releases from the mine, including Rainy Creek and the Kootenai River. Rainy Creek Road is also included in OU3. The geographic area of OU3 is based primarily upon the extent of contamination associated with releases from the former vermiculite mine.

- **OU4.** OU4 is defined as residential, commercial, industrial (not associated with former W.R. Grace Company [Grace] operations), and public properties, including schools and parks in and around the City of Libby, or those that have received material from the mine not associated with Grace operations. OU4 includes only those properties not included in other OUs.

- **OU5**. OU5 includes all properties that were part of the former Stimson Lumber Mill and that are now owned and managed by the Kootenai Business Park Industrial Authority.

- **OU6**. The rail yard owned and operated by Burlington Northern Santa Fe (BNSF) is defined geographically by the BNSF property boundaries and extent of contamination associated with BNSF rail operation. Railroad transportation corridors are also included in this OU and have not been geographically defined.

- **OU7**. The Troy OU includes all residential, commercial, and public properties in and around the Town of Troy, approximately 20 miles west of downtown Libby.

- **OU8**. OU8 is comprised of the US and Montana State highways and secondary highways that lie within the boundaries of OU4 and OU7.

1.1.2 Site Contamination

OU1 was historically owned and used by Grace for stockpiling, staging, and distributing vermiculite and vermiculite concentrate to vermiculite processing areas and insulation distributors outside of Libby. The vermiculite deposit that was mined by Grace contains a distinct form of naturally-occurring amphibole asbestos that is comprised of a range of mineral types and morphologies. In various past reports, this form of amphibole asbestos has been termed interchangeably by the EPA as Libby amphibole asbestos or Libby asbestos (LA). The term LA refers generally to amphibole materials that originated in the Libby vermiculite deposit, have the ability to form durable, long, and thin structures that are generally respirable, can reasonably be expected to cause disease, and hence are considered the contaminant of concern at the site.

Because vermiculite mined from Libby has been found to be contaminated with LA, which is known to cause human health effects, the United States Environmental Protection Agency (EPA) initiated an emergency response action in November 1999 to

address questions and concerns raised by citizens of Libby regarding possible ongoing exposures to asbestos fibers as a result of historical mining, processing, and exportation of asbestos-containing vermiculite.

OU1 is divided into three areas (Area 1, Area 2, and Area 3), each of which are described and shown in maps in Section 2. Numerous investigations were conducted at the site and are summarized in Section 2.2. Based on those investigations, contamination is known to be present in the following media:

- Indoor air
- Indoor dust
- Outdoor air (both ambient and near disturbed soil)
- Soil

Exposure to the contamination has been mitigated by various interim removal actions (see Section 2.2.2) conducted in Areas 1 and 2 primarily to remove accessible source areas. Concentrations of LA remaining are shown in Exhibit 1-3.

Exhibit 1-3. Post-Removal LA Results Representing Current Status of OU1

Media	Total Number of Samples Collected	Total Number of Samples with Detections of LA	Percentage of Samples with LA Observed (%)	Range of LA Results
Indoor Air	22	18	81.8	ND to 0.0699 s/cc
Indoor Dust	9	2	22.2	ND to 75 s/cm^2
Outdoor Ambient Air*	143	32	22.4	ND to 0.00016 s/cc
Outdoor Air Near Disturbed Soil	8	6	75.0	ND to 0.0715 s/cc
Surface Soil	73	16	21.9	ND to <1%

ND – non-detect; s/cc – structures per cubic centimeter; s/cm^2 – structures per square centimeter;* Original table from OU1 RI Report (EPA 2009a)

1.2 ROD Format

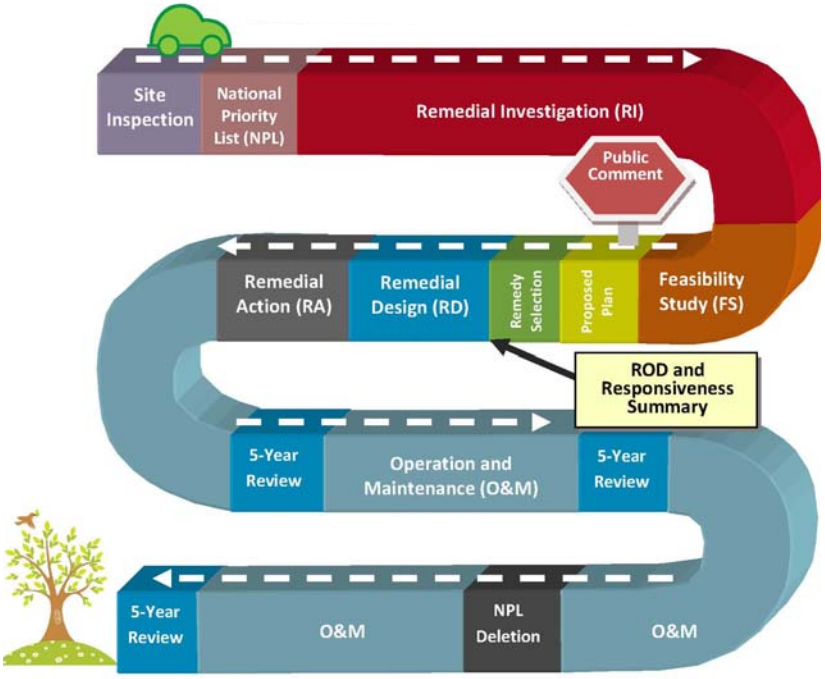
This record of decision (ROD) is the final decision document at the end of a detailed investigation and evaluation of conditions at OU1 (Exhibit 1-4). Since the selected remedy will leave waste in place, the remedy will be evaluated at least every five years to ensure that the remedy remains protective. When the site-wide risk assessment

is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. It is anticipated that current research efforts will result in data that will contribute to the development of LA-specific toxicity values. When those toxicity values are available , EPA will reevaluate this remedy to ensure continued protectiveness.

Once the remedy has been implemented and performance standards have been met, there will be an opportunity to delete this OU from the National Priorities List (NPL). Institutional controls (ICs) and operation and maintenance (O&M) will continue. Deletion from the NPL does not preclude any additional response actions to ensure protectiveness of the remedy.

Exhibit 1-4. The Superfund Process – The Road to the ROD



EPA's detailed investigation and evaluation of conditions at OU1 included performance of a remedial investigation/feasibility study (RI/FS) for OU1 and the completion of numerous removal actions to address significant human health risks during completion of the RI and FS. The RI report for OU1 includes a comprehensive description of the nature and extent of contamination and a description of past investigative and removal actions at the site, as well as the risk assessment. The FS report for OU1 uses information from the RI to perform a systematic analysis to determine the need for, and scope of, any required remedial action. The steps leading up to the ROD also included numerous opportunities for public involvement, including preparation of a proposed plan (mailed to all Libby residents on September 7, 2009), a public meeting, and a 120-day public comment period.

This ROD documents EPA's selected remedy for OU1. The next step in the Superfund process at OU1 will be completion of a remedial design followed by implementation of a remedial action (RA) based on the selected remedy documented in this ROD.

This ROD is organized into the following sections:

- **Section 1 – Introduction**. Provides a very brief introduction to the ROD.
- **Section 2 – Site History and Response Activities.** Provides a brief history of the site, OU1, and EPA's activities.
- **Section 3 – Highlights of Community Participation.** Describes the range of community outreach activities conducted site wide and at OU1.
- **Section 4 – Scope and Role of OU1**. Describes how the actions taken at OU1 fit into the overall scope of the Libby site.
- **Section 5 – Summary of Site Characteristics.** Contains an overview of the site, conceptual site model (CSM), and a summary of the results of the RI.
- **Section 6 – Current and Potential Future Land and Resource Uses**. Describes land use and how resource use will be addressed in a site wide ROD.
- **Section 7 - Summary of Site Risks**. Discusses the human health risk assessment for OU1, including risk estimates.
- **Section 8 - Remedial Action Objectives and Remedial Goals**. Discusses the goals and objectives developed by EPA to protect human health and the environment at the Libby site in general and OU1 in particular.
- **Section 9 - Description of Alternatives**. Describes the remedial alternatives developed and evaluated in the FS, including a description of remedy components, common elements and distinguishing features, and expected outcomes.
- **Section 10 - Comparative Analysis of Alternatives**. Presents a summary of the remedial alternatives that were retained for detailed analysis against the two threshold criteria and five balancing criteria in the FS.
- **Section 11 - Principal Threat Wastes**. Identifies the principal threat waste at OU1 and discusses how the selected remedy will prevent exposure to it.
- **Section 12 – Selected Remedy**. Provides a detailed description of the selected remedy, including its components, cost, expected outcomes, performance standards, and compliance with EPA's environmental justice mandate.

- **Section 13 –Statutory Determinations**. Describes how the selected remedy is protective of human health and the environment, complies with or appropriately waives applicable or relevant and appropriate requirements (ARARs), is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

- **Section 14 – Documentation of Significant Changes**. Confirms that no significant changes were made to the Preferred Remedy that was outlined in the proposed plan prior to its becoming the selected remedy described in this ROD.

- **Section 15 – References**. Provides a list of references cited in the ROD.

Section 2 Site History and Response Activities

2.1 Site Background and History

Numerous hard rock mines have operated in the Libby area since the 1880s, but the dominant impact to human health and the environment in Libby has been from vermiculite mining and processing. Prospectors first located vermiculite deposits in the early 1900s on Rainy Creek northeast of Libby. Edward Alley, a local rancher, was also a prospector and explored the old gold mining tunnels and digs in the area. Reportedly, while exploring tunnels in the area, he stuck his miner's candle into the wall to chip away some ore samples. When he retrieved his candle, he noticed that the vermiculite around the candle had expanded, or "popped," and turned golden in color.

Exhibit 2-1. History of Mining Activities Relevant to OU1

In 1919 (Exhibit 2-1), Alley bought the Rainy Creek claims and started the vermiculite mining operation called the "Zonolite Company." While others thought the material was useless, he experimented with it and discovered it had good insulating qualities. Over time, vermiculite became a product used in insulation, feed additives, fertilizer/soil amendments, construction materials, absorbents, and packing materials. Many people used vermiculite products for insulation in their houses in and around the Libby site and soil additives in their gardens. In 1963, Grace bought the mine and associated processing facilities and operated them until 1990.

Operations at the mine included blast and drag-line mining and milling of the ore. Dry milling was done through 1985, and wet milling was done from 1985 until closure in 1990. After milling, concentrated ore was transported down Rainy Creek Road by truck to a screening facility (known today as the former Screening Plant) adjacent to Highway 37, at the confluence of Rainy Creek and the Kootenai River. Here the ore was size-sorted and transported by rail or truck to processing facilities in Libby and nationwide. At the processing plants, the ore was expanded or "exfoliated" by rapid

heating, then exported to market via truck or rail. Historic maps show the location of the "Zonolite Company" processing operation at the edge of the lumber mill, near present day Libby City Hall. This older processing plant was taken off line and demolished sometime in the early 1950s. The other processing plant (known today as the former Export Plant – OU1), was located near downtown Libby near the Kootenai River and Highway 37. Expansion operations at the site ceased sometime prior to 1981, although existing site buildings were still used to bag and export milled ore until 1990.

After operations ceased, Grace completed reclamation of the vermiculite mine. Reclamation included demolition of existing facilities and standard land recontouring and revegetation. The former Screening Plant was sold and converted into a nursery and was used for that purpose until 2000. Over the course of Grace's operation in Libby, invoices indicate shipment of nearly 10 billion pounds of vermiculite from Libby to processing centers and other locations. Most of this was shipped and used within the United States. Nearly all of this material ended up in a variety of commercial products that were marketed and sold to millions of consumers.

2.1.1 Former Export Plant (Area 1)

From the early 1960s to approximately 1990, the Export Plant was used by Grace for stockpiling and distributing vermiculite concentrate to Grace expansion plants and customers throughout the United States (Exhibit 2-2). Ownership was transferred to the City of Libby in the mid-1990s.

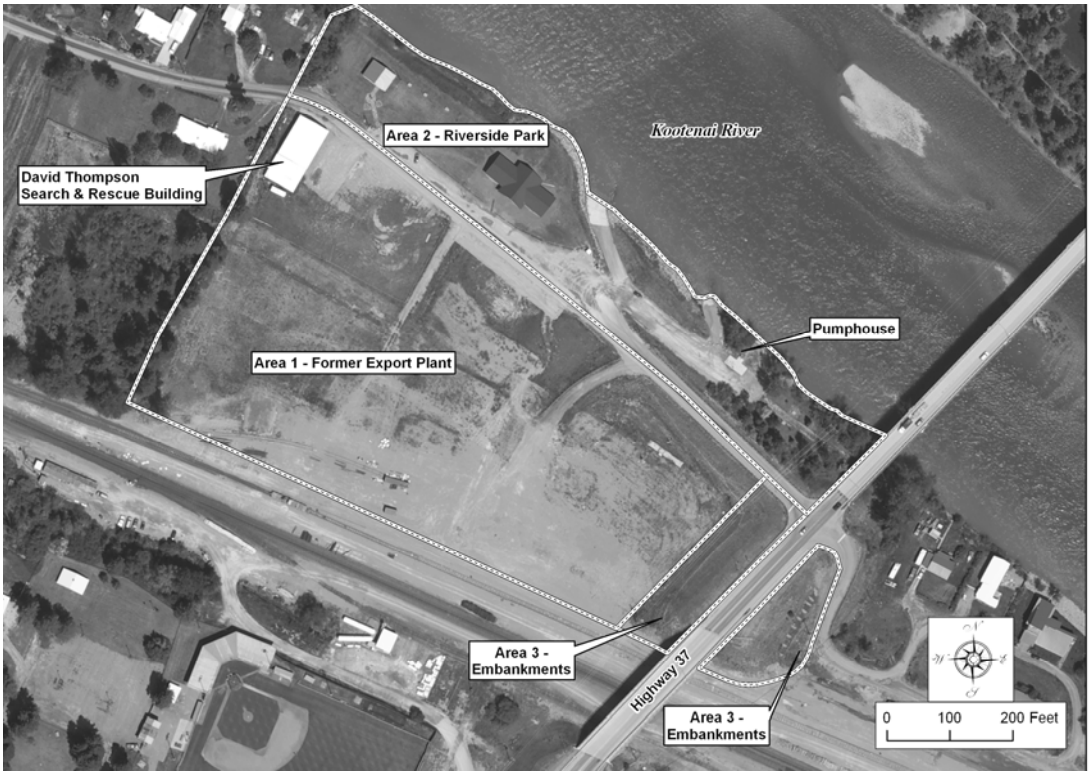
Throughout its history, portions of the site were leased to various parties for both commercial and non-commercial enterprises. From approximately 1977 to 1997, organized youth baseball events (games and practices) were held at ball fields, which were centrally located in Area 1. Between approximately 1987 and 2000, the Millwork West Company, a retail lumberyard and building material supplier, leased the northwestern portion of Area 1. Buildings and equipment owned by Millwork West were removed and/or demolished as part of the removal activities conducted by Grace in 2001 and 2002.

Other commercial and industrial uses of the site also occurred in the past that utilized infrastructure at the site. These other commercial/industrial uses reportedly included a metal scrap dealer and a larch tree gum manufacturer. The infrastructure that supported these businesses included industrial power supply, a railroad spur, and truck scales. This infrastructure was removed during the removal activities conducted at this site.

Area 1 is approximately 12 acres in size. It is currently owned by the City of Libby and is undeveloped, with the exception of a small area used by David Thompson Search and Rescue. In 2004, the search and rescue organization constructed a building containing an office and a five-bay garage on the northwest portion of the site on the

south side of City Service Road. The garage is used for storing search and rescue equipment and vehicles. Several other agencies, including local and state law enforcement, also hold meetings in the main office. Access to Area 1 has been restricted by construction fencing and EPA has provided guidance to the city regarding the use of caution when conducting any activities at the site that disturb soil.

Exhibit 2-2. OU1 Site Layout



2.1.2 Riverside Park (Area 2)

Area 2, Riverside Park, is approximately 4.7 acres in size. It is also currently owned by the City of Libby and serves a variety of recreational visitors. The main features of the park include two boat ramps, two pavilions, picnic tables, and a pumphouse. The newer of the two boat ramps is used by recreational boaters and commercial fishing outfitters; the older ramp is not commonly used due to swift current at its approach. The pumphouse contains a pump that draws non-potable water from the Kootenai River. The pump was installed jointly by the City of Libby and Lincoln County in 1999 to provide a backup water source to local fire departments. The pumphouse is accessed by city personnel in order to perform maintenance on the pump. The pump is connected to an external water spigot, which is used by the city to draw water for street sweeping and other maintenance operations, and other workers (such as employees of local fill pits and contractors working on EPA's removal program) to

draw water primarily for use in dust suppression equipment. Access to Area 2 is unrestricted.

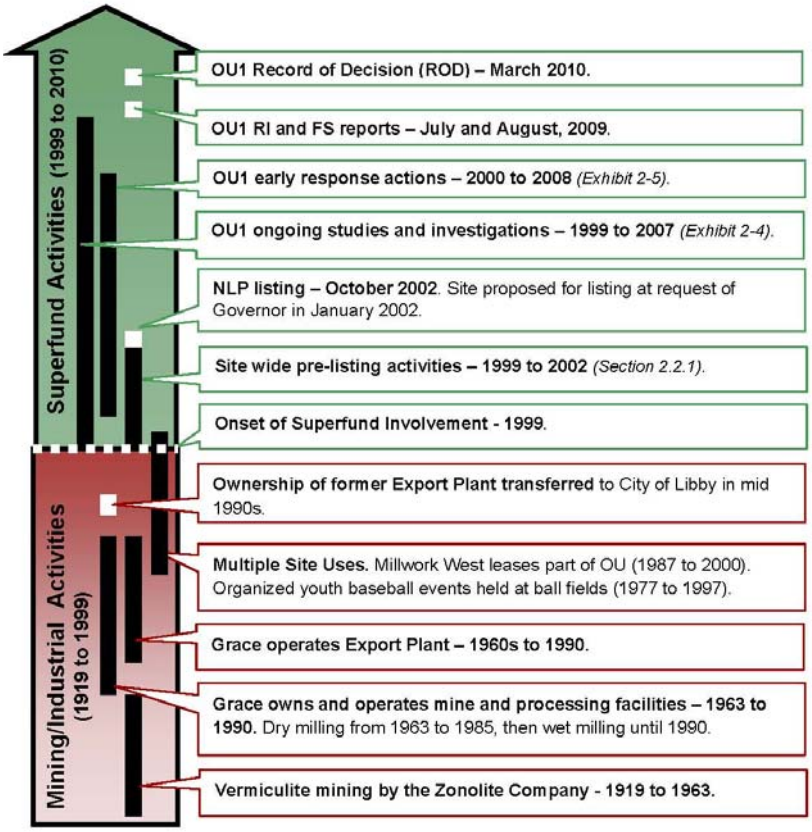
2.1.3 Embankments (Area 3)

Area 3 is less than 1 acre in size. It is owned and maintained by the Montana Department of Transportation (MDT). MDT currently performs only periodic maintenance of these embankments as needed. The types of maintenance activities conducted by MDT include application of herbicides, replacement of guardrails and guardrail posts, and replacement and maintenance of roadside light posts. Access to these areas is unrestricted.

2.2 Response Activities

In response to local concern and news articles about asbestos-contaminated vermiculite, EPA sent an Emergency Response Team to Libby, Montana in late November 1999 (Exhibit 2-3). EPA's first priority was to assess the current risk to public health from asbestos-contaminated vermiculite in Libby. EPA then began taking necessary actions to reduce that risk.

Exhibit 2-3. Response and Mining/Industrial Activities at OU1



In December 1999, EPA collected nearly 700 samples from air, soil, dust and insulation at homes and businesses. Indoor air sample results were released in January - first to property owners and then to the media and general public. EPA also moved immediately to locate areas in and near Libby that were likely to have high levels of contamination such as two former vermiculite processing facilities.

EPA also looked at general asbestos exposures in the community and at health effects seen in people who had little or no association with the vermiculite mine in Libby. EPA worked closely with local, state and federal agencies to understand how people might come into contact with asbestos-contaminated vermiculite and what can be done to prevent future exposures - in Libby and elsewhere.

In January 2002, EPA received a formal written request from Governor Martz that Libby be added to the NPL. In exercising this request, the Governor used the State of Montana's one-time privilege of naming a site as its highest priority for designation to the NPL. The site was added to the NPL in October 2002.

2.2.1 Site-Wide EPA Activities

EPA's first priority at Libby was to reduce risk as quickly as possible. Early removal activities focused on understanding the sources of contamination and removing those source areas that presented the highest potential risk.

2.2.1.1 Activities Conducted Prior to NPL-Listing

Between 1999 and 2002, EPA's activities in Libby included:

- **1999.** Opened the EPA Information Center.
- **1999 to 2002.** Investigated sources of contamination.
- **2000 and 2001.** Removed several major source areas (Plummer Elementary, Libby High School, Libby Middle School, Cemetery Park Ballfields, Export Plant, and Screening Plant).
- **2002.** Built a special cell in the Lincoln County Landfill for disposal of asbestos wastes; reconsidered standard protocols for analyzing asbestos samples and assessing risk from asbestos exposure and tested methods of remediating indoor contamination, and began a formal human health risk assessment; proposed the site for the NPL at the request of the governor; expanded the Superfund investigation to include extensive sampling and analysis and additional risk assessment; began inspection and sampling of over 3,000 residential and commercial properties as part of the Contaminant Screening Study (CSS); and authorized and began removal of vermiculite from Libby homes and businesses (26 homes completed in 2002).

2.2.1.2 Activities Conducted After NPL Listing

After the Libby site was added to the NPL in October 2002, response activities intensified. Listed below are the major activities conducted since 2003:

- **2003.** Completed the CSS (over 1,200 properties inspected or sampled), completed 157 residential or commercial cleanups and the city boat ramp cleanup, and published interim cleanup standards and protocols.

- **2004.** Completed 170 residential or commercial cleanups and cleanup of BNSF rail yard and Flyway property. Announced that Troy will be included in the cleanup.

- **2005.** Completed 225 residential or commercial cleanups, conducted special sampling to verify protectiveness of cleanup, initiated RI/FS, and began initial coordination for 2006 Troy investigations.

- **2006.** Completed 216 residential or commercial cleanups and initiated Outdoor Ambient Air sampling program.

- **2007.** Completed 160 large and complicated cleanups; continued Outdoor Ambient Air sampling program; initiated Activity Based Sampling (ABS) program, Environmental Resource Specialist (ERS) program, and sampling in Troy; and identified toxicity studies for risk assessment.

- **2008.** Completed 143 residential or commercial cleanups in Libby and 6 in Troy; completed initial OU4 residential ABS; continued toxicity studies for risk assessment, sampling in Troy, and investigations at all OUs; and work begins on creeks with contaminated rip-rap.

- **2009**. Completed 159 residential or commercial cleanups, sampling in Troy, removal at Cabinet View Golf Course, creek removals at Pipe Creek and Libby Creek, and various investigations.

2.2.2 OU Specific Response Activities

Multiple investigation, pre-removal, and removal events have occurred at OU1 to date. All of these activities were conducted by EPA or by Grace under EPA's oversight. These activities are detailed in the OU1 RI report, along with tables of analytical results and figures showing the locations of the specific activities. This section provides only a very brief overview by subarea. Investigation activities are summarized in Exhibit 2-4, and removal activities are summarized in Exhibit 2-5.

2.2.2.1 Area 1 Investigation and Removal Activities

- **Investigation Sampling – December 1999.** 80 grab soil samples were collected from the 0- to 2-inch, 0- to 24-inch, or 2- to 12-inch depth interval. Results varied between non-detect (ND) and 5 percent (%) LA.

- **Investigation Sampling – March/April 2000.** EPA collected 17 surface samples, 16 samples from the 2- to 12-inch depth interval, and 1 sample of bagged vermiculite. LA ranged from ND to 10%. Outdoor stationary air sampling was conducted to

establish baseline concentrations of LA in ambient air. LA was detected at all three sample locations at concentrations from 0.0001 to 0.0023 structures per cubic centimeter (s/cc).

Exhibit 2-4. Summary of Investigation Activities at OU1

Year	Event	Summary
Area 1 – Former Export Plant		
1999, Dec	Soil sampling	Baseline evaluation of LA soil contamination on site.
2000, Mar/Apr	Soil and stationary air sampling	Soil sample event to supplement the 1999 investigation and better characterize site soil. Air sampling was conducted to establish baseline concentrations of LA in ambient air.
2000, June	ABS sampling	Done to assess exposure risk associated with disturbance of LA in areas containing vermiculite. Activities investigated included floor sweeping and moving bags of vermiculite insulation inside a building.
2001, Mar/Apr/Aug	Soil, bulk material, and dust sampling	Investigation of soil, bulk materials (wood shavings, insulation, debris, etc. in the five buildings), and dust (surfaces inside warehouse and pole barn) sampling to determine if residual levels of LA remained at the site after the 2000/2001 removal.
2002, April/May	Bulk materials and soil sampling	Addressed concerns of tenants about residual contamination. Bulk materials samples (from Millwork West) and soil samples from areas of suspect mine-related materials).
2006, June	Soil sampling	City of Libby waterline sampling during excavation of a trench through Area 1 parallel to City Service Rd. in preparation for new water supply pipeline. Gross quantities of vermiculite were encountered. Samples were collected from soil stockpiled during initial pipeline excavation.
2007, Sept/Oct	Soil sampling and indoor ABS	RI data gap sampling, site-wide soil sampling and indoor ABS. Surface soil samples were collected to evaluate LA content and presence/absence of surficial vermiculite. ABS was conducted to assess indoor air in onsite building and outdoor air near disturbed soil.
Area 2 – Riverside Park		
2003, May/July	Soil sampling	In response to a discovery of contaminated material, a visual inspection and soil sampling was conducted near the new boat ramp and picnic table area.
2003, Sept/Oct		Pre-removal characterization included interviews, visual inspection, and collection of surface and subsurface soil samples.
2007, Sept		Surface samples collected using a grid to evaluate LA asbestos content and presence/absence of surficial vermiculite.
Area 3 - Highway 37 Embankments		
2007, Sept	Soil sampling	RI data gap and soil sampling

- **Investigation Sampling – June 2000.** Personal air sampling was performed during an ABS event to determine exposures to LA from routine activities in areas with

vermiculite. Two samplers were monitored. LA concentrations were 0.6470 s/cc and 2.3666 s/cc for a break room sweeper and a bag house worker, respectively.

Exhibit 2-5. Summary of Response Action Removals at OU1

Year	Material Removed	Summary of Response Action
Area 1 – Former Export Plant		
July 2000 through January 2001 (Grace)	Vermiculite and contaminated dust, soil, and debris	Removal and cleaning per the UAO between EPA and Grace.
2001, September/ October (Grace)	Contaminated soil and building debris	Demolition of historic buildings and removal of contaminated soil
2002, October through December (Grace)		Demolition of remaining historic building and removal of additional contaminated soil
Area 2 – Riverside Park		
2003, Oct/Nov	Contaminated soil	Removal of contaminated soil
2007, July (City of Libby)	None	Placement of rock cover in areas of observed vermiculite
2008, May		Site work for placement of pavilion footers
2008, July	Contaminated soil	Removal of contaminated soil

Except where noted, activity was conducted by EPA
No removal activities conducted in Area 3 – Highway 37 Embankments

- **Removal Event – July 2000 through January 2001.** EPA issued a Unilateral Administrative Order (UAO) to Grace on May 23, 2000, based on the finding of LA at levels of concern in air and site soil. The UAO required that Grace temporarily relocate the onsite business (Millwork West), clean five onsite historic buildings and the building's contents, excavate and dispose of vermiculite and LA-contaminated soil and debris, and restore the property. The structures were ultimately demolished because they were in poor condition, did not meet current building code requirements, and could not be decontaminated. In exchange for the value of the buildings, and at no cost the City, Grace built a water main to the property that meets all code requirements. Grace also temporarily relocated Mill Work West, which decided not to move back to the property. EPA provided oversight to ensure compliance. Contaminated materials were disposed of at the former mine. During soil excavation, confirmation sampling was conducted by Grace. The 63 samples were analyzed and the results ranged from ND to 2% LA. Grace was directed to remove soil in additional 4- to 6-inch increments until EPA clearance criteria (<1% LA at depth) was met. The excavation was backfilled with

EPA-approved fill, and the final 6-inch layer was either gravel or topsoil, depending upon original surface conditions.

- **Investigation Sampling – March/April/August 2001.** After the UAO cleanup, additional sampling was done to determine if residual levels of LA remained. Fifteen soil samples were collected from various intervals and locations with results ranging from ND to 35% LA. In April**,** 39 bulk material samples were collected from the pole barn, planar shop, scale house/lumber storage building, warehouse, and shed. Results ranged from ND to 5% LA. Two single-point dust samples were also collected: one inside and one on the exterior surface of the warehouse foundation. Results show LA in dust on the building's exterior foundation at 169,836 s/cm^2, while the indoor sample was ND for LA. Composite dust samples were collected from inside the pole barn, from the surface of equipment in the shed and inside two storage containers. Results indicated LA in dust at 129,127 s/cm^2; 97,455 s/cm^2; 19,491 s/cm^2; and 40,200 s/cm^2, respectively.

- **Removal Event – September/October 2001**. EPA required Grace to conduct a cleanup to address residual LA contamination in site buildings and soil. All buildings except the planar shop were demolished and soil was excavated. Contaminated soil and debris was disposed at the former vermiculite mine. A composite dust sample was collected from the surface of lumber that had been decontaminated and moved outside the exclusion zone and was ND for LA. A dust sample was collected from the surface of a lumber pile inside the exclusion zone and had LA at 365 s/cm^2. Six composite dust samples were collected in and around the planar shop and results showed LA at levels between 609 s/cm^2 and 444,636 s/cm^2. Subsurface confirmation soil samples were collected in the pole barn, warehouse, scale house/lumber storage building, shed, east ball field, and BNSF spur extending just south of the planar shop. Results were all <1% LA. Surface composite soil samples were also collected from previously remediated areas that were suspected to have been impacted by subsequent removal activities and results were either ND or <1% LA. Limited additional soil samples were collected from other areas to determine cleanup needs, and results were ND for surface samples and <1% LA for subsurface. EPA required that all impacted areas be covered with a 4-inch layer of crushed gravel. Restoration also included backfill with EPA-approved materials. Personal air monitoring data were also collected during this removal effort and are presented in the RI (EPA, 2009a).

- **Investigation Sampling – April/May 2002**. In response to concerns of site tenants regarding potential residual contamination, EPA conducted additional sampling. In April, two bulk materials samples were collected from the interior of equipment owned and operated by Millwork West and results were ND for LA. In May, two composite soil samples were collected from areas where suspect material had been identified and both samples contained <1% LA.

- **Removal Event – October through December 2002.** As a result of concerns of site tenants about potential residual contamination from the 2001 removal actions, Grace began removing all remaining building material and debris at the direction of EPA. Contaminated soil from the footprint of the demolished planar shop and from an area near the BNSF railroad tracks was also removed. All removed material was disposed at the former vermiculite mine. EPA provided oversight and confirmation soil sampling, as well as personal and perimeter health and safety air monitoring. A total of 44 subsurface confirmation soil samples were collected from the floor of the excavations (36 were analyzed and 8 were archived). Results were either ND or <1% LA. Restoration was conducted using EPA-approved backfill materials. 10 personal air samples were collected.

- **Investigation Sampling – June through September 2006.** In the summer of 2006, the City of Libby began excavating a trench through the field portion of Area 1 parallel to City Service Road in preparation for installing a new drinking water supply pipeline. Vermiculite was encountered in localized areas near the existing hydrant at depths between 10 and 36 inches below ground surface (bgs) and the City halted work. EPA collected samples from the soil stockpiled during the initial excavation (8 composite samples). Results ranged from ND to 3% LA. As a result, EPA provided oversight and air monitoring during the work needed to complete the water line installation. All soil removed was transported to the mine for disposal, including the soil stockpiled during the initial excavation work.

- **Other Activity.** During an August 2007 site visit, 50 cubic yards of riprap was observed in several piles on the south side of City Service Road, about half way between the Highway 37 intersection and the David Thompson Search and Rescue building. The riprap was obtained from the United States Army Corps of Engineers' pit (on Fisher River Road 17 miles east of Libby) for the purpose of covering two areas of exposed orange fencing: one along the Kootenai River bank in between the new and old boat ramps and the other on the surface of the old boat ramp.

- **Investigation Sampling – September to November 2007.** Sampling was conducted after a data gap analysis to provide information for completion of a risk assessment specific to OU1. A total of 42 composite surface soil samples were collected. A visual observation of the amount of visible vermiculite was made at 1,170 points. No vermiculite was observed in the majority (88%) of point inspections. Low levels were observed at 10% of the inspection points, medium levels were observed at 1.4%, and high levels were observed at 0.3%. An ABS sampling event was conducted in the search and rescue building for both passive and active behaviors in the garage and meeting room and 22 air samples were collected. Results were: active-garage scenario, ND to 0.0699 s/cc; active-meeting room, 0.0011 s/cc to 0.0088 s/cc; and passive-meeting room, 0.0003 s/cc to 0.0079 s/cc. Dust samples were also collected and LA was detected in two samples

(meeting room at 75 s/cm^2 and garage at 20 s/cm^2). Air samples were also collected during brush hogging prior to soil sampling.

2.2.2.2 Area 2 Investigation and Removal Activities

- **Investigation Sampling – May/July 2003**. The City of Libby initiated renovations at Riverside Park in. A 2-inch thick layer of vermiculite was discovered during construction of a new boat ramp approximately 8 to 10 inches bgs. Additional vermiculite-containing soil was exposed in the picnic area when overburden was scraped off the bank west of the new boat ramp. Subsequent communications with former City worker's indicated that the vermiculite in this area was scraped and used to fill in low spots in Area 1. In response, a visual inspection and soil sampling was conducted. Vermiculite was observed in the park and along the river banks. Three surface soil samples were collected from the boat ramp and were ND for LA. EPA covered and fenced-off those areas with the greatest visible contamination to mitigate any short-term exposure risk.

- **Pre-Removal Sampling – September/October 2003**. This characterization included a verbal interview with city park personnel, visual inspection, and collection of surface and subsurface soil samples. Libby's Supervisor of City Services was interviewed about historical use of Riverside Park and confirmed use of the area for storing vermiculite. Visual inspections showed vermiculite at several locations, generally concentrated in areas on the former access road, on the southwest side of the embankment of City Service Road, and in an isolated area at the bottom of the embankment of City Service Road on the east side of the highway. Surface soil sampling included samples from the park, the riverbank, and on the north on south side of the embankment of City Service Road between the highway and the park entrance. LA was observed in 9 samples at concentrations from trace to <1%. For subsurface sampling, test pits were excavated and sampled and LA was only observed at trace levels in three samples.

- **Removal Event – October/November 2003.** The Riverside Park removal called for excavation to a depth of 12 inches bgs, except on the riverbank and the embankment on the northeast side of City Service Road (6 inches bgs). Excavation of the embankment on the southeast side of City Service Road has not yet been conducted. Additional soil was removed if vermiculite was visible at the excavation floor and confirmation soil samples were collected. The area was restored by backfilling to grade using EPA-approved fill and by hydroseeding, as required. Orange fencing was placed at depth to indicate the presence of vermiculite should soil be disturbed in the future. Riprap previously placed by the City was removed, washed, and replaced and topsoil was placed in the interstitial spaces. Prior to removal work, the City obtained riprap to be installed in the river about three-quarters of the way from the new boat ramp to the existing boat ramp to slow the water velocity near the new boat ramp. The removal contractor placed this riprap in consultation with the City during restoration activities.

- **Other Area 2 Activity – July 2007**. EPA was asked to address subsurface vermiculite brought to the surface during installation of cable the utility. The company was installing a cable through Area 2, in an east to west line, at a depth of two feet bgs. Vermiculite was exposed at the easternmost toe of the area previously excavated during the 2003 cleanup. Excavation was halted once the orange snow fencing, placed over areas of vermiculite containing soil in 2003, was encountered. EPA responded by covering the area with four to six-inches of rock.

- **Investigation Sampling – September 2007**. Nine composite surface samples were collected from the 3- to 6- inch interval and all were ND for LA. A total of 270 point inspections for visible vermiculite were made. No vermiculite was observed at the majority (90%) of the point inspections. Low levels of vermiculite were observed at 10% of the point inspections in Area 2.

- **Quick Response Removal Event – May 2008**. EPA excavated soil required to place foundation footings and a full concrete slab to assist the City of Libby with the construction of a new pavilion. Two areas were excavated. The area requiring excavation for the footings was excavated to an approximate depth of 57 inches bgs and approximately 808 cubic yards (cy) of material was removed. The second area was excavated to provide an access ramp and approximately 21 cy of material was removed. Restoration was performed by the City of Libby using EPA-approved fill. Confirmation samples were not collected.

- **Quick Response Removal Event – July 2008**. Several small areas containing medium to high amounts of vermiculite as well has what appeared to be raw LA were found on the surface of the gravel driveway, parking area, and the eastern portion of City Service Road. It is suspected the vermiculite was imported as it was not observed during the September 2007 sampling in this area. The vermiculite was removed in these areas by hand and with a surface vacuum. EPA approved the use of visual inspection as the clearance criteria for these areas.

2.2.2.3 Area 3 Investigation Activities

- **Embankment Investigation - September 2007.** Composite surface samples were collected from embankment areas. Most of the 22 samples were ND for LA (2 were trace and 1 was <1%). A total of 660 point inspections for visible vermiculite were made. The majority (88%) of inspections had no visible vermiculite. Low levels were seen at 9% of the inspections, medium levels were seen at 2%; and high levels were seen at 0.6%. Grab soil samples were collected from 0 to 24 inches bgs to determine if large quantities of vermiculite were used to construct the embankments. LA results ranged from ND to trace, and no vermiculite observed.

2.2.2.4 Other OU1 Investigation Activities

To estimate exposure associated with inhalation of LA in outdoor ambient air in and around the City of Libby, an outdoor ambient air monitoring program was designed

for OU4. To estimate LA concentrations in ambient air specific to OU1, the four Libby site-wide sampling locations nearest to OU1 (Kootenai River Road, 247 Indian Head Road, 501 Mineral Avenue, and 1427 Highway 37N/J. Neils Park) were used. Of the 143 sample results from these locations, the total LA concentrations ranged from ND to 0.00016 s/cc. The average total LA concentration observed during 2006-2008 Libby site ambient air sampling program was 0.00001 s/cc.

2.3 Summary of Data Sources and Quality Assurance/ Quality Control

Data from numerous sources were used in the RI (EPA 2009a), which formed the basis for the FS (EPA 2009b). EPA conducted numerous investigations. Investigations during removal actions were conducted by EPA, Grace, and CDM Federal Programs Corporation (CDM). These investigations were outlined in Section 2.2.

EPA also conducted other sampling relevant to the RI and FS for OU1. This included the sampling of fill used to ensure it is free from organic and inorganic contaminants (above background levels) and meets project-specific physical characteristics. Fill was also tested to ensure it was ND for LA. Only fill that met these standards was used in restoration.

Additional sampling also included sampling of ambient air. To estimate exposure associated with inhalation of LA in outdoor ambient air at the Libby site, an outdoor ambient air monitoring program was designed and implemented.

For work conducted by EPA and its contractors in Libby, quality assurance/quality control (QA/QC) measures include, but are not limited to, the collection of QC samples (such as duplicate samples and field blanks), implementation of a laboratory QA program, review of project reports generated by CDM by an approved QA staff member, and an auditing component to assess the effectiveness of the QA program. All QA/QC components for measurement reports required by EPA Region 8 (i.e., precision, accuracy, representativeness, completeness, and comparability) are addressed in the Draft Quality Assurance and Quality Control Summary Report for the Libby Asbestos Superfund Site. Field modifications to the governing documents were approved by EPA and implemented by field staff during activities at OU1. Signed modification forms are located at the CDM Libby office. No negative implications or biases to data have been noted as a result of these modifications.

Data collected at OU1 were evaluated by the EPA or government-contracted staff. Data were validated as required by analytical laboratories' QA/QC program. It is assumed that the raw data were useable for their intended purposes. Each guidance document referenced in this report describes the data quality objectives (DQOs) identified for each data collection activity conducted at OU1 or the Libby site as a whole. Data collected under the 1999 or 2000 Phase 1 Sampling and Quality

Assurance Project Plans are under review by the EPA project team as part of the human health risk assessment; however, the general Phase 1 objectives were met. All other work plan-specific DQOs were met.

2.5 Summary of Sampling and Analysis Methods

Various sampling and analysis methods were used to determine the presence of asbestos fibers in different media, such as soil, dust, and air. The following list provides examples of these types of methods that were implemented as part of the remedial investigation at the site:

- **ABS**. This sampling simulates routine activities at the site to estimate potential exposures. Personal air samples are collected from contractors engaged in an activity and the sample analyzed for asbestos fibers using transmission electron microscopy (TEM) analysis.

- **Ambient Air Sampling.** Stationary air monitoring stations are placed in the vicinity or downwind of contaminated areas to collect continuous air samples using a pump and air filtering cassette. The purpose is to determine the extent of asbestos fiber released from soil. Weather data is collected to correlate climatic conditions with measured releases of fibers. Samples are analyzed for asbestos fibers using TEM analysis.

- **Personal Air Monitoring.** Personal air samples are collected from the breathing zones of participants during various activities. Samples are collected at two flow rates using two different types of pumps during each two-hour event, with a new sample started at the beginning of each new period. Both the high volume and low volume samples are then submitted to the laboratory for analysis using TEM.

- **Polarized light microscopy (PLM) with stereomicroscopy analysis.** Soil samples are analyzed using EPA/600/R-93/116 with a modified protocol that uses a combination of PLM and stereomicroscopy analysis to identify bulk asbestos containing material (ACM) and/or asbestos fibers that may be present in soil.

- **Visual Inspection.** A visual inspection of ACM is completed by first designating inspection areas to establish a boundary around the inspection zone. The soil is then visually inspected for ACM using subsurface excavations or boreholes or surficial visual inspection.

Section 3 Highlights of Community Participation

EPA has implemented a very robust program of community participation at the Libby site. This program began in 2000 and continues today. It goes far beyond the scope of activities typically conducted at a Superfund site. Many of the activities included are listed below. Copies of these materials will be available in the revised Community Engagement Plan for the site in spring 2010.

- Conducted interviews and prepared the Community Involvement Plan (CIP)
- Established a local EPA Information Center and information repository
- Established an on-site community involvement (CI) team
- Provided support to the real estate community
- Provided support and education to stakeholders via classes and workshops
- Supported the Technical Assistance Group (TAG) and Community Advisory Group (CAG)
- Developed a mailing list and prepared and distributed multiple fact sheets
- Published numerous informational advertisements
- Developed and distributed informational brochures, other materials, and a website
- Held numerous public meetings and availability sessions and regularly updated City Council and County Commissioners
- Implemented several targeted informational campaigns
- Issued proposed plans, held a public hearing, and developed responsiveness summaries and RODs for OUs 1 and 2

A brief description of these activities is provided below. A more detailed description is provided in the Community Engagement Plan for the Libby site, which should be available in spring 2010.

3.1 Conducted Interviews and Prepared the CIP

In 2000, EPA conducted community interviews with citizens living on or near the site to find out general information about the properties and information on the property owner's concerns and issues with the site and how best to communicate with the public. Access and land use information was also gathered during those interviews. Using the information from those interviews, a CIP was prepared and distributed March 2001. Additional interviews were conducted in January 2009, and a Community Engagement Plan is being prepared.

3.2 Established a Local Information Center and an Information Repository

In December 1999, EPA established the EPA Information Center, which is the primary information resource for the Libby community on the project. Located at 108 E. 9th Street, it is a resource for the community and visitors who need information on EPA's work, either in general or as it relates to their property.

The administrative record is housed at the EPA Superfund Records Center in Denver, Colorado. The information repository contains a subset of documents from the administrative record and is located at the EPA's Information Center in Libby. The repository contains basic site information, documents on site activities, technical site documents, and general information about the Superfund program all for public review. Information about the administrative record file and information repository has been included in site fact sheets, so that the general public is aware of the existence and location of the site documents.

3.3 Established an On-site CI Team

A team of on-site CI coordinators (CICs) was established to facilitate interaction between the field team and residents. The CICs are contractors who are responsible for issues that need to be coordinated in order for sampling and cleanups to occur. These include: briefing residents on the scope of work, providing information on temporary relocations, arranging for relocations, facilitating interactions between the field crew and residents, documenting the scope of work and obtaining residential approval, coordinating with residents during relocations, facilitating their return to the property, taking care of all outstanding issues, and ensuring that residents were reimbursed for their costs during relocation. This support is also provided to business owners during cleanup of their properties.

3.4 Provided Support to the Real Estate Community

Libby leaders and the real estate community were concerned that work being done by EPA would slow or stop home sales, make appraisals cumbersome, and make financing more difficult to obtain. In response, EPA developed a multi-phased assistance approach for the real estate community. This includes writing hundreds of

"comfort letters" to support real estate transactions. EPA also provided additional information to complete mortgage transactions and arranged for representatives of federal mortgage insurers, lenders, and loan underwriters to attend meetings in Libby. Finally, EPA makes the sampling of properties pending sale a priority, and regularly adjusts schedules to accommodate these requests.

3.5 Provided Education to Stakeholders via Classes and Workshops

EPA has offered a variety of workshops for target audiences that included housing industry representatives (realtors and mortgage lenders) and area contractors. The goal was to ensure that development questions were answered and that contractors knew the issues related to preservation of the integrity of the work conducted to date at the site. EPA set up training classes for area contractors on the subject of asbestos abatement in 2006, 2007, 2008, and 2009. EPA also coordinated multiple stakeholders while putting together two major workshops for (in 2004 and 2006) at the site.

3.6 Provided Support to the TAG and CAG

EPA has funded a TAG in Libby since 2003. In 2004, EPA developed an audience-specific technical workshop aimed at helping TAG members understand the science behind analytical methods and ongoing risk management decisions at the site. This included planning content, presentation materials, travel arrangements, etc. Support also includes advertisement of the meetings each month. EPA has provided meeting support for the monthly CAG since its inception in 2000. This support has included arranging for and paying for the meeting space and a meeting facilitator. Support also includes advertisement of the meetings each month.

3.7 Developed a Site Mailing List and Prepared and Distributed Multiple Fact Sheets

EPA uses a commercially obtained mailing list of all people with mailing addresses within the Libby area zip-code (59263). A new list is purchased about every other year. In addition, a smaller mailing list of stakeholders who are located outside of the Libby area is also maintained (e.g., county, state, and federal elected officials and regulators associated with the site). EPA has prepared and distributed 12 fact sheets to the community about the Site since 2000.

3.8 Published Advertisements

A series of question and answer advertisements have been developed and placed in local newspapers. Entitled *Ask EPA*, these ads provide a question and answer in a concise format. They were originally published biweekly and are now published as needed. To date, over 200 *Ask EPA* ads have been placed. EPA also prepared and placed an advertisement each month to announce the meeting times, places, and dates

of the TAG, CAG, and O&M meetings. EPA has used paid advertisements in the form of newspaper columns targeted at specific site issues, from general topics (e.g., what is Superfund) to very specific issues (e.g., cleanups of specific areas). Fifteen columns have been placed in the local newspapers.

3.9 Developed and Distributed Informational Brochures, Written Materials, and a Website

EPA has worked to provide the materials needed to educate and engage the public on the very serious health issues associated with the site. As needs arise, information pieces are designed for a wide variety of audiences. EPA also developed a Libby Superfund website that is user-friendly and presents cleanup information. The website is based in large part on the brochure EPA developed as a community resource. The address for the website is www.epa.gov/libby.

3.10 Held Public Meetings and Availability Sessions and Updated Commissioners

Six public meetings, five joint meetings, two availability sessions, and two listening sessions have been held by EPA since 2004. These meetings are advertised well in advance and at least one was also broadcast simultaneously on the radio. In an effort to improve communication at the site in recent years, EPA has made it a point to regularly provide updates to the City and County Commissioners. These updates are made monthly at the regularly scheduled commission meetings.

3.11 Implemented Targeted Informational Campaigns

EPA has conducted educational efforts targeted at specific upcoming events at the site. The first event was in 2005 and involved a series of advertisements and meetings to provide information on the Superfund process in anticipation of a ROD. The second event was designed to launch the Libby Area ERS position in 2007. The third event was conducted in 2009 to educate the public on the Superfund process and the upcoming release of proposed plans for OUs 1 and 2, public comment period, and issuance of RODs for those OUs. It included the creation and placement of a series of ads depicting the *Road to the ROD*.

3.12 Issued Proposed Plans, Held a Public Hearing, and Developed Responsiveness Summaries and RODs

EPA issued a proposed plan for OU1 on September 7, 2009 and for OU2 on September 14, 2009. These plans were mailed to all residents of the Libby area. A public hearing for the proposed plans was held on September 28, 2009, at which EPA gave a brief presentation and the public had an opportunity to provide oral or written comment. The 30-day comment period was subsequently extended to January 16, 2010.

Section 4 Scope and Role of the OU

The OU1 RA will build on the numerous removal actions already implemented at the former Export Plant. OUs 1 and 2 are the first of the eight site OUs to have RODs completed. The specific RAs that will be taken at OU1 as a result of the ROD are very discrete in scope and will not impact work being done at the remaining OUs.

As described in Section 2, numerous investigations and removal actions have already been completed at OU1. The contamination to be actively addressed in this remedy covers approximately 9 acres of the site and includes both surficial and subsurface soils. LA-contaminated soil also remains at depth across many areas of the OU.

The remedy focuses primarily on preventing direct exposure to remaining areas of contamination –through containment and/or removal. The remedy also uses ICs both to protect the remedy and to prevent disturbance of the deeper residual LA-contamination. This approach is protective of both human health and the environment.

Certain issues at OU1 of the Libby site will be addressed separately from implementation of the selected remedy. An ecological risk assessment is being developed at the mine site, OU3. Once that work is complete, EPA will build upon information gathered during the risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at the former Export Plant.

Pending completion of the final risk assessment being developed under OUs 4 and 7, EPA is taking action at the former Export Plant now to break exposure pathways. A risk assessment to include activity based sampling, will be conducted following construction of the remedy to verify that exposure pathways have been broken.

In addition, remedial actions that result in hazardous substances, pollutants, or contaminants remaining at a site above levels that allow for unlimited use and unrestricted exposure are required to be reviewed every five years to ensure protection of human health and the environment. EPA is currently engaged in research to derive LA-specific toxicity values. If that research is successful, and LA-specific toxicity values are developed, this remedy will be reevaluated to ensure continued protectiveness.

Although EPA does not anticipate the need for any further response action following implementation of this remedy, additional work may be necessary if it is determined during a five-year review that it is required to ensure protectiveness of human health and the environment.

Section 5 Summary of Site Characteristics

This section contains an overview of the site and the CSM.

5.1 Site Overview

5.1.1 Surface Features and Size

OU1 covers roughly 17 acres on the south side of the Kootenai River, just north of the downtown area of the City of Libby, Montana (Exhibit 2-2). It is bounded by the Kootenai River on the north, Highway 37 on the east, the BNSF railroad thoroughfare on the south, and State of Montana property on the west.

- **Area 1.** This area west of Highway 37 is divided into two areas by the partially-paved City Service Road. Area 1 is the 12-acre area south of the road. It is a primarily undeveloped area that is currently owned by the City of Libby. In 2004, the David Thompson Search and Rescue organization constructed a building containing a main office and a five-bay garage on the northwest portion of the site on the south side of City Service Road. This area is currently fenced.

- **Area 2**. This area is the 4.7-acre area north of the road, known as Riverside Park. It is also owned by the City of Libby and is developed as a recreational facility. The main features of the park include two boat ramps, two pavilions, picnic tables, and a pump house.

- **Area 3.** This area is made up of the embankments of City Service Road and Highway 37 (on and adjacent to the OU). The embankments adjacent to the OU are included because of their proximity and the known presence of LA and vermiculite in this area.

5.1.2 Climate

Libby has a relatively moist climate, with annual precipitation in the valley averaging slightly over 20 inches (this includes approximately 60 inches of snowfall). Surrounding higher elevations receive significantly more precipitation. During the winter months, moist Pacific air masses generally dominate, serving to moderate temperatures and bring abundant humidity, rain, and snow. Colder, continental air masses occasionally drop temperatures significantly, but generally only for shorter periods. The average temperatures in December and January are 25 to 30 degrees Fahrenheit (°F).

During summer, the climate is warmer and dryer, with only occasional rain showers and significantly lower humidity and soil moistures. High temperatures of greater than 90 °F are common. The average temperature in July is approximately 65 to 70 °F. Spring and fall are transition periods.

Due to its valley location along the Kootenai River and downstream of the Libby dam, fog is common in the Libby valley. This effect is most pronounced during winter and in the mornings. Inversions, which trap stagnant air in the valley, are also common. Winds in the Libby valley are generally light, averaging approximately 6 to 7 miles per hour. Prevailing winds are from the WNW, but daily wind direction is significantly affected by temperature differences brought about by the large amount of vertical relief surrounding the area.

5.1.3 Areas of Archeological or Historical Importance

There are no known areas of archeological or historical importance within the disturbed area of the site.

5.1.4 Geology

The mountains surrounding Libby are generally composed of folded, faulted, and metamorphosed blocks of Precambrian sedimentary rocks and minor basaltic intrusions. Primary rock types are meta-sedimentary argillites, quartzites, and marbles.

Excluding vermiculite-related materials that may be present, x-ray diffraction analyses by the United States Geologic Survey of shallow, sub-surface soil from more than ten sites in the Libby area show that it is comprised of major (greater than 20%) quartz, minor (5-20%) muscovite (and/or illite) and albitic feldspar, trace (<5%) orthoclase, clinoclore, non-fibrous amphibole (likely magnesiohornblende), calcite, amorphous material (probably organic) and possible pyrite and hematite. Other minerals will be present at levels below 0.5% and are generally not detectable by routine x-ray diffraction analysis. These mineral components represent the average components for the area and will vary to some extent depending on location and history. Surface soil contains the above components with the addition of more organic material.

The vermiculite deposit located at Vermiculite Mountain, the source of LA, is located approximately 7 miles northwest of the town of Libby in the Rainy Creek drainage. The vermiculite deposit specific to the former vermiculite mine is classified as a deposit within a large ultramafic intrusion, such as pyroxenite plutons, which is zoned and cut by syenite or alkalic granite and by carbonatitic rock and pegmatite. The formation of vermiculite and asbestiform amphiboles in the mine deposit, have been assessed to be the result of the alteration of augite by high-temperature silica-rich solutions.

The Vermiculite Mountain deposit is contained within the Rainy Creek alkaline-ultramafic complex. The Rainy Creek complex is described as the upper portion of a hydrothermally altered alkalic igneous complex composed primarily of magnetite pyroxenite, biotite pyroxenite, and biotititie. The original ultramafic body is an

intrusion into the Precambrian Belt Series of northwestern Montana with a syenite body southwest of the adjacent to the altered pyroxenite and is associated with numerous syenite dikes that cut the pyroxenites.

5.1.5 Soil

Soil is largely derived from the pre-Cambrian rocks, which break down to form loamy soil composed of sand and silt with minor amounts of clay. The Libby valley area is somewhat enriched in clays due to its river valley location, and the dense forest of the region contributes organic matter to the soil. Much of the original soil in the area now occupied by the town of Libby has been modified by human activities. These include addition of vermiculite from the Rainy Creek Complex to the soil, reworking of the soil during construction, road building, railroad operations, gardening, processing of vermiculite (i.e., expansion), and other activities. Soil generally varies in color from tan to gray to black.

5.1.6 Surface Water Hydrology

The Kootenai River, which flows adjacent to the site, has its origins in British Columbia's Kootenay National Park in Canada. From there it flows 485 miles into northwest Montana and through the towns of Libby and Troy. From there it flows into northern Idaho, then back into Canada and Kootenay Lake. Ultimately it joins with the Columbia River. Sixteen miles north of Libby, the river is held back by Libby Dam, creating a 90-mile long reservoir called Lake Koocanusa which reaches into Canada (EPA 2009b).

As previously stated, Libby has a relatively moist climate with annual valley precipitation slightly over 20 inches. Higher elevations receive significantly more precipitation and account for much of the creek flow. Seasonal fluctuations cause varying levels of runoff and creek flow. Typically, runoff is most significant in spring when snow at higher elevations begins to melt. Summer precipitation does occur; however, typical summer weather is hot and dry and creek flow is moderated by high elevation lakes.

5.1.7 Hydrogeology

The Libby basin is hydrologically bound to the west by the pre-Cambrian bedrock, to the north by the Kootenai River and to the east by Libby Creek. The southern boundary of the basin extends under the high terrace of glacial lake bed sediments and with the alluvium of Libby Creek.

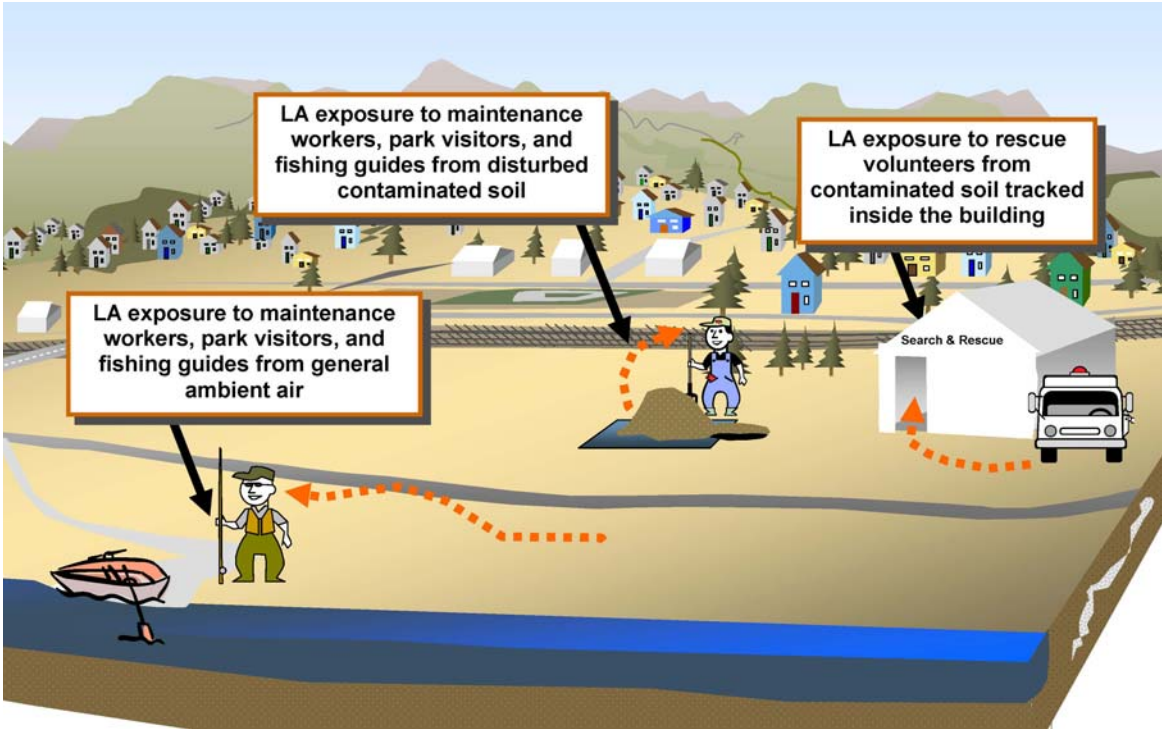
The sediments overlying bedrock in the vicinity of the town of Libby are of glacial, glaciofluvial or alluvial origins. The site stratigraphy is characterized by lenses of interbedded units consisting of gravels, sands, and silty to clayey gravels and sands. These units are the result of numerous episodes of alluvial and glacial erosion and deposition. Types of depositional environments likely to have existed in the Libby

area include braided stream, overbank, splay, point bar, till, moraine, outwash, loess (aeolian), channel, and lacustrine. These environments moved in time and space, occurred contemporaneously, cancelled each other out (by erosion) and varied drastically in the level of energy and capacity to sort the available clastic material.

5.2 Conceptual Site Model

The CSM is a basic description of how contaminants enter the environment, how they are transported, and what routes of exposure to organisms and humans occur. It also provides a framework for assessing risks from contaminants, developing remedial strategies, determining source control requirements, and methods to address unacceptable risks. LA is the dominant environmental concern at the site. A pictorial version of the CSM for current and future receptors at OU1 is depicted in Exhibit 5.1. The traditional flow chart version of the CSM for current and future use is presented in the Section 7 discussion of the risk assessment.

Exhibit 5-1. Summary of Current Status of Exposure Pathways at OU1



5.2.1 Source Materials

Vermiculite and/or vermiculite concentrate was transported to OU1 from the mine for stockpiling and staging prior to distribution. It is also believed that vermiculite materials were used to fill in low lying areas of the site. The potential contaminated media of concern for OU1 include: indoor air, dust in air of vehicles, outdoor air near disturbed soil, general (ambient) outdoor air, and dust in air from disturbances of roofing or other outdoor surfaces.

Specific sources of contamination as described in the RI include the following:

- Surface soil within the OU1 boundary contains visible vermiculite and also LA at ND, trace, or <1% levels.
- Subsurface soil is known to contain vermiculite, the exact location and depths of vermiculite containing soil are not fully documented or delineated.
- LA has been observed in indoor air and indoor dust samples at the search and rescue support building
- LA has been observed in indoor air at the site collected during ABS activities within the garage and meeting room areas of the search and rescue support building.
- LA has been observed in outdoor ambient air samples collected near OU1.
- LA has been observed in personal air samples collected during bush hogging activities within the boundary of OU1.

5.2.2 Affected Media

Affected media at OU1 are soil and air.

- **Soil.** Soil has been impacted by the migration of contaminants via airborne transport of contaminated dust, runoff of contaminated surface water, or mechanical transportation of source materials.
- **Air.** Ambient air has been impacted in the past by airborne transport of exposed LA contamination in soils and transport of LA from vermiculite processed at the OU.

5.2.3 Migration Routes and Exposure Pathways

As discussed in Section 2, LA has been observed in all the media sampled at the site (i.e., indoor air, indoor dust, outdoor ambient air, outdoor air near disturbed soil, and soil). Exposure to LA can be either by incidental ingestion of contaminated soil or by inhalation of air that contains LA fibers. Of these two pathways, inhalation exposure resulting from active soil disturbance is believed to be the most significant. The added risk from the ingestion pathway is expected to be small compared to the risk from the

inhalation pathway. The exposure route of chief concern for asbestos is by inhalation of asbestos fibers in air. People at the site may be exposed to asbestos in air by three main pathways:

- Inhalation of fibers released during active soil disturbance activities;
- Inhalation of fibers in indoor air/dust;
- Inhalation of fibers in outdoor (ambient) air

5.2.4 Populations of Concern

Based on the current and potential future land use at OU1, people who are most likely to be exposed on a regular basis include:

- Volunteers who staff the David Thompson Search and Rescue Facility. This support building is within the boundary of OU1 and is used to store equipment between responses
- Fishing guides who launch fishing boats from the boat launch facility in OU1
- Local residents/recreational visitors who visit OU1 for recreational purposes, either now or in the future.
- City workers who perform maintenance activities at OU1, either now or in the future
- Potential future commercial workers (if the site is developed for commercial rather than recreational purposes)
- Potential future construction workers (if future development includes construction of new buildings or facilities)

Section 6 Current and Potential Future Land and Resource Uses

6.1 Land Use

Area 1 is currently owned by the City of Libby and is undeveloped, with the exception of a small area of the site currently used by David Thompson Search and Rescue. In 2004, the search and rescue organization constructed a building containing a main office and a five-bay garage on the northwest portion of the site on the south side of City Service Road. The garage is used for storing search and rescue equipment and vehicles. Several other agencies, including local and state law enforcement, also hold meetings in the main office. Access to Area 1 has been restricted by construction fencing and EPA has provided guidance to the city regarding the use of caution when conducting any activities at the site that disturb soil.

Area 2, Riverside Park, is also currently owned by the city and serves a variety of recreational visitors. The main features of the park include two boat ramps, two pavilions, picnic tables, and a pumphouse. The newer of the two boat ramps is used by recreational boaters and commercial fishing outfitters; the older ramp is not commonly used due to swift current at its approach. The pumphouse (Exhibit 1-2) houses a pump that draws non-potable water from the Kootenai River. The pump was installed jointly by the City of Libby and Lincoln County in 1999 to provide a backup water source to local fire departments. The pumphouse is accessed by city personnel in order to perform maintenance on the pump. The pump is connected to an external water spigot, which is used by the city to draw water for street sweeping and other maintenance operations, and other workers (such as employees of local fill pits and contractors working on EPA's removal program) to draw water primarily for use in dust suppression equipment. Access to Area 2 is unrestricted.

Area 3 is owned and maintained by the MDT. MDT currently performs only periodic maintenance of these embankments as needed. The types of maintenance activities conducted by MDT include application of herbicides, replacement of guardrails and guardrail posts, and replacement and maintenance of roadside light posts. Access to this area is unrestricted.

Future use of Area 1 is unknown at this time. The city expects that David Thompson Search and Rescue will continue to utilize the northwest portion of the site. Area 2 (Riverside Park) will continue to serve recreational visitors; a change in land use is not currently anticipated. It is also anticipated that Area 3 will not change use and will remain undeveloped and owned and maintained by MDT.

6.2 Groundwater Use

OU1 does not address groundwater contamination issues at the site. EPA does not consider groundwater to be a viable pathway for exposure.

6.3 Surface Water Use

Potential impacts to surface water (the Kootenai River) will be considered when ecological risk is evaluated.

Section 7 Summary of Site Risks

The RI report contains a human health risk assessment for OU1. That risk assessment uses available data to estimate the health risks to people who may breathe asbestos in air while living on, working at, or visiting OU1, either now or in the future, based on the current, post-removal conditions. Methods used to evaluate human health risk are in basic accord with EPA guidelines for evaluating risks at Superfund sites, including recent guidance that has been specifically developed to support evaluations of exposure and risk from asbestos. The cancer risk estimates described below are based on calculations using the currently available Inventory Update Report (IUR) for asbestos. As indicated above, EPA is currently engaged in research to derive LA-specific toxicity values. If that research is successful, and LA-specific toxicity values are developed, the risk estimates below will be reevaluated to ensure that remedial decisions are health protective.

Detailed explanations of the steps used to conduct the risk assessment are provided in the RI report, including background information on asbestos, the basis for concern, the exposure model, a toxicity assessment, quantification of exposure and risk, and a listing of uncertainties.

Toxicity values needed for quantification of cancer risk and non-cancer hazard from inhalation exposure to asbestos are still under development. However, risk estimates based on the best methods and data currently available indicate the following:

- Estimated cancer risks from inhalation of LA caused by disturbance of soils at OU1 are difficult to quantify with confidence, but it seems likely that risks to individuals who repeatedly disturb soil in OU1 may approach or exceed EPA's risk range. Based on this, this pathway is considered to be of potential concern.

- Subsurface soils at OU1 contain vermiculite. In the future, if this buried vermiculite became exposed (e.g., because of soil erosion or soil excavation activities), increased exposures to LA from soil disturbance might be substantially higher than under current conditions.

- Estimated excess cancer risks to volunteers who work indoors at the David Thompson Search and Rescue facility range are below or within EPA's risk range. Based on this, exposure to indoor air, taken alone, is likely to be of low concern. However, these people may be exposed to LA by other pathways, and so risk evaluations must consider the total risk. While this ROD focuses exclusively on exposures and risks that occur within OU1, the contributions of risks from OU1 to total (cumulative) site-wide risk will be addressed in the future.

- Estimated excess cancer risks from inhalation exposure to outdoor ambient air at OU1 are all well below EPA's risk range of 1E-04 (one per ten thousand) to 1E-06 (one per million). Based on this, exposure to outdoor ambient air in OU1 is unlikely to be of significant health concern to any human receptor.

- EPA is working to develop a reference concentration that will allow non-cancer exposure hazard for inhalation exposure to LA to be quantified. Therefore, the risk assessment does not include an evaluation of non-cancer hazard. However, studies in Libby suggest that the incidence of asbestos-related, non-cancer effects (e.g., pleural calcification, pleural thickening and opacities) may be increased in workers and residents. These findings emphasize that, despite the present inability to provide a quantitative calculation, non-cancer effects may be a significant human health concern in the community. Thus, it should not be presumed that cancer risk is the "risk driver" at OU1 or other parts of the site.

7.1 Exposure Assessment

7.1.1 Conceptual Site Model

As discussed in Section 2, historic operations at the Export Plant led to substantial contamination of OU1 soils with vermiculite and LA which became mixed into the soil. Although EPA has undertaken extensive cleanup activities at OU1 (including demolition of the former Export Plant buildings and other contaminated structures), as well as excavation and replacement of surface material at a number of locations across the OU, the surface soil remains contaminated with visible vermiculite in a number of locations. In addition, vermiculite may remain buried at depth in some areas, which could serve as a source of release in the future if excavation activities brought contaminated material to the surface. The conceptual site model for OU1 is shown in Exhibit 7-1.

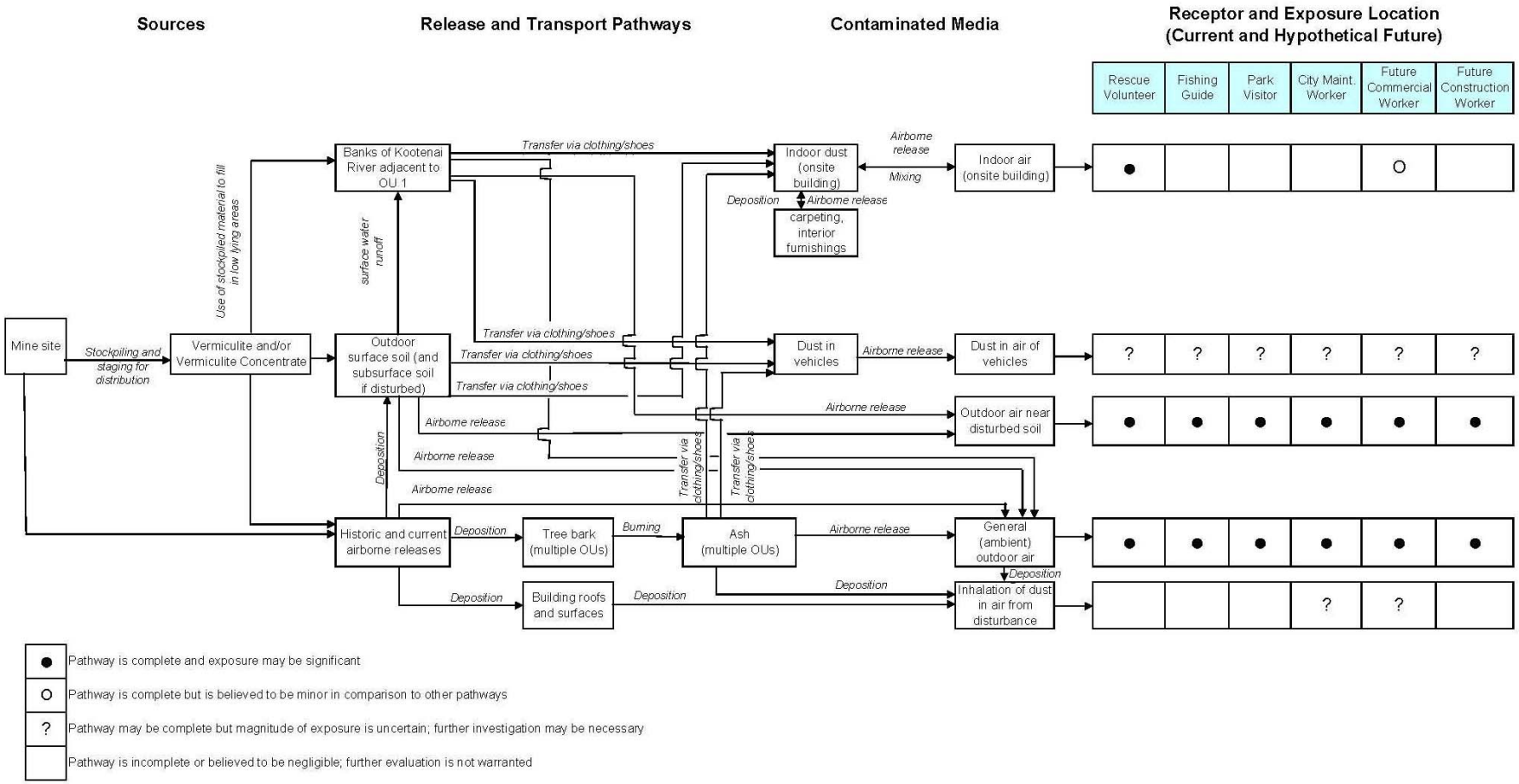
7.1.2 Exposure Routes

People who visit or work at OU1 may be exposed to LA either by incidental ingestion of contaminated soil or by inhalation of air that contains LA fibers. Of these two pathways, inhalation exposure is considered to be of greatest concern. To the extent that incidental ingestion exposure of LA in soil may occur, the added risk from this pathway is expected to be small compared to the risk from the inhalation pathway.

7.1.3 Exposure Pathways

LA fibers may become airborne in a number of ways. This may include natural forces such as wind blowing over contaminated soil, or human activities such as sweeping indoors or mowing, raking, or digging in areas of contaminated outdoor soil. The amount of LA in air, and hence the amount inhaled, will vary depending on the level of LA in the source and also on the intensity and duration of the activity.

Exhibit 7-1. CSM for Current and Future Land Use at OU1



For the purposes of exposure assessment, it is convenient to stratify inhalation exposures according to source material (e.g., outdoor soil, indoor dust) and according to activity (e.g., active disturbance vs. passive behavior). Based on this approach, the exposures of chief concern for each of the exposed populations are as follows:

- Volunteers at the David Thompson Search and Rescue Facility may be exposed both while inside the facility and while working outside in the vicinity of the building. At both locations, exposures may occur during both active and passive activities.

- Fishing guides who launch boats from the boat ramp are expected to be exposed only outdoors. Exposures at the boat ramps could occur as adjacent contaminated soils are disturbed when boats are launched. Likewise, fishing guides might be exposed by disturbing soil when parking their vehicles in non-paved areas.

- Current or future recreational visitors to OU1 (park visitors) are also assumed to be exposed only outdoors. It is assumed that park visitors might engage in a wide variety of different types of activities, ranging from passive (e.g., sitting at a picnic table) to active (e.g., playing sports, a child digging in the soil).

- Potential future commercial workers are assumed to be exposed mainly outdoors in areas of contaminated soil, since any newly constructed buildings would not contain vermiculite or LA. However, exposure could also occur inside if the interior of the workplace became contaminated by tracking in contaminated outdoor soil.

- Potential future construction workers are likely to be exposed to LA in outdoor air as a consequence of activities such as soil grading and excavation that could disturb both surface and subsurface soil.

City maintenance workers are assumed to engage in a variety of activities at OU1, the most common of which would be lawn care and repair or maintenance of facilities. This might include occasional work inside the David Thompson building or in the pump house, but because neither building contains vermiculite insulation and because such indoor exposures are likely to be infrequent, any indoor exposures are likely to be a minor source of exposure compared to exposures that occur outdoors while maintaining the park. Consequently, these potential indoor exposures are not evaluated quantitatively for the maintenance worker.

Note that all individuals who visit the OU by car might be exposed by transfer of contaminated soil from the OU into the car, followed by subsequent inhalation exposure while driving. The significance of this exposure pathway is currently unknown, but may be investigated in the future to support evaluation of cumulative Libby site-wide risk.

7.2 Toxicity Assessment

Toxicity assessments review and summarize the potential for each contaminant of concern to cause adverse effects in exposed populations. Toxic effects generally depend on inherent toxicity and the magnitude, frequency, and duration of the exposure. A toxicity assessment identifies what adverse health effects a chemical causes and how the appearance of these adverse effects depends on exposure. Toxicity assessment is usually divided into two parts: non-cancer effects and cancer effects.

The adverse effects of asbestos exposure in humans have been the subject of a large number of studies and publications. The following section provides a brief summary of the main types of adverse health effects that have been observed in humans who have been exposed to asbestos. Sources for more detailed reviews of the literature are provided in the OU1 RI (EPA 2009a).

7.2.1 Non-Cancer Effects

7.2.1.1 Asbestosis

Asbestosis is a disease of the lung that is characterized by the gradual formation of scar tissue in the lung parenchyma. Initially the scarring may be minor and localized within the basal areas, but as the disease develops, the lungs may develop extensive diffuse alveolar and interstitial fibrosis. Build-up of scar tissue in the lung parenchyma results in a loss of normal elasticity in the lung which can lead to the progressive loss of lung function. People with asbestosis tend to have increased difficulty breathing that is often accompanied by coughing or rales. In severe cases, impaired respiratory function can lead to death. Asbestosis generally takes a long time to develop, with a latency period from 10 to 20 years.

7.2.1.2 Pleural Abnormalities

Exposure to asbestos may induce several types of abnormality in the pleura (the membrane surrounding the lungs).

- Pleural effusions are areas where excess fluid accumulates in the pleural space. Most pleural effusions last several months, although they may be recurrent.
- Pleural plaques are acellular collagenous deposits, often with calcification. Pleural plaques are the most common manifestations of asbestos exposure.
- Diffuse pleural thickening is a noncircumscribed fibrous thickening of the visceral pleura with areas of adherence to the parietal pleura. Diffuse thickening may be extensive and cover a whole lobe or even an entire lung.

Pleural abnormalities are generally asymptomatic, although rarely they may be associated with decreased ventilatory capacity, fever, and pain. Severe effects are rare,

although severe cases of pleural thickening that led to death have been reported. The latency period for pleural abnormalities is usually about 10 to 40 years, although pleural effusions may occasionally develop as early as one year after first exposure. Specific references for these effects are cited in the OU1 RI.

7.2.1.3 Observations of Asbestos-Related Non-Cancer Diseases in People Exposed to LA

Studies of the cause of death in workers exposed to LA while working at the vermiculite mine and mill at Libby reported that Libby workers were more likely to die of non-malignant respiratory disease (i.e., asbestosis, chronic obstructive pulmonary disease, pneumonia, tuberculosis and emphysema) compared to the general population.

These studies evaluated the prevalence of chest radiographic changes in workers exposed to LA while working at the vermiculite mine and mill at Libby. These researchers observed increased prevalence in pleural changes, including pleural calcification, pleural thickening and profusion of small opacities among exposed workers. Similar effects were seen for workers exposed to LA at a facility in Ohio that expanded Libby vermiculite for use in lawn care products. An increased incidence of pleural abnormalities was also seen in household contacts of former employees of the vermiculite mine and residents of Libby. These findings support the conclusion that exposure to LA can induce pleural abnormalities.

7.2.2 Cancer Effects

Many epidemiological studies have reported increased mortality from cancer in asbestos workers, especially from lung cancer and mesothelioma. Based on these findings, and supported by extensive carcinogenicity data from animal studies, EPA has classified asbestos as a known human carcinogen.

7.2.2.1 Lung Cancer

Exposure to asbestos is associated with increased risk of developing all major histological types of lung carcinoma (adenocarcinoma, squamous cell carcinoma, and oat-cell carcinoma). The latency period for lung cancer generally ranges from about 10 to 40 years. Early stages are generally asymptomatic, but as the disease develops, patients may experience coughing, shortness of breath, fatigue, and chest pain. Most lung cancer cases result in death. The risk of developing lung cancer from asbestos exposure is substantially higher in smokers than in non-smokers.

7.2.2.2 Mesothelioma

Mesothelioma is a tumor of the thin membrane that covers and protects the internal organs of the body including the lungs and chest cavity (pleura), and the abdominal cavity (peritoneal). Exposure to asbestos is associated with increased risk of developing mesothelioma. The latency period for mesothelioma is typically around 20 to 40 years; and, by the time symptoms appear, the disease is most often rapidly fatal.

7.2.2.3 Other Cancers

The RI reports that limited evidence exists to suggest that exposure to asbestos may also increase the risk of cancer in several other tissues, including the gastrointestinal tract, the larynx and pharynx, and the kidney.

7.2.2.4 Observations of Asbestos-Related Cancer Cases in Workers in Libby

Studies conducted between the 1980s and present regarding the cause of death in workers exposed to LA while working at the vermiculite mine and mill at Libby reported an increased incidence of lung cancer and mesothelioma in exposed workers, strongly supporting the conclusion that LA can cause increased risk of respiratory cancer when inhaled.

7.2.3 Toxicity Values

At present, although toxicity values have been derived by EPA for chrysotile asbestos no toxicity values are available, specifically, for LA. These values are under development and are anticipated to be available for the site-wide human health risk assessment under OU4.

7.3 Quantification of Exposure Risk

7.3.1 Evaluation of Risks from Breathing Ambient Outdoor Air

All people who visit or work at OU1 will be exposed by breathing outdoor ambient air (outdoor air that is not impacted by personal activities that disturb LA in outdoor soil). Although an outdoor ambient air monitoring program has not been performed within OU1, EPA has performed an extensive study of outdoor ambient air in Libby, using 14 different monitoring stations throughout the community. Based on the best estimate of the mean concentration, estimated cancer risk levels range from 4E-10 to 3E-08, while upper bound estimates (based on the maximum detected concentration) range from 6E-09 to 4E-07. These values are well below EPA's target risk range of 1E-04 to 1E-06, indicating that inhalation exposure to outdoor ambient air is not of significant concern for workers or visitors in OU1.

7.3.2 Evaluation of Risks from Indoor Exposure

The only building at OU1 that is regularly occupied by humans is the Search and Rescue building. Indoor air personal air samples were collected at this building to evaluate three exposure scenarios: active behaviors in the garage area, active behaviors in the meeting room area, and passive behaviors in the meeting room area. Based on the best estimate of the mean air concentration, estimated cancer risk ranges from 8E-07 (central tendency exposure [CTE]) to 1E-05 (reasonable maximum exposure [RME]). Based on the maximum detected concentrations, estimated cancer risk levels range from 4E-06 (CTE) to 9E-05 (RME). In both cases, most of the risk is associated with active behaviors, with relatively little coming from passive indoor activities. These estimates are all within or below EPA's target risk range, indicating that indoor exposures alone are of relatively low concern. However, risks from inside the building must be considered along with other exposures that contribute to the total (cumulative) risk to an individual.

7.3.3 Evaluation of Risks from Disturbing Outdoor Soil

7.3.3.1 Air Concentrations under Current Site Conditions

Measuring the concentration of asbestos in air in association with a specific activity that disturbs soil is referred to as ABS. Only one data set is available on the concentration of LA in ABS air samples near disturbed soils in OU1. This data set consists of 8 personal air samples collected by an individual who was mowing in Area 1 to prepare for an inspection of soil for visible vermiculite contamination. These data are used as the basis for estimation of human exposure from soil disturbances in OU1. Based on the best estimate of the mean concentration, estimated cancer risk ranges from 1E-06 to 1E-04. Based on the maximum detected concentration, estimated cancer risk ranges from 6E-06 to 8E-04. These values are within and above EPA's target risk range of 1E-06 to 1E-04, indicating that exposures via soil disturbance activities may be of concern for some receptors.

It is important to recognize that the OU1 ABS data have a number of potential limitations that limit confidence in the exposure estimates and risk calculations presented above. Specifically, the data may tend to underestimate exposure and risk because:

- Most of the ground was wetted before mowing to suppress dust releases. Thus, the amount of LA released may have been lower than if the disturbance had occurred when the ground was dry.
- The levels of vermiculite in the area mowed are not as high as at some other locations. Thus, similar soil disturbances in other areas may tend to release higher levels of LA.

- The number of samples collected may not be large enough to capture the full range of variability in airborne releases, potentially leading to an underestimate of the mean air concentration that a worker might be exposed to.

Because of these limitations, the risk estimates should be considered uncertain, and actual risks may be higher.

7.3.3.2 Consideration of Future Site Conditions

EPA is also concerned about potential future risks from soil disturbances at OU1. Several lines of information suggest that subsurface soils may contain substantial quantities of residual vermiculite that were released when the Export Plant was operating. This information includes the following:

- Former Export Plant workers report that vermiculite was present in fill material used to level the area of the OU.

- Cleanup activities completed to date have identified substantial levels of buried vermiculite at some locations, including the north face of the OU along the Kootenai River and along the berms to Highway 37 near the eastern end of the OU. Vermiculite in these areas has been observed as layers, possibly the result of material stockpiled during operation of the Export Plant being used to fill in low lying areas.

- Installation of a water pipeline in OU1 by the City resulted in buried vermiculite being brought to the surface. Vermiculite was observed at depths ranging from 10 to 36 inches bgs, and LA concentrations were as high as 3%. Those elevated concentrations were randomly scattered in the path of the pipeline.

- Installation of a new phone line across OU1 resulted in vermiculite being brought to the surface and vermiculite was observed at a depth of 24 inches bgs.

This information indicates that buried vermiculite at OU1 could serve as a potential source of release and re-contamination of surface soils with LA under circumstances in which subsurface soils might become exposed. This could result from natural weathering and erosion at the OU, children or workers digging in the dirt, as well as a range of potential future construction activities that involve soil excavation or earthwork. .

7.4 Summary of Human Health Risk

Toxicity values needed for quantification of site-specific cancer risk and non-cancer hazard from inhalation exposure to asbestos are still under development. However, risk estimates that are based on the best methods and data that are currently available indicate the following:

- Estimated excess cancer risks from inhalation exposure to outdoor ambient air at OU1 are all well below EPA's target risk range of 1E-04 to 1E-06. Based on this, exposure to outdoor ambient air in OU1 is unlikely to be of significant health concern to any human receptor.

- Estimated excess cancer risks to volunteers who work indoors at the David Thompson Search and Rescue facility range are below or within EPA's target risk range. Based on this, exposure to indoor air, taken alone, is likely to be of low concern. However, volunteers in the building may be exposed to LA by other pathways, and so risk evaluations must consider the total risk.

- Estimated cancer risks from inhalation of LA caused by disturbance of soils at OU1 are difficult to quantify with confidence, but it seems likely that risks to individuals who repeatedly disturb soil in OU1 may approach or exceed EPA's target risk range. Based on this, this pathway is considered to be of potential concern.

- Subsurface soils at OU1 contain buried vermiculite. In the future, if this buried vermiculite became exposed (e.g., because of soil erosion or soil excavation activities), excess cancer risks from soil disturbance might be substantially higher than under current conditions.

- Non-cancer hazards from inhalation exposure to LA cannot be quantified at present, but it is anticipated that non-cancer hazards may be of significant concern. Thus it should not be presumed that cancer risk is the "risk driver" at OU1.

7.5 Ecological Risk

EPA expects that the selected remedy will address ecological risk, because it completely cuts off all exposure pathways. An ecological risk assessment is being developed for the mine site (OU3). EPA will build upon the information gathered during that ecological risk assessment to identify potential pathways and receptors to evaluate ecological risk at OU1. If additional ecological exposure pathways are identified, the remedy will be reevaluated.

7.6 Basis of Action

The response actions selected for OU1 in this ROD are necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substances into the environment and of pollutants or contaminants that may present an imminent and substantial endangerment to public health or welfare.

Section 8 Remedial Action Objectives and Remedial Goals

8.1 Remedial Action Objectives

Remedial Action Objectives (RAOs) are goals developed by EPA to protect human health and the environment at the Libby site. These are the overarching goals that all cleanup activities selected for OU1 should strive to meet. EPA considers current and future use of the site when determining RAOs. LA was observed in all media sampled at OU1: indoor air and dust, outdoor ambient air, personal air, and soil. Based on determinations of human health risks, LA in vermiculite and/or soil is likely to pose a current exposure risk to human receptors through inhalation of fibers released during active soil disturbance activities and inhalation of fibers in outdoor (ambient) air. If buried vermiculite becomes exposed, increased exposures to LA from soil disturbance might be substantially higher than under current conditions.

Current and anticipated future land uses for the site are an important consideration for the development of RAOs to ensure remedial alternatives are protective of human health and the environment. With the exception of the David Thompson Search and Rescue facility, current land use is recreational. Recreational land use will continue and future commercial and/or light industrial use is also possible. Residential land use is not anticipated. Land use is not expected to change for the embankments along Highway 37 and City Service Road due to steep topography and location within the rights-of-way. Restrictions are often placed on land use to limit activities that could compromise the integrity of the remediation. For example, one of the primary methods to mitigate or limit the liberation of asbestos is to install an effective cover.

RAOs are typically expressed in terms of the contaminant, the concentration of the contaminant, and the exposure route and receptor. RAOs are typically developed by evaluating several sources of information, including results of the risk assessments and tentatively identified ARARs. These inputs provide the basis for determination of whether protection of human health and the environment is achieved for a remedial alternative.

The RAOs for the site presented below are initially based on anticipated future recreational, commercial, and/or light industrial use of the site:

1. Break the exposure pathways for inhalation of LA fibers that would result in unacceptable cancer risk or non-cancer hazard.

2. Control erosion of contaminated soil by wind and water from source locations to prevent exposures and the spread of contamination to unimpacted locations.

3. Implement controls to prevent uses of the site that could pose unacceptable risks to human health or the environment or compromise the remedy.

8.2 Remediation Goals

At a typical federal Superfund site, remedial action is required by EPA when contamination poses cancer risks that exceed 1 in 10,000 (or 1E-04). The RAOs for OU1 address LA contamination that poses cancer risks in the ranges between 1 in 10,000 and 1 in 1,000,000 (1E-06). Remedial goals (RGs) are used to guide such remedial action. RGs are defined as the average concentration of a chemical or a contaminant in an exposure unit associated with a target risk level such that concentrations at or below the RG do not pose an unacceptable risk. However, due to the lack of LA-specific toxicity values, quantitative, risk-based RGs have not yet been developed for OU1, or the remainder of the Libby site.

RGs would normally be developed by computing the concentration of asbestos in soil that corresponds to an excess cancer risk of 1E-04. However, such a computation is not possible at present because of the lack of LA-specific cancer toxicity values and due to the high variability in the relationship between asbestos in soil and asbestos in air. Even if the computations were possible, the ability to measure asbestos in surface and subsurface soil is presently limited by the available technologies and methods. Additionally, non-cancer hazards from inhalation of asbestos fibers have also been recognized, but there are currently no LA-specific non-cancer toxicity values available y to quantify non-cancer hazards for LA asbestos.

For these reasons, RGs for asbestos have not been established for site soils. If the RAOs for asbestos contamination are achieved through implementation of remedial measures mandated by this ROD, then risks to humans from inhalation exposures to asbestos are expected to be acceptable.

Section 9 Description of Alternatives

This section describes the remedial alternatives developed and evaluated in the FS, including a brief explanation of the alternatives developed for OU1. It is organized into three sections: description of remedy components, common elements and distinguishing features, and expected outcomes.

Remedial alternatives were assembled by combining the retained remedial technologies and process options. Exhibit 9-1 provides a comprehensive list of the remedial technologies/process options that were used to develop each remedial alternative. The fundamental site assumptions and factors were also considered during development of the remedial alternatives.

The remedial alternatives evaluated for OU1 are:

- Alternative 1: No Action
- Alternative 2: Institutional/Engineered Controls with Monitoring
- Alternative 3a: In-Place Containment of Contaminated Soil, and ICs with Monitoring
- Alternative 3b: In-Place Containment of Contaminated Soil, Partial Removal of Contaminated Soil for Utility Corridors, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring
- Alternative 4a: Partial Removal of Contaminated Soil, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring
- Alternative 4b: Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring
- Alternative 5a: Partial Removal of Contaminated Soil, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, and ICs with Monitoring
- Alternative 5b: Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, and ICs with Monitoring

The following provides general descriptions of these remedial alternatives, as well as the common elements and distinguishing features of the alternatives.

9.1 Description of Remedy Components

Each of the remedial alternatives was evaluated against the screening criteria in the FS. Complete descriptions of each of these alternatives and the results of the screening are provided in the FS (EPA 2009b).

Exhibit 9-1. Technologies and Process Options Used in Site Remedial Alternatives

Remedy Component Used	Remedial Alternative							
	1	2	3a	3b	4a	4b	5a	5b
In-Place Containment of Contaminated Soil			●	●				
Partial Removal of Contaminated Soil					●	●	●	●
Removal of Contaminated Surface and Subsurface Soil for Utility Corridors				●		●		●
Offsite Disposal at the Former Libby Vermiculite Mine				●	●	●		
Offsite Thermo-Chemical Treatment and Reuse of Treated Material							●	●
ICs and Monitoring		●	●	●	●	●	●	●
Engineered Controls		●						
Five-year Review	●	●	●	●	●	●	●	●

The shaded alternatives were eliminated from consideration prior to detailed analysis

9.1.1 Alternative 1: No Action

A "no action" alternative is required by the NCP to provide an environmental baseline against which impacts of the various remedial alternatives can be compared.

This alternative would discontinue all current remedial activities and no further action would be taken at the site for contaminated soil to address the associated risks to human health or the environment. Five-year site reviews would be performed as required by the NCP to evaluate whether adequate protection of human health and the environment is provided. Monitoring (consisting solely of visual inspections) would be performed as necessary to complete the five-year site reviews. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs.

9.1.2 Alternative 2: Institutional/Engineered Controls with Monitoring

Alternative 2 provides protection of human health through ICs (legal and administrative controls) coupled with engineered controls to restrict access and use of areas having contaminated soil, rather than active cleanup of the site. Monitoring would be performed to ensure these controls are protective.

ICs would be implemented to prevent or restrict site activities or uses that could pose a risk to human receptors. Engineered controls would consist of physical barriers, such as fencing along with warning signs, to exclude access to the site and areas with contaminated soil. Monitoring (consisting of inspections) would be performed to determine protectiveness of the remedy after implementation and to ensure that the remedy components are not compromised in the future.

The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of the engineered controls such as fencing and signage. As part of the O&M, ICs would be evaluated and updated if necessary to ensure protectiveness.
- Monitoring (inspections with sampling and microscopic analysis) would be performed to ensure protection of human health is maintained outside of the fenced areas.
- Five-year site reviews would be performed since contaminated soil is left in place, preventing unrestricted use of the site. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs.

9.1.3 Alternative 3a: In-Place Containment of Contaminated Soil, and ICs with Monitoring

Alternative 3a provides protection of human health through complete in-place containment (protective cover) of the contaminated surface soil within OU1 (Areas 1, 2, and 3). Protective covers used for in-place containment are assumed to be constructed from contaminant-free soil transported from an offsite borrow. These assumptions would be refined at the time of remedial design.

ICs would prevent or restrict site activities or uses that could pose a risk to human receptors and to protect the remedy (protective cover). Engineered controls (e.g., fencing and warning signs) would not be required.

The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain integrity of the protective cover. ICs would be evaluated and updated if needed to ensure protectiveness.
- Monitoring (inspections with sampling and microscopic analysis) would be performed to ensure integrity of the remedy components (backfilled excavations) and the protection of human health.
- Five-year site reviews would be performed since contaminated soil is left in place below the protective cover, preventing unrestricted use of the site.

9.1.4 Alternative 3b: In-Place Containment of Contaminated Soil, Partial Removal of Contaminated Soil for Utility Corridors, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring

Alternative 3b provides protection of human health through complete in-place containment (protective cover) of the contaminated surface soil and partial removal of subsurface contaminated soil within OU1 (Areas 1, 2, and 3). Scope and protectiveness of this alternative is similar to Alternative 3a, apart from partial removal and offsite disposal of subsurface contaminated soil on a limited basis for utility corridors. The purpose of the partial removal would be to provide uncontaminated areas within utility corridors to mitigate potential future risks to workers installing underground utilities. These corridors have not been defined, but the FS assumed that partial removal of subsurface contaminated soil would only be performed within Area 1 and Area 2 and that the corridors would consist of about 10 percent of the surface of these areas. The utility corridors would be excavated and backfilled with uncontaminated material to allow protection to an assumed depth of 5 feet bgs. The removed contaminated soil would be disposed at the former vermiculite mine.

9.1.5 Alternative 4a: Partial Removal of Contaminated Soil, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring

Alternative 4a provides protection of human health through partial removal (excavation) of the contaminated surface soil within OU1 (Areas 1, 2, and 3) and offsite disposal of the removed soil at the former vermiculite mine. Removal of contaminated soil would be conducted to an assumed depth of 12 inches bgs and the soil would be transported offsite and placed in the former vermiculite mine. Removal areas would be backfilled with clean soil transported from an offsite borrow source outside of the Libby valley tested for contamination. These assumptions would be refined at the time of remedial design.

The ICs would be provided to prevent or restrict any activities or uses of the site which could pose a risk to human receptors and to protect the remedy (backfill) put in place. Engineered controls would not be required.

The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of backfilled areas. ICs would be evaluated and updated if necessary to ensure protectiveness.
- Monitoring (inspections with sampling and microscopic analysis) would be performed to ensure the integrity of the remedy components (backfilled excavations) and the protection of human health.
- Five-year site reviews would be performed since contaminated soil is left in place below the backfilled excavations, preventing unrestricted use of the site.

9.1.6 Alternative 4b: Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Disposal at the Former Libby Vermiculite Mine, and ICs with Monitoring

Alternative 4b provides protection of human health through partial removal of contaminated surface soil, additional removal of subsurface contaminated soil, and offsite disposal of the removed soil at the former vermiculite mine. Scope and protectiveness of this alternative is similar to Alternative 4a, apart from partial removal and offsite treatment of subsurface contaminated soil on a limited basis for utility corridors. The purpose of the partial removal would be to provide uncontaminated areas within utility corridors to mitigate potential future risks to workers installing underground utilities. These corridors have not been defined, but the FS assumed that partial removal of subsurface contaminated soil would only be performed within Area 1 and Area 2 and that the corridors would consist of approximately 10 percent of the surface of these areas. The utility corridor would be excavated and backfilled with uncontaminated material to allow protection to an assumed depth of 5 feet bgs. Removal areas would be backfilled with clean soil transported from an offsite borrow source outside of the Libby valley tested for contamination as discussed for Alternative 4a.

9.1.7 Alternative 5a: Partial Removal of Contaminated Soil, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, and ICs with Monitoring

Alternative 5a provides protection of human health through removal of the contaminated surface soil in OU1 (Areas 1, 2, and 3) and treatment of that soil at an offsite facility that demineralizes asbestos fibers using thermo-chemical conversion. Removal of soil would be conducted to an assumed depth of 12 inches bgs. The soil would be transported to the offsite treatment facility for thermo-chemical conversion. TCCT, patented by ARI, is a commercial form of this technology. Contaminated soil would be mixed with proprietary demineralizing agents in a hydrofluoric acid solution. The mixture is then heated in a rotary hearth furnace and the resulting

reaction product (rock-like material) is an inert material that is not fibrous like asbestos. Testing of the reaction product would be performed before removal from the treatment facility to ensure effectiveness. The technology is relatively new so extensive sets of data are not available to confirm long-term irreversibility of the treatment process.

The treated inert material would be returned to the site and used as backfill material for removal areas. Clean soil from an offsite borrow source would be used to supplement inert backfill material derived from the treatment process. These assumptions would be refined at the time of remedial design.

The ICs would be provided to prevent or restrict any activities or uses of the site which could pose a risk to human receptors and to protect the remedy (treated/clean backfill) put in place. Engineered controls would not be needed.

The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain integrity of backfilled areas. ICs would be evaluated and updated if necessary to ensure protectiveness.
- Monitoring (inspections with sampling and microscopic analysis) would be performed to ensure the integrity of the remedy components (backfilled excavations) and the protection of human health.
- Five-year site reviews would be performed since contaminated soil is left in place below the backfilled excavations, preventing unrestricted use of the site.

9.1.8 Alternative 5b: Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, and ICs with Monitoring

Alternative 5b provides protection of human health through partial removal of the contaminated surface soil and additional removal of subsurface contaminated soil within OU1, including Area 1 (Former Export Plant), Area 2 (Riverside Park), and Area 3 (Embankments), and treatment of the removed contaminated soil at an offsite facility that demineralizes asbestos fibers using thermo-chemical conversion.

The purpose of the partial removal would be to provide uncontaminated areas within utility corridors to mitigate potential future risks to workers installing underground utilities at the site. These corridors have not been defined since future land use is uncertain, but the FS assumed that partial removal of subsurface contaminated soil would only be performed within Area 1 and Area 2 and that the corridors would consist of approximately 10 percent of the surface of these areas. The utility corridor

would be excavated and backfilled with uncontaminated material to allow protection to an assumed depth of 5 feet bgs.

9.2 Common Elements and Distinguishing Features of Each Alternative

Common elements and distinguishing features in how the remaining LA contaminated soils at OU1 are addressed under the eight remedial alternatives are discussed below and summarized in Exhibit 9-1.

The main differences in the use of various remedy components in the remedial alternatives relate to the following questions:

- Is contaminated surface soil across the OU capped in place (3a and 3b) or removed (Alternatives 4a, 4b, 5a, and 5b)?
- Is contaminated soil in the utility corridors at OU1 addressed (Alternatives 3b, 4b, and 5b)?
- Is the removed soil disposed at the former mine (Alternatives 4a and b) or is the soil treated and returned to OU1 (Alternatives 5a and 5b)?

9.2.1 In-Place Containment of Contaminated Soil with Covers

Two of the alternatives (3a and 3b) provide protection of human health through complete in-place containment (protective cover) of the contaminated surface soil within OU1, including Area 1 (Former Export Plant), Area 2 (Riverside Park), and Area 3 (Embankments).

9.2.2 Contaminant Removal (Excavation)

Five of the eight alternatives include some degree of contaminant removal. Alternatives 4a and 5a use removal of the upper 12 inches of contaminated surface soils. Removed soil would be transported offsite and placed in the former vermiculite mine. Removal areas will be backfilled with clean soil.

The “b” versions of Alternatives 3, 4, and 5 include the removal of the upper 12 inches of contaminated surface soil. However, these three alternatives also address excavation of contaminated subsurface soils from utility corridors. The purpose of the removal would be to provide uncontaminated areas within utility corridors to mitigate potential future risks to workers installing underground utilities. These corridors have not been defined, but the FS assumed that partial removal of subsurface contaminated soil would only be performed within Area 1 and Area 2 and that the corridors would consist of approximately 10 percent of the surface of these areas. The utility corridors would be excavated and backfilled with uncontaminated material to allow protection to an assumed depth of 5 feet bgs.

9.2.3 Off-Site Disposal

Of the five alternatives (3b, 4a, 4b, 5a, and 5b) that include excavation of contaminated soils, Alternatives 3b, 4a, and 4b are the only alternatives to use off-site disposal (at the former mine). Contaminated soils excavated under Alternatives 5a and 5b are treated off-site and then returned for use as backfill.

9.2.4 Off-Site Treatment Technology

Alternatives 5a and 5b are the only alternatives that employ an off-site treatment technology to address contamination. Contaminated material would be excavated, transported off-site for thermo-chemical treatment, and then returned to the site for use as backfill.

9.2.5 ICs with Monitoring

All alternatives (except Alternative 1) use ICs to prevent unauthorized disturbance of subsoil that could result in exposure to contaminated soils. Long-term O&M is used for all alternatives (except Alternative 1) to ensure the controls are functioning as planned. As part of O&M, the controls would be evaluated and updated if necessary to ensure protectiveness.

9.2.6 Engineering Controls

Engineering controls (i.e., physical barriers, such as fencing along with warning signs, to restrict access to the site and areas with contaminated soil) would be used only for Alternative 2. Those controls prevent or restrict any activities or uses of the site which could pose a risk to human receptors through contact with the remaining surface contamination at the OU. Alternatives 3a through 5b would not require engineering controls as the surface contamination would either be capped or removed.

9.2.7 Five-Year Reviews

For all alternatives, contaminated subsurface soil is left in place – either because it is not addressed (Alternative 1), is addressed only through ICs or engineering controls (Alternative 2), or is left in place below protective covers (Alternatives 3a and 3b) or backfilled excavations (Alternatives 3b, 4a, 4b, 5a, and 5b). Therefore, unrestricted use of the OU is not allowed and all alternatives require the use of five-year site reviews. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs.

Section 10 Comparative Analysis of Alternatives

Each alternative was evaluated in the FS to determine its overall effectiveness, implementability, and cost. Remedial alternatives deemed to have lower than moderate effectiveness, lower than moderate implementability, and/or high cost were eliminated from further consideration. Those alternatives were Alternatives 2, 5a, and 5b. The remaining alternatives (1, 3a, 3b, 4a, and 4b) were retained for detailed analysis against the two threshold criteria and five balancing criteria in the FS. The results of the detailed analysis (Exhibit 10-1) allow a comparative analysis of the alternatives and identify the key tradeoffs between them.

A comparative analysis for the remedial alternatives against the threshold and balancing criteria is described below. Only significant comparative differences between alternatives are presented. The full set of rationale for the qualitative ratings is provided in the FS. A discussion of the modifying criteria is provided in Section 10.3.

10.1 Threshold Criteria

10.1.1 Overall Protection of Human Health and the Environment

Of the five retained alternatives, only the "no action" alternative (Alternative 1) fails to provide protection for human health and the environment and did not address the RAOs for contaminated soil. Thus, this alternative was given a rating of "none."

Alternative 3a address the RAOs for contaminated soil through in-place containment using soil covers coupled with ICs to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health after the remedy is put in place. Since contaminated soil still remain on site and could pose exposure risks if the remedy components are compromised, this alternative was given a rating of "moderate."

Alternative 3b address the RAOs for contaminated soil. Apart from in-place containment using soil covers coupled with ICs; additional partial removal and offsite disposal of subsurface contaminated soil for utility corridors is performed to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health after the remedy is put in place. Contaminated soil still remains on site and could pose exposure risks if the remedy components are compromised. For this alternative, contaminated subsurface soil is partially removed within the utility corridors and disposed offsite which slightly enhances long-term effectiveness and permanence by protecting utility workers, but due to increased volume of contaminated soil handling as compared to Alternative 3a it also reduces the short-term effectiveness of the alternative. Thus, this alternative was also given a rating of "moderate."

Alternative 4a address the RAOs for contaminated soil through removal and offsite disposal with ICs to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that protection of human health is ensured after the remedy is put in place. Contaminated soil still remains on site and could pose exposure risks if the remedy components are compromised. For this alternative, contaminated soil is removed and disposed offsite which slightly enhances long-term effectiveness and permanence, but due to increased volume of contaminated soil handling as compared to Alternative 3b it also reduces the short-term effectiveness of the alternative. Thus, this alternative was also given a rating of "moderate."

Alternative 4b address the RAOs for contaminated soil. Apart from removal of contaminated surface soil and offsite disposal coupled with ICs; additional partial removal and offsite disposal of contaminated subsurface soil for utility corridors is performed to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that protection of human health is ensured after the remedy is put in place. Contaminated soil still remains on site and could pose exposure risks if the remedy components are compromised. For this alternative, contaminated soil are removed and disposed offsite which slightly enhances long-term effectiveness and permanence, but due to increased volume of soil handling as compared to Alternative 4a it also reduces the short-term effectiveness of the alternative. Thus, this alternative was also given a rating of "moderate."

10.1.2 Compliance with ARARs

Alternative 1 fails to be compliant with the chemical-specific ARARs identified for the site since no action is taken. Thus, this alternative was given a rating of "none."

Alternatives 3a, 3b, 4a and 4b would address the chemical-, location, and action-specific ARARs through adherence of the ARARs during implementation of the remedial action. Based on the current assumptions, compliance with the potential ARAR of National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61 Subpart M regarding cover construction and engineered controls would be met by using the provision contained in 40 CFR 61.151(c). These alternatives were given a rating of "moderate to high."

Exhibit 10-1. Summary of Comparative Analysis of Alternatives

Remedial Alternative	***Description***	***Threshold Criteria***		***Balancing Criteria***					
		Overall Protection of Human Health and the Environment	***Compliance with ARARs***	***Long-Term Effectiveness and Permanence***	***Reduction of Toxicity, Mobility, or Volume through Treatment***	***Short-Term Effectiveness***	***Implement-ability***	***Present Value Cost (Dollars)***	
1	No Action	⓪	⓪	⓪	⓪	⓪	❺	$	$104,000
3a	In-Place Containment of Contaminated Soil, and ICs with Monitoring	❸	❹	❸	⓪	❸	❸	$$	$2,514,000
3b	In-Place Containment of Contaminated Soil, Partial Removal of Contaminated Soil for Utility Corridors, Offsite Disposal, and ICs with Monitoring	❸	❹	❹	⓪	❷	❷	$$	$3,007,000
4a	Partial Removal of Contaminated Soil, Offsite Disposal, and ICs with Monitoring	❸	❹	❸	⓪	❷	❷	$$	$3,291,000
4b	Partial Removal of Contaminated Soil, Additional Removal for Utility Corridors, Offsite Disposal, and ICs with Monitoring	❸	❹	❹	⓪	❶	❷	$$	$3,938,000

Note:
The detailed analysis of retained alternatives involves a qualitative assessment of the degree to which remedial alternatives address evaluation criteria presented in the FS along with detailed cost spreadsheets (cost summaries, present value analyses, and cost worksheets) for qualitative assessment.

Threshold and Balancing Criteria: ⓪ **None,** ❶ **Low,** ❷ **Low to Moderate,** ❸ **Moderate,** ❹ **Moderate to High,** ❺**High**

Balancing Criteria Present Value Cost in $: ⓪ None**,** $ Low ($0 through $2M), $$ Low to Moderate ($2M through $5M), $$$ Moderate ($5M through $8M), $$$$ Moderate to High ($8M through $105M), $$$$$ High (Greater than $10M)

10.2 Balancing Criteria

10.2.1 Long-Term Effectiveness and Permanence

Alternative 1 fails to provide long-term effectiveness and permanence since no action is taken. Thus, this alternative has a rating of "none."

Alternative 3a provide protection of human health through in-place containment of contaminated soil using covers coupled with ICs to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health onsite. Since contaminated soil is covered but is otherwise left in place, persons could be exposed to the contaminated soil if the integrity of the cover is compromised. Thus, long-term effectiveness and permanence is not as certain as for remedies that remove contaminated soil from the site. Thus, this alternative has a rating of "moderate."

Alternative 3b provides slightly higher protection to human health (such as utility workers) by partial removal and offsite disposal of subsurface contaminated soil within utility corridors. Thus, long-term effectiveness and permanence of this alternative is slightly better than Alternative 3a, even though contaminated soil is covered and left in place. Thus, this alternative has a rating of "moderate to high."

Alternative 4a provide protection of human health through removal of contaminated surface soil and offsite disposal with ICs to prevent contact with residual contaminated soil posing potential human health risks. Monitoring would be performed to ensure protection of human health is ensured after the remedy is put in place. Even though the contaminated surface soil is removed (to an assumed depth of 12 inches) and disposed offsite, long-term effectiveness and permanence of this alternative for the site is not certain because contaminated soil below the removal depths, if disturbed, could allow continued release of asbestos fibers to unimpacted media (primarily soil and air). Thus, this alternative has a rating of "moderate."

Alternative 4b provides slightly higher protection to human health (such as utility workers) by partial removal and offsite disposal of subsurface contaminated soil in utility corridors. Thus, long-term effectiveness and permanence of this alternative is slightly better than Alternative 4a, even though contaminated soil is left in place below the removal depths. Thus, this alternative has a rating of "moderate to high."

10.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment

All of the retained alternatives fail to provide a reduction of toxicity, mobility, or volume through treatment since treatment is not a component of these alternatives. Thus, all of the retained alternatives were given a rating of "none."

10.2.3 Short-Term Effectiveness

Alternative 1 fails to provide short-term effectiveness since no action is taken. Thus, this alternative was given a rating of "none."

Alternative 3a addresses the short-term risks to workers, the community, and the environment. ICs could be quickly implemented to address potential exposure by the community to contaminated soil. Construction of covers would be implemented shortly after the implementation of ICs to protect the community and the environment. Duration of construction of covers would be shorter in comparison to Alternative 3b and short-term risks to workers would be mitigated through the use of safety measures such as water-based dust suppression and personal protective equipment. Trucks used to haul offsite borrow used to construct the covers slightly increases short-term risks to the community. Thus, this alternative has a rating of "moderate."

Alternative 3b addresses the short-term risks to workers, the community, and the environment. ICs could be quickly implemented to address potential exposure by the community to contaminated soil Alternative 3b would have a longer construction duration than Alternative 3a as well as an increased volume of clean borrow and contaminated soil to be transported onsite and offsite, respectively, which poses additional risks to workers and the community. The increased truck use to haul clean and contaminated soil would increase short-term risks to the community over Alternative 3a. Thus, this alternative has a rating of "low to moderate."

Alternative 4a involves removal of contaminated surface soil and offsite disposal with ICs to prevent contact with residual contaminated soil posing potential human health risks. Monitoring would be performed to ensure that protection of human health is ensured after the remedy is put in place. Removal and offsite disposal across the site requires disturbance of a large amount of contaminated soil, which poses increased short-term risks to workers as well as to the surrounding community. In addition to trucks hauling contaminated soil offsite, trucks for hauling offsite backfill material are also required which pose additional risks to workers and the community. Since this alternative requires much more disturbance of contaminated soil as compared to the Alternative 3a or 3b, short-term impacts to workers and the community are potentially increased. Thus, this alternative has a rating of "low to moderate."

Alternative 4b requires removal of contaminated surface soil as well as partial removal of subsurface contaminated soil within utility corridors. Compared to Alternative 4a, there is an increased volume of contaminated soil and clean backfill soil which needs to be hauled. Since this alternative requires much more disturbance of contaminated soil as compared to the Alternative 4a, short-term impacts to workers and the community are potentially increased. Thus, this alternative has a rating of "low."

10.2.4 Implementability

Alternative 1 has no action taken other than five-year site reviews, which can be readily implemented. Thus, this alternative has a rating of high.

Alternative 3a requires in-place containment of contaminated soil using covers over the entire site. The construction resources and materials needed to construct the covers for this alternative should be available. Maintenance of the covered areas and monitoring would be relatively easy. However, a large amount of offsite borrow would be required to construct the covers from an offsite source outside of the Libby valley. Thus, this alternative has a rating of "moderate."

Alternative 3b requires in-place containment of contaminated soil using covers over the entire site as well as partial removal of subsurface contaminated soil within utility corridors. The construction resources and materials needed to construct the covers and excavation backfill for this alternative should be available. Maintenance of the covered areas and monitoring would be relatively easy. However, compared to Alternative 3a larger amounts of offsite borrow would be required to construct the covers and backfill the excavations from an offsite source outside of the Libby valley. Thus, this alternative has a rating of "low to moderate."

Alternative 4a primarily involves removal of contaminated surface soil across the entire site and offsite disposal with ICs and monitoring to prevent contact with residual contaminated soil posing potential human health risks. Removal and offsite disposal of contaminated soil could be difficult in areas close to structures and utilities. Under this alternative there is a slight increase in volume of material requires handling (offsite hauling of excavated contaminated soil and hauling of clean backfill material) as compared to Alternative 3b. Overall implementability of this alternative is similar to Alternative 3b. Thus, this alternative has a rating of "low to moderate."

Alternative 4b primarily involves removal of contaminated surface soil across the entire site along with partial removal of subsurface contaminated soil within utility corridors. Under this alternative, there is a considerable increase in volume of material that requires handling (offsite hauling of excavated contaminated soil and hauling of clean backfill material) as compared to Alternative 4a. However the additional volume should not make this alternative much more difficult to implement than Alternatives 3b or 4a. Thus, this alternative has a rating of "low to moderate."

10.2.5 Cost

Present value costs for all alternatives were evaluated over a 30-year period (Years 1 through 30). The present value cost for Alternative 1 was given a rating of "low." The present value cost for this alternative is approximately $104,000. The present value cost for Alternative 3a was given a rating of "low to moderate." The present value cost for this alternative is approximately $2,514,000. The present value

cost for Alternative 3b was given a rating of "low to moderate." The present value cost for this alternative is approximately $3,007,000. The present value cost for Alternative 4a was given a rating of "low to moderate." The present value cost for this alternative is approximately $3,291,000. The present value cost for Alternative 4b was given a rating of "low to moderate." The present value cost for this alternative is approximately $3,938,000.

10.3 Modifying Criteria

The final criteria for evaluation of the alternatives are state and public acceptance. These criteria were applied after review of the input received during the public comment period for EPA's proposed plan for clean up at OU1. The comment period was open from September 7, 2009 through January 16, 2010. Submissions were made by individuals or groups. Four of the submissions were specific to OU1 and nine submissions addressed both OU1 and OU2. A synopsis of the comments received and EPA's responses to them is provided in the Responsiveness Summary (Part 3 of this document). The following summarizes the overall nature of the comments relevant to OU1 and how the modifying criteria affected the remedy.

10.3.1 State Acceptance

Representatives of MDEQ provided input in the RI, FS, proposed plan, and ROD through review of these documents. Their comments were incorporated before the documents were released to the public. The State of Montana, through the MDEQ, supports EPA's preferred alternative for remediation of OU1.

In their comments to EPA, MDEQ indicated that they supported EPA's proposed plan, including the preferred alternative detailed therein. MDEQ did provide several comments, which are addressed in the Responsiveness Summary. They include: a concern about EPA's use of visible vermiculite as a clean-up standard and as a trigger for additional investigation/remediation for OU1, a desire to document that the selected remedy will break all exposure pathways to be protective until a quantitative risk assessment is performed and cleanup levels are established, a desire to have ICs specified in as much detail as possible in the remedial design, and a desire to limit risk to less that 1x10-5.

EPA provided explanation and clarification for these comments in the Responsiveness Summary. However, no modification of the selected remedy was necessary as a result of these comments.

10.3.2 Public Acceptance

The City of Libby, the City-County Board of Health for Lincoln County, and the CAG submitted public comments indicating that they preferred not taking action until a final cumulative risk assessment is available but were accepting of the selected remedy as an interim decision for OU1. Their comments focused primarily on the

need for EPA to work with local government during remedial design and action, concerns about risk, and concerns about the ongoing effectiveness and protectiveness of the remedy.

Public comments were also received from two citizens groups (via one comment letter) that indicated their opposition to the preferred alternative presented in the proposed plan. These comments focused on the lack of contaminant-specific information needed for risk assessment which they believe makes the ROD premature, concern about analytical detection levels, questions about the boundaries and scope of the cleanup, concerns about the completeness and long-term effectiveness of the remedy, concerns regarding recontamination, issues with the boat ramp and highway, and questions about current exposures in Libby.

Finally, public comments were received from members of the public who were not for or against the preferred alternative but who wanted to ensure that their concerns were heard. These comments included a need to require restoration as part of any remedy, a need for plans to address access to the river, and a request for clarification on the contamination status of the Search and Rescue building.

10.3.3 Modifications Made as a Result of Comment

As with the comments from the State of Montana, comments from the general public were addressed through clarification and explanation. Based on these comments and the general tone of discourse in public meetings held to date, EPA has made a number of changes to the original proposal, including:

- **Risk Assessment.** EPA will conduct a quantitative, site-wide risk assessment, to include ABS, at OU1 after construction is complete and toxicity values are available to confirm effectiveness of the remedy.

- **New Information**. When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. In addition, EPA will conduct five-year reviews as part of the ongoing O&M of the remedy.

- **Planned Future Uses**. EPA will work closely with the City of Libby during design so that design can complement any planned future uses.

- **Removal of Contamination at Depth in Excavations**. If LA source materials are encountered during excavation, removal will continue until the source material is removed (to a maximum of 3 feet). If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling.

Section 11 Principal Threat Wastes

Principal threat wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present significant risk to human health or the environment should exposure occur. The LA contaminated soil and LA waste at OU1 is considered a principal threat waste. This material is the source for LA and acts as a source for direct exposure when these materials are encountered. As such, the waste would present a significant risk to human health should exposure occur.

The selected remedy will eliminate the exposure to the source materials by removing the waste in surface soils and in potential utility corridors and by breaking the exposure pathway associated with disturbance of the source materials by in-place containment (covers to contain contaminated soil). ICs will provide assurance that the integrity of the remedy will be protected. While the NCP establishes an expectation that EPA will use treatment to address any principal threat waste, the use of treatment technologies for asbestos containing soils is cost prohibitive for the site.

Section 12 Selected Remedy

Based on consideration of the CERCLA requirements, the detailed analysis of remedial alternatives, state comments, and all public comments (see Part 3, Responsiveness Summary), EPA has determined that the preferred remedial alternative presented in the proposed plan for OU1 is the appropriate remedy for OU1. That remedy is a combination of *Alternative 3b (In-Place Containment of Contaminated Soil, Removal of Contaminated Soil for Utility Corridors, Offsite Disposal, and ICs with Monitoring)* and *Alternative 4a (Partial Removal of Contaminated Soil, Offsite Disposal, and ICs with Monitoring).*

The primary components of the selected remedy are those found in Alternative 3b (in-place containment of contaminated soil across the OU and additional removal of subsurface contaminated soil from utility corridors in Area 1 and Area 2). Alternative 4a was added to the selected remedy because it provides added protection of human health through partial removal of contaminated soil (primarily surface soil). Combining Alternatives 3b and 4a provides EPA the flexibility to accommodate future land uses, as the City of Libby more clearly defines redevelopment options in a future land use plan. For example, future land use might include construction of a structure that would necessitate excavation for a foundation. In that event, it would be important to have a remedial option that allows for at depth removal in selected areas rather than just in utility corridors.

12.1 Short Description of the Selected Remedy

The selected remedy described in this ROD is a containment and removal remedy that addresses protectiveness across the entire OU. Disposal of removed contaminated soil would off site. Riprap would be removed and replaced if necessary to ensure permanence. Long-term O&M would be required to maintain the integrity of the covers, backfilled areas and riprap.

ICs will be used to minimize risks posed to human receptors from remaining LA in soils and also to ensure that covers are not damaged. The controls may allow residential, commercial, and recreational land use, but will limit uses that might damage the remedy. EPA anticipates that the ICs will include governmental, proprietary, and informational controls such as community awareness programs (e.g., ads, handouts, contractor training, EPA Information Center, ERS program). Monitoring (inspections) and five-year site reviews would continue to evaluate effectiveness of the remedy.

When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). If unacceptable exposures are identified, EPA will take action as necessary to ensure

that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs.

The remedy reduces long-term risk of exposure to LA at the OU by eliminating complete exposure pathways. This ensures that residents, commercial workers, and low-intensity users have no more than a 1×10^{-4} chance of contracting cancer from inhalation of LA in onsite soils and that those users are also protected against non-cancer effects from inhalation of LA in soils. The selected remedy also reduces risks to terrestrial ecological receptors through control of LA.

EPA will also work closely with the City of Libby during design so that the remedy can complement any planned future uses. EPA will also conduct a risk assessment at OU1, once toxicity factors are available, to confirm effectiveness of the remedy.

12.2 Rationale for the Selected Remedy

The selected remedy provides the best balance of tradeoffs among the alternatives and attains an equal or higher level of achievement of the threshold and balancing criteria than other site-wide alternatives that were evaluated. It achieves substantial risk reduction and is feasible, implementable, and has long-term cost-effectiveness. Residual risks are effectively eliminated, mitigated, or managed under the selected remedy. The successful performance of the remedy is confirmed by past experience with removal and covering of contaminant sources at the site.

The selected remedy provides a comprehensive cleanup and includes requirements for ICs and operation and maintenance. The selected remedy will be subject to continual re-evaluation, as we learn more about LA, to ensure protectiveness of the remedy into the future. This will include any reevaluation based on possible improvements to the technology to detect LA in soils.

As important as it is to take action now to prevent continued human exposure to LA, EPA recognizes the importance of new information as our knowledge about the affects of LA grows through further investigation. EPA will review the protectiveness of the remedy at least every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). Although EPA does not anticipate any future modifications to the selected remedy, additional response actions will be taken as necessary to protect public health and the environment.

12.3 Detailed Description of the Selected Remedy

As discussed earlier, the selected remedy provides protection of human health by addressing LA contamination in surface soil and in the subsurface utility corridors. The remedy also maintains and protects remedies put in place under past response

actions. Details of the selected remedy are provided below. They may be modified in the remedial design and construction processes.

When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, covers, and/or strengthening ICs.

EPA will also work closely with the City of Libby during design so that the remedy can complement any planned future uses. EPA will also conduct a risk assessment at OU1, once toxicity factors are available, to confirm effectiveness of the remedy.

12.3.1 Containment and Removal

The majority of the remediation work at the OU will consist of containment via construction of soil covers over areas of surface contamination. The FS anticipated that approximately 9 acres of the site would be covered. Soil covers will be used because of ease of installation, availability of borrow soil resources, and affordability compared to other types of covers (e.g., geosynthetic or concrete/asphalt). The cover thickness and materials used will be refined in the remedial design process. The cover will be seeded to minimize erosion. A visible marker layer will be placed at the bottom of the cover to denote the extent of the cleanup.

Removal and offsite disposal of contaminated materials will be used in the proposed utility corridor areas which are expected to encompass approximately 10 percent of Areas 1 and 2. Additionally, by adding Alternative 4a to the selected remedy, EPA obtains the flexibility to remove other areas of contamination that may need to be removed preemptively due to land use issues. The FS estimated that approximately 22,250 loose cy of contaminated soil would be removed. This did not include the additional areas under Alternative 4a.

Clean fill for excavations and construction of covers will be obtained from offsite subsoil and topsoil sources outside of the Libby valley (used for the ongoing Libby cleanup efforts). The FS estimated that approximately 22,600 loose cy of backfill and 14,550 loose cy of topsoil would be required for excavations and covers. Final quantities will be determined in the design process and may differ significantly.

During construction, water-based dust suppression would likely be used to prevent asbestos fibers from becoming airborne. Chemicals could be used as an alternative to water, if necessary.

12.3.2 ICs

ICs, or land use restrictions, are often placed on properties to limit activities that could compromise the integrity of the remedy. ICs such as restrictive covenants,

zoning ordinances, easements, deed restrictions, and public information serve to limit use of reclaimed areas to acceptable activities or guide behavior to avoid exposures that may exceed health-based levels. ICs also provide for an orderly transfer of land use, such as when open space lands may be proposed for commercial or industrial use. ICs also provide for the proper transfer of ownership so that land restrictions are clear when ownership changes. The controls may allow residential, commercial, and recreational land use, but will limit uses that might create an exposure pathway or damage the remedy.

For OU1, ICs will be used to restrict use of areas containing contaminated soil, including subsurface soil covered under previous response actions and subsurface contamination remaining below excavated areas. EPA anticipates that ICs for OU1 will include governmental and/or proprietary land use restrictions, and informational devices. Governmental ICs, for example, may impose land or resource restrictions using government authority, such as building codes, permits, or zoning regulations that are administered by local agencies. Proprietary controls, either private, governmental, or a combination of the two, typically involve landowner agreements or easements that restrict certain activities on the property.

A utility locate service, such as U-Dig, may also be considered as a way to notify anyone disturbing the ground that asbestos contamination may be found below the ground surface. U-Dig is a local service that people call at no cost before digging at their property to locate underground hazards (e.g., electrical lines). U-Dig could add "known areas of subsurface vermiculite at OU1" to their database of underground hazards using information provided by EPA. Advice on how to address the contamination, if disturbance is required, would be obtained from the ERS. The ERS is a position currently staffed in Libby by EPA which may be transitioned to another government entity when remedial action across the Libby site is complete. In addition to providing advice and instruction, the ERS will manage any contamination encountered. Additional informational devices include the EPA Information, ad, handouts, and contractor training classes. Specific details will be developed in the remedial design process.

EPA will work closely with the MDEQ, the City of Libby, MDT, and the City and County Board of Health in the remedial design process to ensure that the controls selected will be implementable and will achieve the desired results. ICs are considered an integral part of the remedy, so development and implementation of the ICs will be conducted as part of the remedial action. Response actions are funded through a settlement with Grace.

12.3.3 Operations and Maintenance

Long-term O&M will be required to maintain the integrity of the engineered controls, backfilled areas, and covers, including covers placed during previous response

actions and as part of this remedy. Monitoring will be used to ensure these controls are protective.

12.4 Estimated Cost of the Selected Remedy

As discussed in Section 10, present value cost for the combination of Alternative 3b and 4a is approximately $3,447,000. The estimated capital costs are $3,295,000 and O&M and five-year review costs (for the first 30 years) are $955,000. The construction timeframe is estimated to be one to two construction seasons (May to October). Exhibit 12-1 presents the cost estimate summary for the selected remedy, including the present value analysis on a year by year basis.

12.5 Expected Outcomes of the Selected Remedy

The selected remedy will achieve acceptable exposure risks through a combination of containment and removal. The remedy is expected to address the most significant contaminant sources. Risks to human health from inhalation of contaminated soil will be eliminated or reduced to acceptable levels. Exposure to contaminated soil remaining will be controlled by limiting access and use of ICs to address potential future uses.

The selected remedy will allow OU1 to continue to be used for non-residential purposes. It employs the use of covers to contain contamination and prevent direct contact. Because certain activities (e.g., off-road vehicle use) can compromise covers, ICs will be used to limit those activities thereby preserving the integrity of the covers and limiting potential exposure.

12.6 Performance Standards

Current analytical capabilities are insufficient to adequately characterize concentrations of LA in soil, particularly at concentrations of less than 0.2%. Additionally, there is not an established relationship between concentrations of LA in soil and concentrations of LA in air. Given these analytical constraints, the performance standard will be based on an estimate of risk calculated for the soil-to-air exposure pathway following implementation of the remedy. That risk will be estimated using air samples collected during activity based sampling for both workers at the David S. Thompson Search and Rescue facility and workers or visitors to the property who may disturb soil. The acceptable risk range is between 1E-04 to 1E-06.

Exhibit 12-1. Cost Estimate Summary for Selected Remedy

Year[1]	Capital Costs	Capital Costs (Earthwork)	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[2]	Present Value[3]
0	$0	$0	$0	$0	$0	$0
1	$61,000	$3,234,000	$0	$0	$3,295,000	$3,079,507
2	$0	$0	$23,000	$0	$23,000	$20,088
3	$0	$0	$23,000	$0	$23,000	$18,775
4	$0	$0	$23,000	$0	$23,000	$17,547
5	$0	$0	$23,000	$48,000	$71,000	$50,623
6	$0	$0	$23,000	$0	$23,000	$15,325
7	$0	$0	$23,000	$0	$23,000	$14,322
8	$0	$0	$23,000	$0	$23,000	$13,386
9	$0	$0	$23,000	$0	$23,000	$12,510
10	$0	$0	$23,000	$48,000	$71,000	$36,089
11	$0	$0	$23,000	$0	$23,000	$10,927
12	$0	$0	$23,000	$0	$23,000	$10,212
13	$0	$0	$23,000	$0	$23,000	$9,545
14	$0	$0	$23,000	$0	$23,000	$8,919
15	$0	$0	$23,000	$48,000	$71,000	$25,730
16	$0	$0	$23,000	$0	$23,000	$7,790
17	$0	$0	$23,000	$0	$23,000	$7,282
18	$0	$0	$23,000	$0	$23,000	$6,806
19	$0	$0	$23,000	$0	$23,000	$6,360
20	$0	$0	$23,000	$48,000	$71,000	$18,346
21	$0	$0	$23,000	$0	$23,000	$5,555
22	$0	$0	$23,000	$0	$23,000	$5,191
23	$0	$0	$23,000	$0	$23,000	$4,851
24	$0	$0	$23,000	$0	$23,000	$4,533
25	$0	$0	$23,000	$48,000	$71,000	$13,078
26	$0	$0	$23,000	$0	$23,000	$3,961
27	$0	$0	$23,000	$0	$23,000	$3,701
28	$0	$0	$23,000	$0	$23,000	$3,459
29	$0	$0	$23,000	$0	$23,000	$3,234
30	$0	$0	$23,000	$48,000	$71,000	$9,329
TOTALS:	$61,000	$3,234,000	$667,000	$288,000	$4,250,000	
TOTAL PRESENT VALUE OF ALTERNATIVES 3b and 4a [4]						$3,447,000

Notes:

1 Duration is assumed to be 30 years for present value analysis.
2 Total annual expenditure is the total cost per year with no discounting.
3 Present value (PV) is the total cost per year including a 7.0% discount factor for that year.
4 Total PV is rounded to the nearest $1K. Inflation and depreciation are excluded from the PV cost.
Costs presented are expected to have accuracy between -30% to +50% of actual costs, based on the scope. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation.

Section 13 Statutory Determinations

Under CERCLA Section 121 and the NCP, EPA must select a remedy that is protective of human health and the environment, complies with or appropriately waives ARARs, is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that include treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the selected remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy includes components to address human health and environmental risks associated with residual LA at OU1. Unacceptable human health or environmental risks will be addressed. The selected remedy will be monitored and maintained through comprehensive programs using ICs, monitoring, and maintenance. There are no short-term threats associated with the selected remedy that cannot be readily controlled through applicable health and safety requirements, monitoring, and standard construction practices. In addition, no adverse cross-media impacts are expected from the selected remedy.

The selected remedy will protect human health and the environment through consolidation and covering to eliminate a complete exposure pathway for inhalation at the OU. Removal of contaminated soils will be used in selected areas (i.e., utility corridors and other as yet unspecified areas that may require a removal based on proposed land use). Protection will be maintained via a comprehensive O&M plan. ICs will be implemented to ensure that the remedy is not disturbed inappropriately.

13.2 Compliance with ARARs

ARARs are determined based on analysis of which requirements are applicable or relevant and appropriate to the distinctive set of circumstances and actions contemplated at a specific site. The NCP requires that ARARs be attained during the implementation and at completion of the remedial action. A summary of federal and state ARARs for the OU1 ROD is attached as Appendix A.

The selected remedy would address the chemical-, location, and action-specific ARARs through adherence of those ARARs during implementation of the remedial action. The overall rating for the selected remedy on compliance with ARARs is "moderate to high." Exhibit 13-1 presents the evaluation criteria considerations and the justification for the rating.

Exhibit 13-1. Evaluation of Compliance with ARARs for Selected Remedy

Evaluation Criteria Considerations for Compliance with ARARs	Justification for Rating
Compliance with Chemical-Specific ARARs	■ Contaminated surface soil contained in-place with covers along with removal of contaminated soil and offsite disposal coupled with backfilled excavations would physically address contaminant sources and prevent discharges of asbestos fibers to air, thus meeting visible emissions requirements of NESHAP and chemical-specific ARARs for air.
Compliance with Location-Specific ARARs	■ Addressed during implementation of the RA.
Compliance with Action-Specific ARARs	■ Addressed during implementation of the RA. Specifically, as per EPA's determination the cover requirements specified under NESHAP (40 CFR 61.151) are a potential consideration as a relevant and appropriate ARARs for the site and would be in compliance with this ARAR as allowed under 40 CFR 61.151(c) and 40 CFR 61.151(b), respectively.

13.2.1 Contaminant Sources

No permits will be necessary to implement a remedial action within the site boundary of OU1 in accordance with Section 121(e) of CERCLA; however, the substantive requirements of the permits will be followed.

13.2.2 Surface Water

The State of Montana has promulgated specific water quality standards applicable to the use designation of the Kootenai River. Montana's non-degradation standard applies.

Stormwater discharge best management practices (BMPs) will be implemented during construction based on site-specific evaluation. The BMPs will allow the surface water ARARs to be met. This will require adherence to the substantive requirements of the general stormwater permits for certain activities and refer to the requirement of BMPs to minimize or prevent discharge that may adversely affect human health or the environment. As noted in Section 7.5, an ecological risk assessment is being developed at OU3. EPA will build upon that information to identify potential exposure pathways and receptors to evaluate ecological risk at OU1.

13.2.3 Other ARARs

Several federal location-specific ARARs are applicable to OU1 and will be met by the selected remedy through consultation with the appropriate state and federal agencies and other resources. These ARARs include a variety of acts designed to protect endangered species, bald eagles, and migratory birds and encourage historic,

archeological, and antiquities preservation. EPA will involve the U.S. Fish and Wildlife Service and historical preservation agencies in remedial design to ensure compliance with these ARARs.

Federal and state standards for air[1] are both contaminant and action-specific ARARs at OU1. These standards are applicable to releases of particulate matter during remediation. EPA anticipates that these ARARs can be met through the implementation of appropriate standard operating procedures and monitoring.

13.3 Cost Effectiveness

In EPA's judgment, the selected remedy is cost effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost effective if its costs are proportional to its overall effectiveness" [NCP §300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the overall effectiveness of the selected remedy and comparing that effectiveness to the overall costs. Overall effectiveness was evaluated by examining how the selected remedy meets three of the balancing criteria in combination – long-term effectiveness and permanence; reduction in toxicity, mobility, and volume; and short-term effectiveness. Overall effectiveness of the remedial alternatives was then compared to costs to determine cost effectiveness.

It is important to note that more than one cleanup alternative may be cost effective, and that Superfund does not mandate the selection of the *most* cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria nor is it necessarily the least costly alternative that is both protective of human health and the environment and ARAR compliant.

Net present value costs for each alternative were compared in the FS, and a range of costs for each alternative was developed that represents the range and possible scope of actions. The cost of the selected remedy is expected to be 3,447,000. EPA believes an appropriate balance between cost effectiveness and adequate protectiveness is achieved in the selected remedy.

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

This determination looks at whether the selected remedy provides the best balance of trade-offs among the alternatives with respect to the balancing criteria set forth in

[1] Federal Clean Air Act(40 CFR 50.6) and Clean Air Act of MT (ARM 17.8.233)

NCP §300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanence and treatment can be practicably utilized at this site. NCP §300.430(f)(1)(ii)(E) provides that the balancing shall emphasize the factors of "long-term effectiveness" and "reduction of toxicity, mobility, or volume through treatment," and shall consider the preference for treatment and bias against offsite disposal. The modifying criteria were also considered in making this determination.

Of the alternatives evaluated that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against offsite treatment and disposal, and considering state and community acceptance. Based on the evaluation in the FS, treatment technologies are not cost-effective at OU1. The use of active treatment increases the cost of the remedy by over 600%.

Protection and long-term effectiveness are achieved through maintenance, monitoring, and ICs. The selected remedy is expected to provide short-term effectiveness with a low level of risk to the community, cleanup workers, and the environment. It is also highly implementable.

13.5 Preference for Treatment as a Principal Element

Treatment does not constitute a major component of the remedy for OU1 and the selected remedy does not satisfy the statutory preference for treatment as a principal element. Although EPA has an expectation for treatment whenever principal threat wastes are present on a site (as at OU1), treatment is not a viable option at OU1 for the reasons presented in Section 13.4.

13.6 Five-Year Reviews

Because the selected remedy results in contaminants remaining on site (although under covers) above levels that allow for unlimited use and unrestricted exposure (based on what is currently known), a statutory review will be conducted pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C). EPA shall conduct a review of remedial actions no less often than every five years after the initiation of such remedial action to assure that the remedy is, or will be, protective of human health and the environment.

The five-year reviews will include any additional information related to human health or ecological risk that is developed during the period covered by the review. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs.

Once EPA identifies toxicity factors for LA, EPA will reevaluate this remedy to ensure continued protectiveness. Although EPA does not anticipate further remedial action following implementation of this remedy, additional work may be conducted as necessary to ensure protectiveness.

Section 14 Documentation of Significant Changes

The proposed plan for OU1 was released for public comment in September 2009. It identified Alternative 3b as the preferred alternative. That alternative is described herein as the selected remedy. The public comment period was extended from 30 to 120 days, and EPA reviewed all written and verbal comments submitted during that comment period. It was determined that no significant changes to the remedy, as originally identified in the proposed plan, were necessary.

The following points of clarification were made:

- **Risk Assessment.** EPA will conduct a quantitative, site-wide risk assessment, to include ABS, at OU1 after construction is complete and toxicity values are available to confirm effectiveness of the remedy.

- **New Information**. When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). New information concerning toxicity factors will also be evaluated in five-year reviews. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. In addition, EPA will conduct five-year reviews as part of the ongoing O&M of the remedy.

- **Planned Future Uses**. EPA will work closely with the City of Libby during design so that design can complement any planned future uses.

- **Removal of Contamination at Depth in Excavations**. If LA source materials are encountered during excavation activities, removal will continue until the source material is removed (to a maximum of 3 feet). If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling.

Section 15 References

EPA 2009a, Final Remedial Investigation Report, Operable Unit 1 - Former Export Plant, Libby Asbestos Site, Libby, Montana, prepared for EPA by CDM Federal Programs Corporation.

_____ 2009b, Final Feasibility Study Report Operable Unit 1 - Former Export Plant, Libby Asbestos Site, Libby, Montana, prepared for the EPA by CDM Federal Programs Corporation.

RECORD OF DECISION

FOR

LIBBY ASBESTOS SUPERFUND SITE

THE FORMER EXPORT PLANT

OPERABLE UNIT 2

LINCOLN COUNTY, MONTANA

Part 3
Responsiveness Summary

Section 1 Introduction

Based on the RI for the OU1, EPA believes it is prudent to move forward and take remedial action to reduce exposure and protect public health. Removal and/or capping of contaminated soil mitigates potential current and future human exposure pathways that contribute to an unacceptable risk at these locations. EPA recognizes there are uncertainties with the proposed plan, but believes the public health benefit outweighs the alternative of taking no action at this time.

EPA continues to study the effects of LA contamination on human health and the environment. While these important investigations are underway, current findings show that it is necessary to move forward with a remedy at OU1 to mitigate continued exposure to asbestos.

The most significant human exposure pathway of concern is inhalation of LA from contaminated soil that may become airborne as the soil is disturbed. The selected remedy uses proven techniques (removal and capping) to break the soil-to-air pathway. Breaking the pathway will result in significantly reduced exposure to LA. In addition to breaking exposure pathways from surface soil, the selected remedy will also ensure that potentially contaminated subsurface soil will be managed to prevent further exposure, if it is disturbed in the future.

EPA believes it is important to proceed with a comprehensive remedy to protect human health from known exposure to LA. This remedy will address both surface and subsurface soil. This approach will also provide ICs and define maintenance requirements for any contamination left in place.

ICs will be used to minimize risk to people from any potential remaining contamination. They will also serve to ensure that the remedy is not damaged. The ICs may allow residential, commercial, and recreational land use, but will limit uses that might compromise the remedy. Long-term maintenance of the backfilled areas and covers, including covers placed during previous response actions, will be required. Monitoring will be used to ensure the ICs are protective into the future.

To confirm the effectiveness of the selected remedy, EPA will conduct a risk assessment following construction of the remedy once the necessary toxicity values have been developed. The risk assessment will include ABS to measure the soil to air exposures addressed by the remedy. ABS will include an evaluation of potential exposure to workers and exposure scenarios representative of potential future land use.

As important as it is to take action now to prevent continued exposure, EPA also recognizes the importance of incorporating new information as our knowledge about the effects of LA grows through further study. EPA will review the protectiveness of

the remedy no less often than every five years. If unacceptable exposures are identified, during this five-year review process (or in the interim), EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

Section 2 Responses to Specific Comments

The public comment period for EPA's proposed remedy at OU1 was open from September 7, 2009 through January 16, 2010. Seventeen individuals or groups submitted comments. One group sent two comment letters, and one individual sent two comment letters for a total of nineteen distinct submissions. Four submissions were specific to the OU1, nine addressed both OU1 and OU2, and six addressed OU2 only. Comments on OU2 will be addressed in the Responsiveness Summary to the ROD for OU2.

Each comment (or a synopsis of each) relevant to OU1 is numbered and italicized below, followed by EPA's response. For the full text of each comment, please visit www.epa.gov/libby.

2.1 Comments in Favor of the Preferred Alternative

The State of Montana, through the MDEQ, a local organization of community leaders, and one individual support EPA's preferred alternative for remediation of the OU1. MDEQ's support is based on the premise that the remedy will be re-evaluated for effectiveness as soon as the site-wide risk assessment is completed.

1) ***Comment.*** *Restoration at OU1 must be required as a part of any remedy put in place on this site.*

   EPA Response. RODs generally do not address issues of restoration. However, EPA can offer the following: during past response actions, Grace demolished the structures that were on the Export Plant property because they were in poor condition, did not meet current building code requirements, and couldn't be decontaminated. In exchange for the value of the buildings and at no cost to the City of Libby, Grace built a water main to the property that meets all code requirements. Grace also temporarily relocated Mill Work West. The owner of Mill Work West later decided not to move back to the property.

2) ***Comment.*** *Describe EPA's role in placing the Search and Rescue building at its current location.*

   EPA Response. EPA did not have a role in deciding to place the Search and Rescue building on OU1.

3) ***Comment.*** *EPA's proposal to possibly remove rip rap is a concern. Consider potential damage to the new park by accessing the river frontage over the existing water line, new grass, and trees. Plans must be developed to address access to the river.*

   EPA Response. Design of the selected remedy will evaluate issues such as river access. EPA will work closely with the City of Libby, which is the owner of the

OU1 property, throughout remedy design to ensure that the remedy complements future land use plans.

4) ***Comment.*** *Explain whether the Search and Rescue building is currently contaminated or has the potential to become contaminated in the future.*

EPA Response. ABS at the David H. Thompson Search and Rescue facility indicated the presence of LA in the buildings. Low levels of LA were detected in the indoor dust in the areas occupied by personnel and in the garage areas. The exposure levels were in the acceptable range as evidenced by the screening level risk assessment performed for OU1. EPA will re-evaluate the risk levels in the Search and Rescue facility once the remedial action has been completed at OU1. EPA will also re-evaluate risk once toxicity factors for Libby Amphibole asbestos have been identified. There is concern that the Search and Rescue building could become contaminated in the future if contaminated soil on OU1 or other source areas is inadvertently tracked into the building. If the future risk evaluation indicates that exposure levels in the Search and Rescue facility are unacceptable, EPA will take appropriate remediation action to address the contamination. EPA believes that once the soil-to-air exposure pathway at OU1 is broken, any low levels of LA detected in the building will be below a level of concern. Low-level, sporadic detections and track-in of LA will be a continuing issue in Libby.

5) ***Comment.*** *Visible vermiculite is neither an appropriate, nor an accurate, method of quantifying the concentration of LA in the potentially impacted soil and is not a valid cleanup standard for the ROD.*

EPA Response. EPA agrees that observation of visible vermiculite is not an accurate method of quantifying the concentration of LA in the potentially affected soil. Please refer to Section 8.2 of this ROD for a discussion on remediation goals.

6) ***Comment.*** *DEQ's policy supports an "acceptable risk" as being $1x10^{-5}$ or less. EPA should require additional response action at sites where the excess cancer risk exceeds $1x10^{-5}$.*

EPA Response. The NCP establishes "acceptable risk" in the $1x10^{-4}$ to $1x10^{-6}$ range. While MDEQ's policy may differ from the NCP, the State's policy is not considered an ARAR and it has not been applied consistently across Superfund sites in Montana.

7) ***Comment.*** *The ROD should indicate that additional soil sampling and analyses will be conducted to better define the areas requiring further remediation. MDEQ does not support using the presence of visible vermiculite to trigger remedial actions.*

EPA Response. For action levels and clearance criteria, EPA will continue to use the protocols developed in the "Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum", dated December 2003. This technical memorandum and the associated action levels and clearance criteria may be revised as we learn new information about LA. EPA is currently reviewing the data from activity-based sampling and PLM and PCM evaluation of soil contamination in OU4. Once these data have been analyzed, EPA may revise the action levels and clearance criteria.

In areas to be excavated and backfilled, EPA will remove up to 18 inches of contaminated soil. EPA will also continue to excavate and remove any material that appears to be vermiculite, processed ore, or material associated with vermiculite mining/milling or processing operations to a maximum depth of 3 feet. If contamination continues below 3 feet, a visible marker will be placed at the bottom of the excavation to denote the extent of clean up. Please see Sections 12 and 14 of this ROD.

2.2 Comments Accepting the Preferred Alternative as an Interim Decision

The City of Libby, the City-County Board of Health for Lincoln County, and the CAG each support a remedy once a thorough risk assessment has been completed. Each of these groups also indicated a willingness to accept moving forward with the preferred alternative as an interim decision. The City-County Board of Health (Board of Health) for Lincoln County joined in the comments submitted by the City of Libby for OU1 and OU2. The Board of Health also acknowledged the Libby Area Technical Advisory Committee (TAG) for its input and assistance.

EPA Response: EPA does not believe that an interim action is appropriate for the former Export Plant property. Interim actions are typically limited in scope and institute temporary measures to stabilize a site. The selected remedy provides a comprehensive cleanup and includes requirements for ICs and operation and maintenance. The selected remedy will be subject to continual re-evaluation, as we learn more about asbestos, to ensure protectiveness of the remedy into the future.

As important as it is to take action now to prevent continued human exposure to LA, EPA recognizes the importance of new information as our knowledge about the affects of Libby Amphibole asbestos grows through further investigation. EPA will review the protectiveness of the remedy at least every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). Although EPA does not anticipate any future modifications to the selected remedy, additional response actions will be taken as necessary to protect public health and the environment.

8) ***Comment.*** *EPA should commit to consult with the City on the remedial design, taking future use of the property into consideration.*

EPA Response. EPA has agreed to work closely with the City as designs are developed to ensure that remediation plans are consistent with future anticipated use of the Export Plant property. See Section 12 of this ROD.

9) ***Comment.*** *The ROD should state that in areas to be excavated, soil will be removed to a depth of 18 inches and where vermiculite is visible, contamination should be followed and removed completely regardless of depth.*

EPA Response. Please see the response to #7.

10) ***Comment.*** *The City cannot be responsible for O&M costs and the ROD should explicitly state who is to pay for those costs and from where that money is to come.*

EPA Response. A detailed O&M plan will be developed as part of the remedial design. Although EPA and MDEQ have settlement money with which to fund O&M, how cleanups are financed is generally not an issue EPA discusses in its decision documents.

11) ***Comment.*** *EPA should also be responsible for the cost of design, adoption, implementation and enforcement of ICs.*

EPA Response. ICs are considered an integral part of the remedy, so development and implementation of the ICs will be conducted as part of the remedial action. Response actions are funded through a settlement with Grace. Please see Section 12.3.2 of this ROD.

12) ***Comment.*** *The City expects to take a lead role in working with EPA on the design, adoption, implementation, and enforcement of ICs.*

EPA Response. EPA looks forward to working with the City on ICs. See Section 12.3.2 of this ROD.

13) ***Comment.*** *The City plans to relocate City Service Road. EPA's design and implementation of its selected remedy must be consistent with that relocation.*

EPA Response. Please see response to comment #8.

14) ***Comment.*** *The EPA has to ensure that all pathways of exposure have actually been closed by implementation of the selected remedy at OU1. Any fibers found after the remedy is in place would constitute failure of the remedy, since there are no toxicity studies upon which to base a safe exposure level.*

EPA Response. To confirm the effectiveness of this selected remedy, EPA will conduct an additional risk assessment following construction of the remedy.

This risk assessment will include ABS to measure the soil-to-air exposures addressed by the remedy. ABS will include an evaluation of potential exposure to workers in the search and rescue facility and activities associated with the anticipated future land use of OU1.

Cross contamination is likely to be a lingering issue in Libby. The remedy selected for OU1 includes maintenance requirements, ICs, and routine review to evaluate the continued effectiveness of the remedy.

15) ***Comment.*** *The park should be considered a specific use area. Visible vermiculite in a public park is unacceptable.*

EPA Response. Please see the response to #7.

16) ***Comment.*** *The ROD must contain post-remedy implementation ABS to ensure the effectiveness of the remedy. The ROD must also contain post-remedy implementation public health studies to ensure the effectiveness of the remedy at no cost to the City.*

EPA Response. Please see response to #14. In addition to a risk assessment following construction of the remedy, studies will continue on the potential human health and ecological affects of LA. As new information becomes available, and no less often than every five years, EPA will re-evaluate the remedy for effectiveness.

17) ***Comment.*** *The selected remedy for OU1 must be durable and effective. The ROD must require stringent O&M requirements.*

EPA Response. EPA agrees that long-term O&M will be required to maintain the integrity of the engineered controls, backfilled areas, and covers, including covers placed during previous response actions and as part of this remedy. Monitoring will be used to ensure these controls are protective. See Section 12.3.3 of this ROD. An ecological risk assessment is being developed at the mine site, OU3. Once that work is complete, EPA will build upon information gathered during the risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at the former Export PlantOU1.

18) ***Comment.*** *We wish to be absolutely certain of the safety of our Search and Rescue volunteers. Once the contaminated soil in the vicinity of the building is remediated, the building should be tested with ABS.*

EPA Response. Please see response to #4 and #14. ABS was performed at the building during the RI. The results of the investigation are described in the RI for OU1.

19) ***Comment.*** *The City asks EPA to delay the ROD until the City better understands the toxicity of LA.*

EPA Response. EPA believes that it is prudent to move forward taking remedial action to reduce exposure and protect public health. Removal and/or capping contaminated soil will mitigate potential current and future human exposure pathways that contribute to an unacceptable risk at these locations. Since the soil-to-air exposure pathway will be broken, it is not necessary to have a complete understanding of the toxicity of LA asbestos. However, EPA recognizes the importance of new information as our knowledge about the effects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

20) ***Comment.*** *The proposed plans for OU1 and OU2 describe an interim remedy that, following additional study, may be deemed final or may require augmentation. A ROD based on the proposed plans should be considered interim.*

EPA Response. EPA has already completed significant clean up at OU1. Remaining work, identified in this ROD, represents a comprehensive remedy for the property to include excavation, capping, O&M and ICs. Following implementation of the remedy, EPA will conduct a quantitative risk assessment, to include ABS, to confirm effectiveness of the remedy. Remedies selected in RODs are continually subject to modification based on new information. EPA will evaluate the effectiveness of the remedy at least every five years to ensure protectiveness. These routine evaluations will include any new information gained from the on-going Libby Action Plan investigations. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

21) ***Comment.*** *Further research and testing is needed to better define the relationship between concentrations of LA in soil and indoor dust to airborne concentrations of LA before a final remedy can be determined.*

EPA Response. Please see response to #19.

22) ***Comment.*** *Until ABS, together with reliable sampling and analytical methods for LA in solid matrices, is complete, the selected remedies for OU1 and OU2 should not be considered final.*

EPA Response. Please see response to #20.

23) ***Comment.*** *Extensive ABS should be performed throughout the Libby site to determine potential cumulative exposure of residents to LA. This sampling should include surface wipe samples of protective clothing worn and equipment used by the researchers, perimeter samples, background samples, soil moisture and wind data, and information on particle size of asbestos structures.*

EPA Response. Cumulative risk across the Libby site will be addressed in the remedy decision for residential soil, OU4. The remedy for OU1 will be designed to break potential exposure from the soil-to-air pathway. Effectiveness of the remedy will be confirmed through a risk assessment (including ABS) and continued monitoring following implementation of the remedy.

EPA recognizes the importance of incorporating new information as our knowledge about the affects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). Although EPA does not anticipate any future modifications to the selected remedy, additional response actions will be taken as necessary to protect public health and the environment.

24) ***Comment.*** *The limited activity-based sampling done at OU1 may underestimate exposure and risk because most of the ground was wetted to suppress dust dispersion before mowing.*

EPA Response. EPA agrees that risk at OU1 may have been underestimated. However, the screening risk assessment does indicate that risks exceeded the threshold requiring remedial action. It is important to move forward with a remedy now to address the potential inhalation of asbestos contaminated soil. Following implementation of the remedy, EPA will conduct additional ABS to confirm the effectiveness of the remedy.

25) ***Comment.*** *ABS has shown that is it not known if all pathways of exposure are discovered and/or those that are known are completely understood. As such, the proposed plans cannot be said to accomplish the goal of severing all pathways and the assessments of risks of continued exposure must be fully included in the proposed plans.*

EPA Response. Please see response to #23.

26) ***Comment.*** *There are inadequacies in EPA's present approach to risk assessment at the Libby site in general and the proposed plans for OU1 and OU2 in particular. These inadequacies call into question the accuracy and reliability of the data EPA relies upon to make its risk assessments.*

a. ***Comment.*** *Uncertainty is increased when using dose-response information only from animal studies and dose-response information from high doses to predict adverse health effects from low exposure, and not considering increased susceptibility of special groups within the exposed population.*

EPA Response. EPA agrees that there is uncertainty in the risk assessment process. We also acknowledge that risk estimates were not made for all exposure pathways at OU1 and that risk may be underestimated.

However, the most significant exposure pathway of soil-to-outdoor air has been addressed with the ABS. Using the EPA Framework Guidance (2008), theoretical excess cancer risks were estimated using the existing inhalation unit risk factor and ABS exposure data. Exposures were bracketed using average and maximum air concentrations. This is standard risk assessment practice where sample variance exceeds an upper bound estimate of the mean concentration. Using the maximum air concentration to estimate theoretical risk is a conservative approach for estimating risk. Risks exceeded the threshold value for acceptability and further remedial action is required. The screening level risk assessment fulfills the goals of risk assessment at OU1. The decision to move forward based on cancer risk levels alone is appropriate and EPA believes the action is necessary to protect public health.

b. ***Comment.*** *Current risk models may underestimate the risk associated with exposure to LA. The current risk models do not address susceptible populations or brief exposures to high levels of asbestos. The current risk models do not adequately address risks associated with low-dose exposure to the mixed LA seen in Libby. Current risk models assume a linear relationship and the slope is largely derived from occupational cohorts with much higher exposure levels.*

EPA Response. EPA acknowledges that current risk models may underestimate the risk associated with exposure to LA. The inhalation unit risk (IUR) factor is based on additive risk of lung cancer and mesothelioma, using a relative risk model for lung cancer and an absolute risk model for mesothelioma. The data used for the derivation of the IUR utilized experimental groups exposed to several forms of asbestos, but primarily chrysotile and tremolite asbestos. Libby Amphibole contains approximately 6% tremolite in its mixture. EPA acknowledges that LA is different than chrysotile asbestos, but it is the only value available.

EPA has determined that based on known human health risks, it is important to proceed with a comprehensive remedy to protect human health now. New information will be considered as it is developed to ensure effectiveness of the remedy into the future.

c. ***Comment.*** *Exposure estimates provided in the epidemiological reports used to derive the current risk models are often highly uncertain. Cancer predictions based on the current method may be underestimating risk by up to 20%.*

EPA Response. Using the current IUR factor may underestimate the actual risk. Although risk may be underestimated, the available value indicates that current exposure is unacceptable and steps must be taken to reduce exposure now.

d. ***Comment.*** *A reference concentration for inhalation exposure to LA, including non-cancer risks of LA fibers less than 0 .5 micrometers (µm) in length and 0.25 µm in diameter, must be developed and used for future sampling.*

EPA Response. The toxicity of fibers less than 5 µm in length and less than 0.25 µm in diameter is not being addressed specifically in the Libby Action Plan. The evidence that fibers of this size are significantly more hazardous than fibers greater than 5 µm in length and greater than 0.25 µm in diameter is sparse in the peer reviewed literature. It will take time to potentially address this issue in laboratory experiments if the correct model for assessing the most critical endpoint is established. It will not be possible to ascertain these data in humans.

e. ***Comment.*** *The occurrence of non-cancer effects is a significant human health concern in the Libby community. These non-cancer adverse health outcomes may be more significant than cancerous effects and are not addressed by the current cancer risk models. Studies of former workers and residents provide strong evidence that exposure to LA results in an increased incidence of non-cancer adverse effects, and that these effects occur in some individuals who appear to have had only low exposure.*

EPA Response. Because cancer risk estimates exceed the threshold value for acceptability, remedial action is required. The decision to move forward based on cancer risk levels alone is appropriate and EPA believes that it is necessary to protect public health. The cleanup to be implemented will address non-cancer risk as well as cancer risk.

f. ***Comment.*** *Animal and in vitro studies suggest that fibers less than 5 µm in length may play a role in fibrosis. To reduce uncertainties and address the most significant health concerns in Libby, the reference concentration for inhalation exposure to LA should be based on TEM analysis, including analysis of short and thin fibers, and the role these fibers play in causing non-cancer adverse health effects.*

EPA Response. Existing TEM analysis of bulk soil is not a viable option since soil particles interfere with counting LA fibers. The TEM analysis of LA includes a fiber size distribution of the detected fibers. However, it is not feasible to assess differential toxicity to the short, small-diameter sized fibers. EPA will evaluate a new technology this field season that may provide greater sensitivity analysis of bulk soil. EPA will also continue ABS to assess soil contamination this field season.

g. ***Comment.*** *There is a lack of epidemiology data for the Libby site that must be addressed. Epidemiological studies, together with toxicological studies are needed to assess the health effects of low-dose exposures to LA.*

EPA Response. Toxicity factors for use in risk assessment originate from experimental animal data, human epidemiological data, or the combination of both data sources. EPA currently employs a toxicity factor for asbestos that is based on numerous epidemiological investigations. EPA will use Libby-specific toxicity factors when they become available. However, environmental exposures and environmentally based epidemiological investigation are just now being initiated in Libby. It will be several years before these factors may be developed for and applied to the Libby residents.

27) ***Comment.*** *The present data gaps in solid matrix sampling data quantification must be addressed. The current analytical methods for solid matrix sampling are insufficient for cleanup decisions.*

EPA Response. EPA acknowledges that current analytical methods for bulk soil lack sensitivity. Further, it is difficult to predict concentrations of asbestos in air compared to concentrations of asbestos in soil. However, current findings show that it is necessary to move forward with a remedy at OU1 to prevent continued exposure to asbestos. EPA will consider new information as analytical methods improve to routinely evaluate effectiveness of the selected remedy.

28) ***Comment.*** *The estimation of bulk asbestos content in soil at OU1 and OU2 is uncertain because the soil sampling protocol may not accurately quantify the concentration of LA. Given the limitations of the analytical methods for identifying and quantifying LA in soils at OU1 and OU2, it is impossible to say that the pathways of exposure have been eliminated.*

EPA Response. EPA agrees that current analytical methods for bulk soil analysis lack sensitivity and are marginally acceptable for health-based decision making. PLM and PLM-VE lack the sensitivity based on comparison with corresponding ABS sampling on the same soil samples.

EPA will evaluate a new technology this field season that may provide greater sensitivity analysis of bulk soil. EPA will also continue site ABS to assess soil contamination this field season.

While current analytical methods may not accurately quantify the concentration of LA in soil, data indicates that current exposures are unacceptable and steps must be taken to reduce exposure now. In addition, EPA will prepare another risk assessment to include site sampling, once the remedy has been implemented to confirm effectiveness of the remedy.

29) ***Comment.*** *The present data gaps in air sampling quantification must be addressed. Because of the variability of LA in air, estimates of mean exposure concentrations are uncertain due to random variation between samples. Risk calculations based on mean air concentrations, rather than the 95th upper confidence level, represent a level of*

uncertainty which could result in an underestimate of risk. Additionally, air sampling data reported from a laboratory as non-detect are treated as zero. It is probable that some of these zero values contain LA that is not quantified. Finally, air sampling data from LA represents only a point in time that may not be representative of exposure under various activities and environmental conditions. Risk assessments based on estimated mean anticipated exposures in OU1 and OU2 are not appropriate, and risk calculation should be based on concentrations expected for the greatest exposure scenario anticipated in OU1 and OU2.

EPA Response. EPA acknowledges that current analytical methods and risk models may underestimate the risk associated with exposure to LA. However, this is not relevant to the situation at OU1. The remedy for this OU is adequate to address significantly more risk that the current calculations show. Based on the risk as EPA now understands it, EPA has also determined that based on known human health risks, it is important to proceed with a comprehensive remedy to protect human health now. New information and improved analytical methods will be considered as they are developed to ensure effectiveness of the remedy into the future.

As a point of clarification, ambient air samples are not single point estimates. The ambient air samples are taken over time (usually for 5 consecutive days) and are repeated for up to two months at a time.

30) ***Comment.*** *The present data gaps in cleanup efficacy data and elimination of exposure pathways must be addressed. Because trace levels or higher levels of LA are present in soil at OU1 and OU2 and in other areas throughout Libby, future exposure associated with disturbing on-site soil during construction or redevelopment events at these sites is a potential exposure pathway. In addition, trace levels or higher levels of LA are vulnerable to disturbance by various anthropogenic or natural activities. Consequently, residents can be potentially exposed to asbestos fibers released from asbestos-containing debris or soil due to disturbance by common human intrusive activities or natural processes either now or in the future. Uncontrolled drainage of water from areas contaminated with LA may result in environmental dispersion of asbestos.*

Indoor stationary air monitoring performed at varying time periods following completion of cleanup actions at specific properties in Libby showed low airborne concentrations of LA following cleanup, and the level remained low for about a year. However, at some of the homes, there appeared to be an upward trend in airborne levels of LA, suggesting the potential for re-contamination. This indicates pathways of exposure still exist after the completion of cleanup activities. EPA should base cleanup targets on activities that have been shown to produce elevated concentrations by TEM analysis. Detailed site-specific monitoring using TEM methods is needed for a more comprehensive consideration of site-specific conditions related to OU1 and OU2 to assure that exposure pathways have been eliminated.

EPA Response. EPA will conduct ABS following implementation of the remedy to confirm effectiveness of the remedy. This comment also highlights the

importance of ICs and robust maintenance requirements to prevent inadvertent exposure to remaining contamination through common human activities or natural processes.

31) ***Comment.*** *The Libby site conceptual model addressing overall cumulative exposure and potential health risks across all operable units must be considered.*

EPA Response. Please see response to #23.

32) ***Comment.*** *A program to determine the continuing effectiveness of the final remedies should be part of any ROD issued for the site. The decision must include a long-term public health monitoring program together with triggers for future augmentation of the remedies should the occurrence and pathologies of asbestos-related diseases not improve to a significant level. EPA must determine what those acceptable trigger levels should be and seek public comment on those levels.*

EPA Response. EPA agrees that effectiveness of the remedy must be routinely evaluated following implementation to ensure protection of public health and the environment. As new information is developed through the on-going Libby Action Plan investigations, it will be considered in the routine evaluations.

2.3 Comments Opposed to the Preferred Alternative

Two citizens groups (submitting one comment letter), the TAG, and four individuals are opposed to the preferred alternative for remediation of OU1.

33) ***Comment.*** *EPA has not yet established scientifically defensible toxicity information for LA. Until appropriate data are developed, the site should not precede past Baseline Risk Assessments and RI/FS studies or plans to a ROD for any OU.*

EPA Response. EPA continues to study the effects of LA contamination on human health and the environment. While these important studies are underway, current findings indicate that it is necessary to move forward with a remedy at OU1 to prevent continued exposure to LA.

EPA further agrees that there is a lack of complete understanding of the toxicity of LA fibers. The lack of a reference concentration to estimate threshold hazard is also a concern. The reference concentration would allow for evaluation of the theoretical potential for developing pleural disease(s). The hazard quotient has traditionally been the most sensitive predictor of hazard to children. The University of Cincinnati and EPA are developing a reference concentration for LA based on the Marysville, Ohio worker cohort. EPA is also involved with the University of Cincinnati and NCEA to develop a LA-specific miner IUR for use in risk assessment. This important information is expected to be available in early 2011.

EPA believes it is important to proceed with a comprehensive remedy to protect human health from known exposure to LA. This remedy will address both surface and subsurface soil. This approach will also provide ICs and define maintenance requirements for any contamination left in place.

a. ***Comment.*** *Final decisions are not appropriate until scientifically valid information is available to quantify non-cancer risks.*

EPA Response. Since cancer risk estimates exceed the threshold value for acceptability, remedial action is required. The decision to move forward based on cancer risk levels alone is appropriate and EPA believes that it is necessary to protect public health. Action to address cancer risk will also address non-cancer risk.

b. ***Comment.*** *EPA must re-evaluate the site when appropriate scientific information is available for estimating cancer risks.*

EPA Response. As important as it is to take action now to prevent continued exposure, EPA also recognizes the importance of new information as our knowledge about the affects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

34) ***Comment.*** *Exposure levels in Libby are still unknown. In addition to EPA's lack of appropriate toxicology and epidemiology data, EPA has not properly established actual exposures to the residents of Libby.*

EPA Response. EPA continues to study the effects of LA contamination on human health and the environment. While these important studies are underway, current findings indicate that it is necessary to move forward with a remedy at OU1 to stop continued exposure to LA.

a. ***Comment.*** *Cumulative risk must be considered before any ROD is finalized.*

EPA Response. Please see response to #23.

b. ***Comment.*** *Analytical methods used by EPA are not sensitive enough to measure LA present at concentrations at or near an acceptable risk level.*

EPA Response. Please see responses to #27, #28 and #29.

c. ***Comment.*** *The value of PLM analysis for determining actual exposures is severely limited, but EPA uses PLM to establish cleanup goals for OU1.*

EPA Response. Please see response to #28.

d. ***Comment.*** *Any soil analytical method must be confirmed with ABS.*

EPA Response. Please see response to #24.

e. ***Comment.*** *Once representative sample results are available, EPA should use appropriate exposure calculations.*

EPA Response. Please see response to #29.

f. ***Comment.*** *EPA did not attempt to establish a cleanup goal for either OU1 or OU2.*

EPA Response. Please see Section 8.1 of this ROD for a description of remedial action objectives (RAOs) in OU1. See Section 8.2 for a description of remediation goals. Also, please refer to the proposed plans for both OU1 and OU2, which contain the RAOs.

35) ***Comment.*** *EPA has erred in establishing the scope of the response.*

a. ***Comment.*** *EPA's response should be based on asbestos concentrations, not historical property boundaries.*

EPA Response. The scope of the Libby site includes all areas of the site where LA concentrations may be elevated. If some of these areas are not specifically addressed by the proposed plan for OU1, they will be addressed as work continues on other site OUs.

b. ***Comment.*** *Consideration of cumulative risk is essential.*

EPA Response. Please see response #23.

c. ***Comment.*** *Ecological risk and risks to endangered species must be evaluated before work is conducted adjacent to the Kootenai River or Rainy Creek.*

EPA Response. An ecological risk assessment is being developed at the mine site (OU3). Once that work is complete, EPA will build upon information gathered to identify potential pathways and receptors to evaluate ecological risk at OU1.

36) ***Comment.*** *EPA cannot justify its selection of preferred alternatives.*

a. ***Comment.*** *Selection of preferred alternative is premature.*

EPA Response. Based on current information, taking action now is necessary to protect public health and the environment. Removal of soil and capping of soils mitigates/eliminates potential current and future human exposure pathways that contribute to an unacceptable risk at these

locations. EPA recognizes there are uncertainties with the proposed plan, but the public health benefit outweighs the alternative of taking no action at this time.

b. ***Comment.*** *Relocation must be considered as an alternative.*

EPA Response. Relocation will be considered in the FS for the residential areas of the site, OU4.

37) ***Comment.*** *Although the Plans provide some information on the preferred remedial action, EPA should issue a detailed work plan for public comment (when enough risk-based data are available).*

EPA Response. EPA will prepare preliminary and final designs for implementation of the remedy at OU1. EPA has agreed to work closely with the City as designs are developed to ensure that remediation plans are consistent with future use of OU1. See Section 12 of this ROD.

a. ***Comment.*** *Evaluation of potential for re-contamination.*

EPA Response. EPA shares the concern over the potential for re-contamination. Robust maintenance requirements will be identified as part of the remedial design. EPA will also work closely with affected stakeholders to implement suitable ICs.

b. ***Comment.*** *Shoreline and surface water impacts.*

EPA Response. Please see response to 35c.

c. ***Comment.*** *Analysis of incoming fill. EPA's remediation work plan should include TEM analysis of all incoming fill to confirm the absence of LA.*

EPA Response. EPA imports fill material from beyond the Libby valley. LA characterization includes visual inspection as well as PLM-VE. The soil is also characterized for other potential contaminants to ensure that it is suitable for use as fill. Fill specifications have been developed for both common fill and top soil and are available for review upon request through the EPA Information Center in Libby. Existing TEM analysis of bulk soil is not a viable option since soil particles interfere with counting LA fibers.

d. ***Comment.*** *Consultant/Contractor oversight.*

EPA Response. EPA agrees that it is important to provide sufficient oversight to its contractors.

e. ***Comment.*** *Confirmation monitoring.*

EPA Response. Please see response to #14.

f. ***Comment.*** *Ongoing maintenance of containment.*

EPA Response. Long-term O&M will be required to maintain the integrity of the engineered controls, backfilled areas, and covers, including covers placed during previous response actions and as part of this remedy. See also response to #10.

38) ***Comment.*** *Public availability of information.*

EPA Response. The RI/FS reports for both OU1 and OU2 are available on the web at www.epa.gov/libby. These and other key documents are also available at the EPA Information Center in Libby. EPA will also provide a fact sheet describing the remedial design for public information.

39) ***Comment.*** *Uncertainty in risk assessment.*

EPA Response. Please see responses to #26a, #26b and #26c.

40) ***Comment.*** *Lack of a reference concentration (RfC) for inhalation exposure to LA, including non-cancer risks of LA fibers less than 5 µm in length and .25µm in diameter.*

EPA Response. Please see responses to #26d

41) ***Comment.*** *Lack of epidemiology data in Libby.*

EPA Response. Please see response to #26g.

42) ***Comment.*** *Gaps in solid matrix sampling data quantification.*

EPA Response. Please see response to #27.

43) ***Comment.*** *Gaps in exposure pathway quantification.*

EPA Response. Please see response to #23.

44) *Gaps in cleanup efficacy data and elimination of exposure pathways.*

EPA Response. Please see response to #30.

45) ***Comment.*** *According to EPA guidance, EPA is required to understand the cumulative risk from all exposures in the Libby area. EPA must determine the complete exposure pathways that exist for the Libby site and quantify the magnitude, frequency, and*

duration of exposure for each pathway in Libby to determine cumulative risk. Exposure assessments must consider past, present, and future exposures.

EPA Response. The Risk Assessment Guidance for Superfund recommends that cumulative risk be calculated where possible. It is not required to evaluate all cumulative risks. It is sufficient to evaluate the major exposure pathways; not necessarily all pathways. The guidance recommends evaluation of a CTE and a RME scenario. While understanding exposure pathways and quantification of significant pathways is important in risk evaluation, it is not necessary to evaluate all pathways if there are pathways that are major sources of exposure. In addition, exposure assessments consider only the current data. It is impossible to reconstruct and use past data for risk assessments just as it is impossible to use future data. A post-remediation risk assessment can be used to confirm that remedial goals were achieved and that risk levels are acceptable.

46) ***Comment.*** *All contamination should be removed regardless of cost. Containment is not clean up.*

EPA Response. EPA evaluates nine criteria when selecting a remedy. Any remedy must comply with two threshold criteria which are 1) protection of human health and the environment and, 2) compliance with ARARs. EPA believes that the selected remedy meets these criteria and provides the best balance among the remaining criteria. The nine criteria also include five balancing criteria and two modifying criteria (see Section 10 of this ROD). EPA believes that by breaking the soil-to-air exposure pathway, containment will be an effective remedy.

47) ***Comment.*** *The clean up should be performed systematically to prevent cross-contamination.*

EPA Response. EPA agrees that cross-contamination may be a lingering issue in Libby. The remedy selected for OU1 includes maintenance requirements, ICs, and routine review to evaluate the continued effectiveness of the remedy.

48) ***Comment.*** *Insufficient funds have been set aside to manage operation and maintenance costs into the future.*

EPA Response. Both EPA and MDEQ have established accounts to fund O&M activities once remedies have been implemented. See Exhibit 12-1 in this ROD for a cost estimate including operation and maintenance costs and periodic review costs.

49) ***Comment.*** *All contamination should be removed as part of a systematic cleanup to avoid the necessity of ICs.*

EPA Response. Containment remedies, including maintenance and ICs, are a viable approach to protect human health and the environment. Contamination remains at most Superfund projects requiring ICs and routine evaluation to ensure continued protectiveness of the remedy.

50) ***Comment.*** *EPA must insure that they have actually closed pathways of exposure.*

EPA Response. Please see response to #14.

51) ***Comment.*** *ABS is necessary to protect human health.*

EPA Response. Please see response to #14.

52) ***Comment.*** *The City of Libby must be kept apprised of design progress and allowed to participate at OU1.*

EPA Response. Please see response to #8.

53) ***Comment.*** *The remedy put in place must be durable and effective.*

EPA Response. Please see response to #36(f). In addition to long-term maintenance requirements, ICs will be an integral part of the remedy. Effectiveness of the remedy will be evaluated no less often than every five years to ensure protection of human health and the environment.

54) ***Comment.*** *Restoration issues must be resolved before the design is allowed to proceed.*

EPA Response. Please see response to #1.

55) ***Comment.*** *We should be allowed to view EPA's responses to our comments and have time to correct any flaws in those responses before the remedial action is initiated.*

EPA Response. EPA does not request public review of or comment on the Responsiveness Summary. However, any comments submitted will become part of the Administrative Record for the site.

56) ***Comment.*** *Science must come before politics.*

EPA Response. Please see response to #46.

57) ***Comment.*** *A quantitative risk assessment is necessary to protect human health.*

EPA Response. A quantitative risk assessment has been completed for OU1. This risk assessment was based on limited site sampling data and the best information we currently have about the toxicity of asbestos. EPA will perform additional ABS once the remedy is implemented to confirm effectiveness of the

remedy. In addition, EPA will routinely evaluate the remedy for protectiveness as we continue to learn more from the on-going Libby Action Plan investigations.

58) ***Comment.*** *Soil used for restoration from the Boothman Pit was determined to be contaminated with LA and should be replaced at OU1 with clean material.*

EPA Response. EPA sampled and analyzed soil from the Boothman Pit prior to its use as fill at OU1. EPA determined that the Boothman Pit soil was not contaminated. Sample results can be made available for review upon request at the EPA Information Center in Libby. Additional ABS, following implementation of the selected remedy, will confirm the effectiveness of the remedy to protect human health.

59) ***Comment.*** *The boat ramp washout of spring 2009 must be addressed. The engineering cap as a containment program has proven to be a failure at OU1.*

EPA Response. EPA looks forward to implementing a remedy at OU1 which will include maintenance requirements and ICs. It is important that any remaining contamination be managed appropriately to prevent further exposure to LA.

60) ***Comment.*** *Testing at OU1 has created cross contamination that threatens everyone using the park.*

EPA Response. Please see response to #58.

61) ***Comment.*** *OU8 (State Highways) has the potential to re-contaminate every OU cleaned up to date and should be addressed before any other OU.*

EPA Response. EPA recognizes the importance of these transportation corridors and is proceeding with a RI for the State Highways and Secondary Roads. The investigation and evaluation of alternatives will take time and won't be completed prior to remedy selection at OU1 and OU2. Once the remedies are implemented at OU1 and OU2, they will be subject to review to ensure continued protectiveness into the future.

62) ***Comment.*** *Regarding Libby Amphibole asbestos and air quality, is it safe to raise a child in Libby? Is the safety of the schools in question?*

EPA Response. The most recent ambient air quality report summarizes air sampling at 7 to 14 stations throughout Libby (USEPA & SRC, Inc., 2009). The report indicates that LA air concentrations range from 2×10^{-6} to 9×10^{-6} structures/cubic centimeter (s/cc). These concentrations are approximately 10,000 times less than the reported air concentrations in downtown Libby during the period when the mine and milling plants were in operation. By

comparison, the national urban concentrations of asbestos fibers range from 3.9 x 10^{-4} to 5 x 10^{-5} f/cc*. Hence, ambient air concentrations of LA in Libby are less than the national average air concentrations and are within acceptable ranges.

The ABS at the Libby schools indicated that LA fibers were detected in the indoor air at two sampling locations and that student activity samples outdoors in the school yards yielded three detections. All of the detections were equivalent to detecting 1 fiber in the grid openings counted. These detections are low-level detections just above the method detection limit. Using school-specific exposure assumptions, the exposures we calculated for the various activities were found to be in acceptable ranges. There were trace levels of LA detected in soils at the schools. These will be addressed by the EPA and the school board. While exposure to children is a concern due to their early exposure and longer latency periods, the levels of LA exposure were judged acceptable at this time. Note: s/cc is a percentage of the total fibers/cc; based on data from OU 4, the percentage is approximately 59%.

63) ***Comment.*** *I have not been fully informed in the specifics of the contamination in Libby and stand opposed to the EPA ROD and any maintenance program that comes out of it.*

EPA Response. Please see responses to 14, 16, 19, 26 (a) – (g), 33(a), 33(b), 34, and 35(h).

64) ***Comment.*** *We need results of toxicity studies, especially human, before any ROD.*

EPA Response. Please see responses to 26 (a) – 26 (g).

65) ***Comment.*** *ICs should be discussed prior to selection of a remedy.*

EPA Response. ICs will be an integral part of the remedy. Development and implementation of ICs will be conducted as part of the remedial design and remedial action. EPA has been working closely with the O&M work group to make recommendations on suitable ICs. For OU1, these recommendations will be shared with both the City Council and the City-County Board of Health. In addition, language drafted for this ROD discussing ICs was shared with the TAG, O&M Work Group, and City of Libby in February 2010. See also response to #12.

66) Comment. A forensic audit of the expenditures on OU1 is necessary before the people of Libby can make the decisions they have to make.

EPA Response. EPA is unsure how past expenditures affect remedy selection. The commenter is encouraged to review the administrative record for the project for further information on past expenditures.

67) *Comment. There must be a multi-tiered comment process.*

EPA Response: This responsiveness summary responds to comments EPA received on the Proposed Plan for OU1. EPA will work closely with the City during design to implement a remedy that will complement future land use plans. The public will also have an opportunity to comment on five-year reviews as the remedy is evaluated for effectiveness into the future. Comments may be made at any time and will be incorporated into the administrative record for the project. The public will also be invited to provide comment as we proceed with remedy selection at other site OUs.

68) *Comment. Special Agent Rumpole's request for a review by the Office of Program Evaluations should come before our rights to legal remedy are stripped from us.*

EPA Response. The commenter is encouraged to contact the Office of the Inspector General directly to determine the outcome of Special Agent Rumpole's request.

69) *Comment. There seems to be a greater increase of various problems in homes cleaned by EPA than in homes that have not been cleaned. This includes mold, which appears to be a growing problem in homes that have been cleaned by EPA.*

EPA Response. Residential remediation is not a part of the remedy for OU1. Concerns about residential remediation, including issues associated with mold, should be addressed to EPA separately.

70) *Comment. Why are we still testing at Asa Woods?*

EPA Response. Asa Woods is not considered part of OU1. OU1 includes the former Export Plant property, Riverside Park, and a portion of Highway 37 embankment. The commenter is encouraged to contact EPA separately for any questions concerning sampling at the schools.

Appendix A
Summary of Compliance with Federal and State Applicable or Relevant and Appropriate Requirements

OU1 - Former Export Plant Site and OU2 – Former Screening Plant Site

Summary of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) Compliance OU1 - Former Export Plant Site, and OU2 – Former Screening Plant Site

I. INTRODUCTION

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9621(d), the National Oil and Hazardous Substances Pollution Contingency Plan (the "NCP"), 40 CFR Part 300 (1990), and guidance and policy issued by the U.S. Environmental Protection Agency (EPA) require that remedial actions under CERCLA comply with substantive provisions of applicable or relevant and appropriate standards, requirements, criteria, or limitations (ARARs) from State of Montana and federal environmental laws and state facility siting laws during and at the completion of the remedial action. These requirements are threshold standards that any selected remedy must meet, unless an ARAR waiver is granted.

This document identifies ARARs for remedial actions to be conducted at the former Export Plant, Operable Unit 1 (OU1) and the Former Screening Plant, OU2, of the Libby Asbestos National Priorities Site. The following ARARs or groups of related ARARs are each identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR and how and to what extent the ARAR is expected to apply to the activities to be conducted under this remedial action.

Substantive provisions of the requirements listed below are identified as ARARs pursuant to 40 Code of Federal Regulations (CFR) § 300.400. ARARs must be attained during and at the completion of the remedial action.[1] No Federal, State or local permit shall be required for the portion of any removal or remedial action conducted entirely on site in accordance with Section 121(e) of CERCLA.

II. TYPES OF ARARs

ARARs are either "applicable" or "relevant and appropriate." Both types of requirements are mandatory under CERCLA and the NCP.[2] Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental and facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.[3]

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to hazardous substances, pollutants, contaminants, remedial actions, locations, or other circumstances at a CERCLA site, address problems or situations

---

1 40 CFR Section 300.435(b)(2); Preamble to the National Oil and Hazardous Substances Pollution Contingency Plan, 55 Federal Register (FR) 8755-8757 (March 8, 1990).

2 CERCLA § 121(d)(2)(A), 42 U.S.C. § 6921(d)(2)(A). See also, 40 CFR § 300.430(f)(1)(i)(A).

3 40 CFR § 300.5.

sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.[4]

The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including an examination of the purpose of the requirement and the purpose of the proposed CERCLA action; the medium and substances regulated by the requirement and the proposed action; the actions or activities regulated by the requirement and the remedial action; and the potential use of resources addressed in the requirement and the remedial action. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.[5]

ARARs are contaminant, location, or action specific. Contaminant specific requirements address chemical or physical characteristics of compounds or substances on sites. These values establish acceptable amounts or concentrations of chemicals which may be found in or discharged to the ambient environment.

Location specific requirements are restrictions placed upon the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographical or physical positions of sites, rather than to the nature of contaminants at sites. Action specific requirements are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants or contaminants. A given cleanup activity will trigger an action specific requirement. Such requirements do not themselves determine the cleanup alternative, but define how chosen cleanup methods should be performed.

Many requirements listed as ARARs are promulgated as identical or near identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by EPA and the state. The Preamble to the NCP provides that such a situation results in citation to the state provision and treatment of the provision as a federal requirement.

Also contained in this list are policies, guidance or other sources of information which are “to be considered” in the implementation of the record of decision (ROD). Although not enforceable requirements, these documents are important sources of information which EPA and the State of Montana Department of Environmental Quality (MDEQ) may consider, especially in regard to the evaluation of public health and environmental risks; or which will be referred to, as appropriate, in developing cleanup actions.[6] These final ARARs will be set forth as performance standards for any and all remedial design or remedial action work plans.

---

4 40 CFR § 300.5.

5 CERCLA Compliance with Other Laws Manual, Vol. I, OSWER Directive 9234.1-01, August 8, 1988, p. 1-11.

6 40 CFR Section 300.400(g)(3); Preamble to the NCP, 55 Fed. Reg. 8744-8746 (March 8, 1990).

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
Federal ARARs						
National Historic Preservation Act, 16 U.S.C. § 470, 40 CFR 6.301(b) 36 CFR 60, 63, 800	Applicable	This statute and implementing regulations require federal agencies to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the National Register of Historic Places.	If cultural resources on or eligible for the National Register are present, it will be necessary to determine if there will be an adverse effect and, if so, how the effect may be minimized or mitigated. The unauthorized removal of archaeological resources from public or Indian lands is prohibited without a permit, and any archaeological investigations at a site must be conducted by a professional archaeologist. To date, no such resources have been found at OU1 or OU2. If any are found, consultation with the State Historic Preservation Office and compliance with the National Historic Preservation Act will be addressed during remedial design.		✓	
Archaeological and Historic Preservation Act, 16 U.S.C. § 469, 40 CFR 6.301(c), 43 CFR 7	Applicable	This statute and implementing regulations establish requirements for the evaluation and preservation of historical and archaeological data, which may be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.			✓	
Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661, et seq., 40 CFR 6.302(g), 50 CFR 83, 33 CFR 320-330	Applicable	This statute and implementing regulations require coordination with federal and state agencies for federally funded projects to ensure that any modification of any stream or other water body affected by any action authorized or funded by the federal agency provides for adequate protection of fish and wildlife resources.	If the remedial action involves activities that affect wildlife and/or non-game fish, federal agencies must first consult with the U.S. Fish and Wildlife Service and the relevant state agency with jurisdiction over wildlife resources.		✓	
Endangered Species Act, 16 U.S.C. § 1531, 40 CFR 6.302(h), 50 CFR 17 and 402	Applicable	This statute and implementing regulations provide that federal activities not jeopardize the continued existence of any threatened or endangered species. Endangered Species Act, Section 7 requires consultation with the U.S. Fish and Wildlife Service to identify the possible presence of protected species and mitigate potential impacts on such species.	If threatened or endangered species are identified within the remedial areas, activities must be designed to conserve the species and their habitat. To date no threatened or endangered species have been identified in the area of the site.		✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
Federal ARARs						
Migratory Bird Treaty Act, 16 U.S.C. §§ 703, et seq., 50 CFR 10.13	Applicable	This requirement establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the U.S. Fish and Wildlife Service during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds.	The selected remedial actions will be carried out in a manner to avoid adversely affecting migratory bird species, including the bald eagle and including individual birds or their nests.		✓	
Clean Air Act (CAA), 40 CFR 61.149 Note: Section 61.149 (c)(2) not delegated to State per 40 CFR 61.157	Relevant and Appropriate	This Act and implementing regulations, 40 CFR 61.149, establish detailed procedures and specifications for handling and disposal of asbestos containing material (ACM) waste generated by an asbestos mill. The provision allows an alternative emission control and treatment method.	Requirements under this regulation are considered relevant and appropriate to the ACM (friable material containing > 1% asbestos) disposal. It is not applicable because the facilities do not meet the regulatory definition of an asbestos mill and because EPA does not expect to encounter ACM at OU1 or OU2.			✓
CAA, 40 CFR 61.150 Note: Section 61.150(a)(4) not delegated to the State per 40 CFR 61.157	Relevant and Appropriate	Standard for waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations. Provides detailed procedures for processing, handling and transporting ACM waste generated during building demolition and renovation (among other sources). The provision allows an alternative emission control and treatment method.	Applicable to RACM generated by building demolitions that may occur as part of the remedial action. Relevant and appropriate for soil disturbance activities and for asbestos contaminated material that does not meet the strict definition of RACM. EPA does not expect to demolish buildings or otherwise generate RACM as part of this remedial action.			✓
CAA , 40 CFR 61.151 Note: Section 61.151(c) not delegated to the State per 40 CFR 61.157	Relevant and Appropriate	Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations. Provides requirements for covering, revegetation and signage at facilities where RACM will be left in place. The provision allows an alternative control method.	Requirements under this regulation are considered relevant and appropriate to asbestos containing soils and/or debris left in place. It is not applicable because the facilities that are part of this remedial action do not meet the definitions of “facility” in the regulation and because EPA does not expect to encounter RACM at OU1 or OU2.			✓
CAA, 40 CFR 61.154 Note: Section 61.154(d) not delegated to the State per 40 CFR 61.157	Other Requirements	Standard for active waste disposal sites. Provides requirements for off-site disposal sites receiving ACM waste from demolitions and other specific sources. The provision allows an alternative emission control.				✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
Federal ARARs						
Toxic Substances Control Act, 40 CFR Part 763, Subpart G	Other Requirements	Asbestos abatement projects and asbestos worker protection. This subpart protects certain State and local government employees who are not protected by the Asbestos Standards of the Occupational Safety and Health Administration (OSHA). This subpart applies the OSHA Asbestos Standards in 29 CFR 1910.1001 and 29 CFR 1926.1101 to these employees.	The State requires that work be performed in accordance with 40 CFR 763.120 and 763.121 (asbestos abatement projects) and 29 CFR 1926.58 (asbestos standard for the construction industry). These requirements will be incorporated into the health & safety plan but do not meet the definition of an ARAR.			✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
Montana Asbestos Control Act (MACA), MCA 75-2-501 et seq., and implementing regulations at ARM 17.74.301 through 17.74.368	Applicable/ Relevant and Appropriate/ Other Requirements	The MACA and implementing rules establish standards and procedures for accreditation of asbestos-related occupations and control of the work performed by persons in asbestos-related occupations.	Only the portions of the MACA and implementing regulations governing the handling of RACM are potentially applicable or relevant and appropriate. All other provisions (e.g., those governing accreditation, training, etc.) do not meet the requirements of ARARs. As EPA does not expect to encounter RACM at OU1 or OU2, the provisions that qualify as ARARs are only be relevant and appropriate.			✓
MACA, MCA 75-2-501 et seq., ARM 17.74.355, ARM 17.74.359	Applicable/ Relevant and Appropriate	Asbestos abatement project permits. Asbestos abatement projects require a permit from DEQ. Permits must meet requirements at ARM 17.74.355 and ARM 17.74.359.	Applicable to material meeting the definition of RACM. Relevant and Appropriate for soils or contaminated material that does not meet the strict definition of RACM. The substantive requirements for performance of the work and proper disposal and will be met by the contractors used. On-site CERCLA actions do not require a permit. EPA expects soils excavated from OU1 and OU2 and debris generated in the remedial action will not be RACM. Though it is possible that some provisions could be relevant and appropriate for non RACM waste, most material will likely be handled under Montana solid waste provisions. See discussion below for solid waste ARARs.			✓
MACA, MCA 75-2-501 et seq., ARM 17.74.357	Applicable	Establishes air monitoring requirements for asbestos abatement projects, including for building clearance after abatement.	These requirements will be followed unless an equivalent or more stringent approach is deemed appropriate. This is not expected to be an ARAR as EPA does not anticipate remediating inside a "facility" at OU1 or OU2.			✓
MACA, MCA 75-2-501 et seq., ARM 17.74.351, ARM 17.74.365	Applicable/ Relevant and Appropriate/ Other Requirements	Adopts and incorporates by reference 40 CFR subparts A and M (NESHAP) for asbestos, and the National Institute of Occupational Safety and Health Manual of Analytical Methods for detecting asbestos by phase contrast microscopy and a description of the 7402 Analytical Method for detecting asbestos by transmission electron microscopy. It requires that training for asbestos workers,	Only the provisions governing the handling of RACM would be considered relevant and appropriate requirements. Training requirements are not considered ARARs but would be considered as Other Requirements.	✓		✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
		supervisors, inspectors, project management planners, and project designers meet requirements of 40 CFR 763, subpart E, Appendix C (Asbestos Model Accreditation Plan).				
The Montana Asbestos Control Manual (the Manual)	Applicable/ Relevant and Appropriate/ Other Requirements	The Manual is adopted and incorporated by reference in ARM 17.74.351. It identifies practices and procedures for inspecting for asbestos, conducting asbestos projects, and clearing asbestos projects. MDEQ administers NESHAP through its asbestos control program. NESHAP contains standards that regulate building demolitions, renovations, asbestos disposal sites, and other sources of asbestos emissions.	Only the portions of the Manual that pertain to handling of RACM would be considered applicable or relevant and appropriate. As EPA does not expect to encounter RACM at OU1 or OU2, they will most likely be only relevant and appropriate.	✓		✓
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.204, ARM 17.8.206	Relevant and Appropriate	Ambient Air Monitoring & Ambient Air Methods and Data require that all ambient air monitoring, sampling and data collection, recording, analysis and transmittal be in compliance with the Montana Quality Assurance Manual except when more stringent requirements are determined necessary.	These requirements will be followed unless an equivalent or more stringent approach is deemed appropriate.	✓		
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.220, ARM 17.8.223	Applicable	Ambient Air Quality. The standard for settled particulate matter (PM) specifies that settled PM in ambient air shall not exceed a 30-day average of 10 grams per square meter. PM-10 concentrations in the ambient air shall not exceed 150 micrograms/m3 of air on a 24-hour average and 50 micrograms/m3 of air on an annual average.	The removal action will involve significant soil disturbance. Particulate/dust levels will need to be controlled. The ambient air quality standards include specific requirements and methodologies for monitoring and detection. These requirements will be followed unless an equivalent or more stringent approach is deemed appropriate.	✓		✓
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.304	Applicable	Visible Air Contaminants. No source may discharge emissions to the atmosphere that exhibit opacity of 20% or greater, averaged over six consecutive minutes. This standard is limited to point sources, but excludes motor vehicles.	No visible emissions are anticipated.	✓		✓
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.308	Applicable	Airborne Particulate Matter. Emissions of airborne particulate matter from any stationary source shall not exhibit opacity of 20 percent or greater, averaged over six consecutive minutes.	This standard applies to the production, handling, transportation, or storage of any material; use of streets, roads, or parking lots; and to construction or demolition projects.	✓		✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
ARM 17.24.761	Applicable	Fugitive dust control measures must be met.				✓
Local Air Pollution Control Program, MCA 75-3-301	Applicable	The provisions of the Lincoln County Air Pollution Control Program, approved by Montana DEQ pursuant to § 75-2-301, MCA and administered by Lincoln County, are designed to regulate activities in a designated Air Pollution Control District to achieve and maintain such levels of air quality as will protect human health and safety and, to the greatest degree practicable, prevent injury to plant and animal life and property, and facilitate the enjoyment of the natural attractions of Lincoln County.			✓	✓
Montana Water Quality Act (MWQA) , MCA 75-5-101, et seq., and implementing regulations at ARM 17.30.101	Applicable	General. The Clean Water Act, 33 U.S.C. § 1251, et seq., provides the authority for each state to adopt water quality standards (40 CFR Part 131) designed to protect beneficial uses of each water body and requires each state to designate uses for each water body. The MWQA, § 75-5-101, et seq., MCA establishes requirements for restoring and maintaining quality of surface and ground water. ARM 17.30.601, et seq., establishes the Water-Use Classification system. Under ARM § 17.30.609, the water-use for the Kootenai River is "B-1." Under ARM 17.30.623(1), B-1 waters are to be maintained suitable for drinking, culinary, and food processing use after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, furbearers; and agricultural and industrial water supply. Ditches and certain other bodies of surface water must also meet these requirements.[7] Certain portions of the B-1 standards, codified at ARM § 17.30.623, as well as Montana's nondegradation requirements, are presented below.			✓	

[7] As provided under ARM § 17.30.602(33), "'surface waters' means any waters on the earth's surface, including but not limited to, streams, lakes, ponds, and reservoirs; and irrigation and drainage systems discharging directly into a stream, lake, pond, reservoir or other surface water. Water bodies used solely for treating, transporting or impounding pollutants shall not be considered surface water."

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
Montana Water Quality Act, MCA 75-5-101, et seq., ARM 17.30.623	Applicable	Waters classified B-1 are, after conventional treatment for removal of naturally present impurities, suitable for drinking, culinary and food processing purposes. These waters are also suitable for bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and use for agricultural and industrial purposes. This section provides also that concentrations of carcinogenic, bioconcentrating, toxic or harmful parameters which would remain in water after conventional water treatment may not exceed standards set forth in MDEQ circular DEQ-7. DEQ-7 provides that "whenever both Aquatic Life Standards and Human Health Standards exist for the same analyte, the more restrictive of these values will be used as the numeric Surface Water Quality Standard." The numerical standard for asbestos, is based on the MCL for drinking water regulations of 7,000,000 fibers/liter. The concentration may not exceed this limit in any sample.	The remedial action is not expected to impact surface water or groundwater.	✓		✓
Montana Water Quality Act, MCA 75-5-101, et seq., ARM 17.30.637	Applicable	No waste may be discharged and no activities conducted which, either alone or in combination with other waste activities, will cause violation of surface water quality standards; provided a short term exemption from a surface water quality standard may be authorized by the MDEQ for "emergency remediation activities " under the conditions specified in § 75-5-308, MCA.	This requirement would be triggered only in the event that the removal action impacts surface or groundwater. Excavation may take place close to the Kootenai River. Precautions will need to be put into place to prevent accidental release of asbestos containing soils into the river.	✓		
ARM 17.24.633	Applicable	Stormwater. All surface drainage from the disturbed area must be treated by the best technology currently available.				
ARM 17.30.601, et seq., and ARM 17.30.1301, et seq., including ARM 17.30.1341	Applicable	The substantative requirements of the general permit for stormwater for construction activities - General Permit for Storm Water Discharge Associated with Construction Activity, Permit No. MTR100000 (April 16, 2007) (Expires midnight December 31, 2011) are applicable.	Generally, the permit requires best management practices to prevent discharges which have a reasonable likelihood of adversely affecting human health or the environment.			

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
The Natural Streambed and Land Preservation Act of 1975, MCA 75-7-101, et seq. ARM 36.2.401, et seq., and substantive provisions of MCA 87-5-502 and 87-5-504	Applicable/ Relevant and Appropriate	Establishes minimum standards if a project alters or affects a streambed, including any channel change, new diversion, riprap or other stream-bank protection project, jetty, new dam or reservoir or other commercial, industrial or residential development.	The remedial action may require stream-bank protection. If so, the substantive portions of these requirements would be applicable.			✓
Montana Floodplain and Floodway Management Act, MCA 76-5-401 et seq., and implementing regulations, ARM 36.15.601 et seq.	Applicable/ Relevant and Appropriate	The Floodplain and Floodway Management Act and regulations specify types of uses and structures that are allowed or prohibited in the designated 100-year floodway and floodplain. OU1 and OU2 are adjacent to the Kootenai River, and these standards are relevant to all actions within the floodplain.	According to the National Flood Insurance Program, Floodway Boundary and Floodway Map, the Former Export Plant property is outside the 100-year flood plain. The Screening Plant, which is at a higher elevation, is also presumed to be outside the 100-year flood plain.No solid waste disposal will occur in the floodway or floodplain.		✓	
Montana Floodplain and Floodway Management Act, MCA 76-5-401 et seq., ARM 36.15.602(5), ARM 36.15.605, ARM 36.15.703	Relevant and Appropriate	Solid and hazardous waste disposal and storage of toxic, flammable, hazardous or explosive materials are prohibited anywhere in floodways or floodplains.	The selected action will not result in excavation of materials considered toxic or hazardous. In any event, excavated materials will not be disposed in a flood plain.		✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
Montana Floodplain and Floodway Management Act, MCA 76-5-401 et seq., ARM 36.15.701 ARM 36.15.702(2)	Relevant and Appropriate	In the flood fringe (i.e., in the floodplain but outside the floodway), residential, commercial, industrial, and other structures may be permitted subject to certain conditions relating to placement of fill, roads, and flood proofing. Standards for residential, commercial or industrial structures are found in ARM 36.15.702(2).			✓	
Solid Waste Management Act MCA 75-10-201 and implementing regulations ARM 17.50.501, et seq.	Applicable	The statute and regulations are applicable to the management and disposal of all solid wastes.	EPA expects to encounter soils with asbestos at concentrations <1% at OU1 and OU2. The material is not RACM and qualifies as Group III waste. Substantive requirements for Class III landfills are therefore applicable at locations where the material is disposed. Debris generated in connection with the remedial action will be handled as Group IV waste.			✓
ARM 17.50.503	Applicable	Sets forth definitions for types of solid wastes including Group III and IV wastes.	The material to be excavated from OU1 and OU2 qualifies as a Group III waste. Debris generated as part of the remedial action qualifies as Group IV waste.			✓
ARM Title 17, Chapter 50, subchapter 11	Applicable	Sets forth standards that all solid waste disposal sites must meet including run-on and run-off control system requirements, requirements that sites be fenced to prevent unauthorized access, and prohibitions of point source and nonpoint source discharges which would violate Clean Water Act requirements.	Only the substantive requirements for Class III landfills are applicable. Substantive requirements for Class IV landfills are applicable to debris.			✓
ARM 17.50.1115	Relevant and Appropriate	The owner or operator of a solid waste management facility shall manage asbestos contaminated material in accordance with 40 CFR Part 61, subpart M as adopted by reference in ARM 17.74.351.	These requirements are not expected to apply as EPA does not believe it will encounter RACM at OU1 or OU2. Portions of these requirements may be considered relevant and appropriate.			✓
MCA 75-10-212 and ARM 17.50.523	Applicable	For solid wastes, MCA § 75-10-212 prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted. ARM 17.50.523 specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle.				✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
ARM 17.50.1117 and 17.50.1118	Applicable	These provisions set forth criteria for Class III and Class IV landfills.	EPA expects that excavated soils will qualify as Group III wastes and associate debris will qualify as Group IV wastes.			✓
ARM Title 17, Chapter 50, Subchapters 12, 13, and 14	Applicable	Provide additional design criteria, ground water monitoring, corrective action, and closure requirements for Class IV landfills. Subchapter 14 also contains closure requirements for Class III landfills.	EPA expects that soils to be excavated at OUs 1 and 2 will qualify as Group III wastes.			✓
MCA 75-10-206	Applicable	Provides for a variance from certain solid waste requirements where such variance would not result in a danger to public health or safety.				✓
Montana Antiquities Act, MCA 22-3-421, et seq.	Relevant and Appropriate	Montana Antiquities Act addresses the responsibilities of State agencies regarding historic and prehistoric sites including buildings, structures, paleontological sites, archaeological sites on state owned lands. Each State agency is responsible for establishing rules regarding historic resources under their jurisdiction which address National Register eligibility, appropriate permitting procedures and other historic preservation goals. The State Historic Preservation Office maintains information related to the responsibilities of State Agencies under the Antiquities Act.			✓	
Montana Human Skeletal Remains and Burial Site Protection Act (1991), MCA 22-3-801, et seq.	Applicable	The Human Skeletal Remains and Burial Site Protection Act is the result of years of work by Montana Tribes, State agencies and organizations interested in ensuring that all graves within the State of Montana are adequately protected. If human skeletal remains or burial sites are encountered during remedial activities within OU1 and OU2, then these requirements will be applicable.			✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
MCA 87-5-502 and 504	Applicable	Provide that a state agency or subdivision shall not construct, modify, operate, maintain or fail to maintain any construction project or hydraulic project which may or will obstruct, damage, diminish, destroy, change, modify, or vary the natural existing shape and form of any stream or its banks or tributaries in a manner that will adversely affect any fish or game habitat. The requirement that any such project must eliminate or diminish any adverse effect on fish or game habitat is applicable to the state in approving remedial actions to be conducted. The Natural Streambed and Land Preservation Act of 1975, MCA 75-7-101, et seq., (Applicable -- substantive provisions only) includes similar requirements and is applicable to private parties as well as government agencies.	Consultation with the Montana Department of Fish, Wildlife and Parks, and any conservation district or board of county commissioners (or consolidated city/county government) is encouraged during the designing and implementation of the remedial action for OU1 and OU2.		✓	
Noxious Weeds, MCA 7-22-2101(8)(a) and ARM 4.5.201, et seq.	Applicable	MCA 7-22-2101(8)(a) "noxious weeds" must be managed consistent with weed management criteria developed under MCA 7-22-2109(2)(b).				✓
Occupational Health Act MCA 50-70-101, et seq., ARM 17.74.101 ARM 17.74.102	Other Requirements	ARM 17.74.101, along with the similar Federal standard in 29 CFR §1910.95, addresses occupational noise. ARM 17.74.102, along with the similar federal standard in 29 CFR 1910.1000 addresses occupational air contaminants.	These requirements will be addressed as part of the Health & Safety Plan and do not meet the definition of an ARAR.			✓
Montana Safety Act MCA 50-71-201, 202 and 203	Other Requirements	Every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe. The employer must also do every other thing reasonably necessary to protect the life and safety of its employees. Employees are prohibited from refusing to use or interfering with the use of safety devices.	These requirements will be addressed as part of the Health & Safety Plan and do not meet the definition of an ARAR.			✓
Employee and Community Hazardous Chemical Information Act, MCA 50-78-201, MCA 50-78-202, MCA 50-78-204	Other Requirements	State that each employer must post notice of employee rights, maintain at the work place a list of chemical names of each chemical in the work place, and indicate the work area where the chemical is stored or used. Employees must be informed of the chemicals at the work place and trained in the proper handling of the chemicals.	These requirements will be addressed as part of the Health & Safety Plan and do not meet the definition of an ARAR.			✓

Preferred Remedy Compliance with ARAR Evaluation	
Evaluation Factors for Compliance with ARARs	**Evaluation Summary**
Compliance with Chemical-Specific ARARs	Contaminated soil at depth contained in-place with soil cover with all surface soil removed and disposed of offsite excavations backfilled would physically address contaminant sources and prevent discharges of asbestos fibers to air, thus meeting visible emissions requirements of NESHAP and chemical-specific ARARs for air.
Compliance with Location-Specific ARARs	Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	Action-specific ARARs for the remedy would be addressed during implementation of the remedial action. Specifically, as per EPA's determination the cover requirements specified under NESHAP (40 CFR 61.151) are a potential consideration as a relevant and appropriate ARARs for the site and would be in compliance with this ARAR as allowed under 40 CFR 61.151(c).

Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
ARM	Administrative Rules of Montana
BMP	Best Management Practices
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
MCA	Montana Code Annotated
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NCRS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
RACM	Regulated Asbestos Containing Material
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
TSCA	Toxic Substances Control Act
U.S.C	United States Code