

**SIXTH FIVE-YEAR REVIEW REPORT FOR  
LIBBY GROUND WATER CONTAMINATION SUPERFUND SITE  
LINCOLN COUNTY, MONTANA**



**Prepared by**

**U.S. Environmental Protection Agency  
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Date

## Table of Contents

LIST OF ABBREVIATIONS AND ACRONYMS .....	iv
I. INTRODUCTION.....	1
Site Background.....	1
FIVE-YEAR REVIEW SUMMARY FORM .....	4
II. RESPONSE ACTION SUMMARY .....	4
Basis for Taking Action .....	4
Response Actions .....	5
Status of Implementation .....	8
Systems Operations/Operation and Maintenance (O&M) .....	15
III. PROGRESS SINCE THE PREVIOUS REVIEW.....	16
IV. FIVE-YEAR REVIEW PROCESS.....	17
Community Notification, Community Involvement and Site Interviews .....	17
Data Review.....	18
Site Inspection.....	19
V. TECHNICAL ASSESSMENT .....	19
QUESTION A: Is the remedy functioning as intended by the decision documents? .....	19
QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?.....	20
QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?.....	21
VI. ISSUES/RECOMMENDATIONS .....	21
OTHER FINDINGS.....	22
VII. PROTECTIVENESS STATEMENT.....	23
VIII. NEXT REVIEW .....	23
APPENDIX A – REFERENCE LIST .....	A-1
APPENDIX B – SITE CHRONOLOGY .....	B-1
APPENDIX C – REMEDIAL FEATURES SITE MAP.....	C-1
APPENDIX D – PRESS NOTICE .....	D-1
APPENDIX E – INTERVIEW FORMS .....	E-1
APPENDIX F – SITE INSPECTION CHECKLIST .....	F-1
APPENDIX G – SITE INSPECTION PHOTOS .....	G-1
APPENDIX H – DATA REVIEW FIGURES .....	H-1
APPENDIX I – SCREENING-LEVEL RISK REVIEW .....	I-1

## Tables

Table 1: Soil COC Cleanup Goals.....	6
Table 2: Groundwater COC Cleanup Goals .....	8
Table 3: Summary of Planned and/or Implemented Institutional Controls (ICs).....	12
Table 4: Protectiveness Determinations/Statements from the 2015 FYR Report .....	16
Table 5: Status of Recommendations from the 2015 FYR Report.....	17
Table B-1: Site Chronology.....	B-1
Table I-1: Soil Screening Level Risk Review .....	I-1

## Figures

Figure 1: Site Vicinity Map.....	3
Figure 2: Detailed Site Map .....	11
Figure 3: Institutional Control Map.....	14
Figure C-1: Remedial Features.....	C-1
Figure H-1: New Monitoring Well Location Map .....	H-1
Figure H-2: PCP Concentrations in Lower Aquifer (2019).....	H-2
Figure H-3: PCP Concentrations in Upper Aquifer, Shallow Subunit (2019).....	H-3
Figure H-4: PCP Concentrations in Upper Aquifer, Middle/Deep Subunit (2019).....	H-4

## LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMU	Corrective Action Management Unit
CFR	Code of Federal Regulations
CGA	Controlled Groundwater Area
COC	Contaminant of Concern
Dioxin TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
ELF	Expanded Landfarm
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
IP	International Paper
ISB	In-situ biosparging
LCPA	Lincoln County Port Authority
LNAPL	Light Non-Aqueous Phase Liquid
LTU	Land Treatment Unit
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MCL	Maximum Contaminant Level
MDEQ	Montana Department of Environmental Quality
MNA	Monitored Natural Attenuation
NAPL	Non-Aqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NS	Not Sampled
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCP	Pentachlorophenol
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SAETS	Source Area Extraction and Treatment System
UU/UE	Unlimited Use/Unrestricted Exposure



# I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering the EPA policy.

This is the sixth FYR for the Libby Ground Water Contamination Superfund Site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two operable units (OUs), both of which are addressed in this FYR Report. OU1 addresses the alternative drinking water supply initiative. OU2 addresses contaminated soil and groundwater in the upper and lower aquifers.

The EPA remedial project manager (RPM) Andrew Schmidt led this FYR. Participants included former Montana Department of Environmental Quality (MDEQ) project manager, Lisa Dewitt, and Treat Suomi and Alison Cattani from the EPA FYR contractor Skeo. The review began on 9/30/2019.

The cleanup at the Libby Ground Water Contamination Superfund Site is currently protective for industrial and commercial use. There is a city ordinance which prohibits the installation of drinking water or irrigation wells. International Paper, the responsible party for the Site, continues to pay the City of Libby to help offset the cost of additional irrigation water use and continues to offer the Buy Water program to help with property owner costs. More work is needed in the future so the cleanup stays protective. This includes more groundwater monitoring, reviewing the soil cleanup to decide if changes are needed, starting a controlled groundwater area for parts of Lincoln County, accessing the need for institutional controls for existing private wells, reviewing the dioxin cleanup goal, and thinking about additional controls if they are needed for the remaining waste areas.

## **Site Background**

The Site, a former lumber mill and wood-treatment facility, is located on the eastern edge of the City of Libby in northwest Montana (Figure 1). The facility treated timbers and poles with creosote and pentachlorophenol (PCP) from 1946 to 1969. Historical releases of wood-treating fluids at the Site resulted in impacts to the underlying soil and groundwater. Soil and groundwater remediation have been ongoing at the Site since the late 1980s under the oversight of the EPA and MDEQ. The Site includes two groundwater plumes (Upper and Lower Aquifers) that extend laterally from a former waste pit area to the north-northwest as well as contaminated soil areas and remedial features underlying the original wood-treating facility (Figures 1, 2 and C-1). The former mill property is also OU5 of the Libby Asbestos Superfund Site where the only contaminant of concern being addressed is asbestos.

The former mill property is used for light industrial, commercial and recreational purposes. A portion of the former mill property, owned by Lincoln County Port Authority (LCPA), is currently being developed for additional industrial and commercial uses. A public fishing pond and trail adjacent to the Libby Creek diversion canal on the southeast portion of the Site property were recently finished.

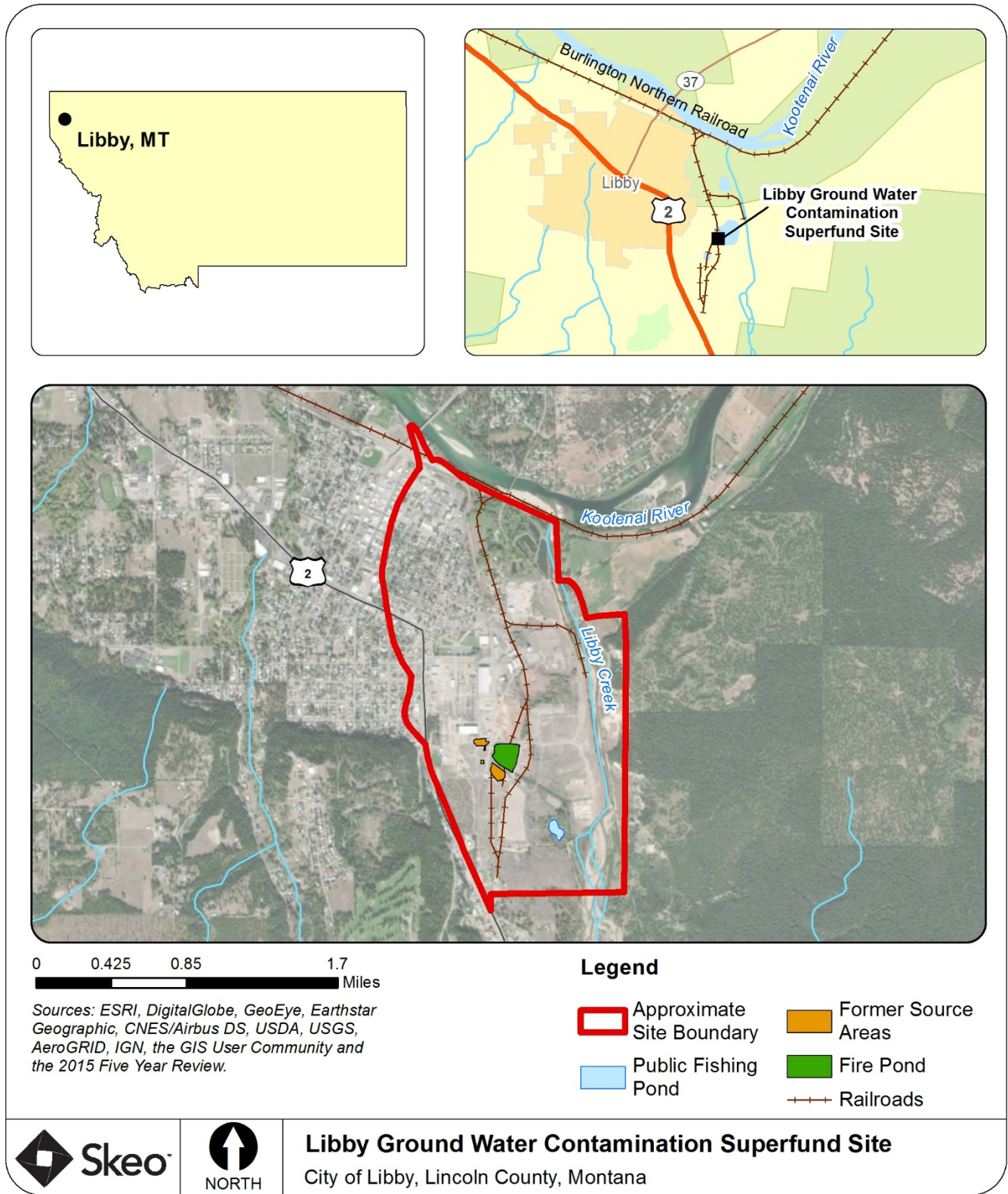
The topographic relief at the Site is relatively flat and dips gently toward the north-northeast. Underlying the Site are two main aquifers separated by a leaky aquitard. The Upper Aquifer occurs from the water table surface (5 to 30 feet below ground surface (bgs)) to about 70 feet bgs and is unconfined. Three Upper Aquifer subunits with differing hydrogeologic properties and/or contaminant impacts have been characterized, including the shallow, middle and deep subunits. The Lower Aquifer consists of alluvial deposits. It occurs from 110 to 190 feet bgs. The groundwater flow direction is north-northwest toward the Kootenai River. PCP and polycyclic aromatic hydrocarbons (PAHs) are the primary contaminants of concern (COCs) at the Site. They exist as both nonaqueous phase liquid (NAPL) and dissolved phase in groundwater.

Local residents historically used the Upper Aquifer (typically the shallow subunit) groundwater for drinking and irrigation. A city ordinance now prohibits drilling water wells for the purpose of human consumption or irrigation in the City of Libby. Instead of personal groundwater wells, City residents currently use public water for human consumption and irrigation. Residents have retained certain wells for irrigation use and these may be used during the summer months.

On-site surface water features include the fire pond, fishing pond, and Libby Creek, which runs along the eastern side of the Site. The Kootenai River is north of the Site. The Kootenai River, which flows to the northwest, is a major river system of regional groundwater discharge used by the public for fishing, boating and other recreational activities.

Appendix A provides a list of Site-related resources referenced in this FYR Report. Appendix B provides the Site's chronology of events.

**Figure 1: Site Vicinity Map**



*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

**FIVE-YEAR REVIEW SUMMARY FORM**

<b>SITE IDENTIFICATION</b>		
<b>Site Name: Libby Ground Water Contamination</b>		
<b>EPA ID: MTD980502736</b>		
<b>Region: 8</b>	<b>State: MT</b>	<b>City/County: Libby/Lincoln</b>
<b>SITE STATUS</b>		
<b>NPL Status: Final</b>		
<b>Multiple OUs?</b> Yes	<b>Has the Site achieved construction completion?</b> Yes	
<b>REVIEW STATUS</b>		
<b>Lead agency: EPA</b>		
<b>Author name: Andrew Schmidt, with contractor support provided by Skeo</b>		
<b>Author affiliation: EPA Region 8 and Skeo</b>		
<b>Review period: 9/30/2019 – 6/1/2020</b>		
<b>Date of site inspection: 11/5/2019</b>		
<b>Type of review: Statutory</b>		
<b>Review number: 6</b>		
<b>Triggering action date: 9/25/2015</b>		
<b>Due date (five years after triggering action date): 9/25/2020</b>		

**II. RESPONSE ACTION SUMMARY**

**Basis for Taking Action**

Beginning in 1983, the EPA performed four phases of site investigative work. The results found that wood-treating compounds in the upper aquifer were migrating off site. Based on 1984 sampling data, in 1985, Champion, successor to the St. Regis Company, offered to pay the owners of contaminated wells to use municipal water. The EPA conducted field investigations in May 1985 and January 1986, and approval to implement an alternate water supply followed shortly thereafter.

A baseline human health endangerment assessment prepared in 1986 as part of the feasibility study and a second baseline endangerment assessment in 1988 identified unacceptable risks to residential populations and industrial and construction workers. Based on these assessments, the EPA determined that residential exposure to groundwater for domestic use would result in unacceptable risks. The primary COCs for groundwater at the Site are PCP and PAHs. Benzene, dioxins/furans, and arsenic are also groundwater COCs, based on their potential association with historical wood-treating practices. However, concentrations of these constituents are not as widespread at this Site. The EPA determined that direct exposure to soils in the waste disposal pit area, the former

butt dip area and the former tank farm would result in unacceptable risk under a residential or industrial land use scenario. Primary COCs for soils include PCP, PAHs, and dioxins/furans.

### **Response Actions**

Between 1946 and 1969, J. Neils Lumber Company and then St. Regis Company operated a wood-treatment mill on site. Its operations contaminated soil and groundwater at several locations. After wood-treating operations ceased in 1969, St. Regis Company continued to own the Site property until 1985, when Champion International Corporation (Champion) purchased it. Operations included periodic hauling of sludge from the wood-treating fluid tanks to waste pits. The Montana Department of Health and Environmental Sciences Water Quality Bureau first detected wood-treating compounds in groundwater in April 1979 when water from a newly-installed residential drinking water well smelled of creosote. In 1980, an initial site investigation by the EPA found creosote, PAHs, and PCP in three of the 11 residential wells sampled. The EPA identified the wood-treating operations at the former Champion property – notably a tank farm, butt dip area, and waste disposal pits – as the source of the groundwater contamination and NAPL (Figure 2).

The EPA placed the Site on the Superfund program's National Priorities List (NPL) in September 1983. The St. Regis Company (the original responsible party) entered into an Administrative Order on Consent with the EPA in October 1983 to begin remedial investigations, feasibility studies and remedial action programs

The EPA signed the Site's OU1 Record of Decision (ROD) in September 1986. The remedial action objective (RAO) for OU1 was to significantly reduce or eliminate human exposure to contaminated groundwater as an interim remedy. The 1986 ROD states:

- An ordinance by the City of Libby preventing the installation of new water wells that would provide water for human consumption or irrigation in the upper and lower aquifers within the limits of the City of Libby.
- A Buy Water Plan, in which responsible parties offered to plug and abandon domestic wells within the aerial extent of groundwater contaminated by the Site, hook residents up to city water (if not already) and offered financial compensation for the increased cost of using city water for irrigation purposes.
- An agreement between the responsible party and the City of Libby, whereby Champion provided annual compensation to the City to ensure free irrigation water to residents.

The EPA signed the Site's OU2 ROD in December 1988. The RAOs for OU2 were to reduce human exposure to both the soil and groundwater COCs. Two Explanations of Significant Differences (ESDs), one in 1993 and a second in 1997, modified the remedy selected in the 1988 OU2 ROD. In 2020, a ROD Amendment was signed.

The major components of the original OU2 remedy (1988 ROD, 1993 and 1997 ESDs) include:

- Excavation and consolidation of contaminated soils from identified source areas (Figure C-1 in Appendix C).
- On-site soil treatment via biodegradation (i.e., landfarming).
- Use of proprietary controls for property within the Site identifying locations of hazardous areas and land-use restrictions to limit use to industrial or commercial use.
- In-situ bioremediation of groundwater beneath the waste pit areas.
- NAPL source area extraction, treatment and reinjection.
- An ordinance preventing the installation of new water wells for human consumption or irrigation in the Upper and Lower aquifers within Libby city limits.<sup>1</sup>
- Monitoring activities.

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<sup>1</sup> The city ordinance was included in both the OU1 interim remedy and the final OU2 remedy.

The EPA determined that active remediation in the Lower Aquifer was technically infeasible via a technical impracticability waiver and updated the remedy for the Lower Aquifer (institutional controls and monitoring) in the 1993 ESD. The 1993 ESD for the Lower Aquifer discussed that long-term monitoring will be conducted to determine if the contaminant plume is moving and ensure protection of human health. If plumes are shown to migrate in the future, potential damage to the Kootenai River will be assessed. Results of the Lower Aquifer monitoring program will be submitted to EAP and MDEQ annually. Modifications to the monitoring program will be assessed at the FYR. The 1993 ESD also removed soil cleanup goals for several COCs. The 1997 ESD revised soil and groundwater cleanup goals to address updated federal and state maximum contaminant levels (MCLs) and risk assessment calculations. Table 1 lists the final soil cleanup goals for the land treatment unit (LTU).

**Table 1: Soil COC Cleanup Goals**

Soil COC	ROD Cleanup Goals (mg/kg) <sup>a</sup>
Total Carcinogenic PAHs	88 <sup>b</sup>
Acenaphthene	166
Anthracene	33
Fluorene	250
Fluoranthene	250
Chrysene	59,400
Benzo(a)anthracene	594
Benzo(b)fluoranthene	594
Benzo(k)fluoranthene	5,940
Benzo(a)pyrene	59
Indeno (1,2,3-c,d)pyrene	594
Dibenzo(a,h)anthracene	59
PCP	36
2,3,7,8-Tetrachlorodibenzo-p-dioxin (Dioxin TCDD)	0.0029
<p><i>Notes:</i>            Soil cleanup goals are site-specific and risk-based using a construction worker exposure scenario.            mg/kg = milligrams per kilogram            a. Cleanup goals provided in 1997 ESD unless otherwise noted.            b. Cleanup goal set in the 1988 OU2 ROD, utilized for contaminated soil excavation.</p>	

Due to ongoing issues with meeting cleanup levels in the NAPL-impacted portions of the Upper Aquifer, the EPA and MDEQ revised the cleanup strategy for the Upper Aquifer, with a focus on three areas with remaining impacts (Areas 1, 2, and 3, Figure 2). The EPA issued the Record of Decision Amendment (ROD Amendment) in April 2020. The RAOs include:

- Prevent ingestion of upper aquifer groundwater with site-related COCs that exceed revised groundwater cleanup levels.
- Protect human health and the environment by reducing site-related COCs in upper aquifer groundwater to preliminary revised groundwater cleanup levels.

The updated remedy in the 2020 ROD Amendment consists of the following changes:

- Replace the current source area extraction and treatment system (SAETS) with in-situ biosparging (ISB) in the NAPL source area (Area 1).
- Add ISB to the area downgradient of the NAPL source area (Area 2).
- Continue monitored natural attenuation (MNA) for the dissolved plume area (Area 3).

- Updated performance standards for groundwater, based on current State and federal standards.
- Continuation of all other aspects of the ongoing remedial action, including institutional controls.

The 2020 ROD Amendment focuses on the following areas of the Site (shown on Figure 2):

- Area 1 (2.7 acres) includes the former waste pit source area that contains predominantly residual (immobile) NAPL and the highest groundwater contaminant concentrations.
- Area 2 (33 acres) includes the former tank farm source area and residual NAPL that historically migrated away from the former sources.
- Area 3 (98 acres) includes the area containing only dissolved-phase COC contamination in the Upper Aquifer (beyond the extent of observed NAPL).

Upper Aquifer remediation areas were developed on the basis of COC concentrations in groundwater and the interpreted presence of NAPL in the Upper Aquifer. Selecting remediation areas in this manner allowed for evaluating more rigorous treatment technologies in the areas that pose the greatest risk to human health (i.e., areas of the aquifer with the highest COC concentrations) and those areas that serve as a continuous source of groundwater contamination (i.e., areas of the aquifer with the greatest NAPL impacts).

Table 2 lists the groundwater cleanup levels from the 1997 ESD and the groundwater cleanup levels in the newly-signed 2020 ROD Amendment for the Upper Aquifer. While the COCs in the Upper Aquifer consist of PCP, PAHs, benzene and arsenic, the distribution of PCP in groundwater has the largest vertical and horizontal extent. The extent of the contaminants is within the extent of the PCP plume; therefore, the PCP plume will be referred to more frequently in this document and other site documents. The updated remedy will remediate all COCs shown in Table 2.

**Table 2: Groundwater COC Cleanup Goals**

Groundwater COC	Cleanup Goals 1997 ESD (µg/L)	Cleanup Goals 2020 ROD Amendment (µg/L)
Pentachlorophenol	1	1 <sup>a</sup>
Benzene	5	5 <sup>a</sup>
Arsenic	50	10
Dioxin TCDD	0.00003	0.00003
Chrysene	0.2	50
Benzo(a)anthracene	0.1	0.5
Benzo(b)fluoranthene	0.2	0.5
Benzo(k)fluoranthene	0.2	5
Benzo(a)pyrene	0.2	0.2 <sup>a</sup>
Indeno(1,2,3-c,d)pyrene	0.4	0.5
Dibenzo(a,h)anthracene	0.3	0.05
Acenaphthene	NL	70
Anthracene	NL	2,100
Fluoranthene	NL	20
Fluorene	NL	50
Naphthalene	NL	100
Pyrene	NL	20
<i>Notes:</i> a. Cleanup level based on MCL. All other cleanup levels are based on DEQ-7 groundwater quality standards. NL = not listed as a COC µg/L = micrograms per liter		

**Status of Implementation***OU1*

The OU1 interim remedy, consisting of an alternative water supply and institutional controls, started in October 1986 is in place. The interim remedy for OU1 includes:

- An offer of an alternate water supply to Libby residents whose domestic wells were either contaminated or potentially contaminated by off-site contaminant migration in the Upper Aquifer. Residents who agreed to participate in the Buy Water Plan would obtain their water from Libby's public water system. Champion capped and locked domestic wells and provided the resident monetary compensation for costs incurred from using metered public water. The first FYR Report stated that 35 residential well owners were part of the Buy Water Plan.
- Champion augmented the Buy Water Plan in 1997 by offering to reimburse affected well owners with \$2,000. In return, the well owners allowed Champion to permanently seal and disable their wells according to state well abandonment regulations. The second FYR Report stated that 44 residential wells were abandoned and sealed by Champion. Effective June 20, 2000, Champion became a wholly owned subsidiary of International Paper Company (IP). Then on December 31, 2000, Champion was merged into IP. IP, the current potentially responsible party (PRP), recently reported one additional abandoned well.
- Champion also made 12 payments of \$30,000 per year to the city for a fixed amount of irrigation water per household. Payments began in 1986. IP is currently in the process of renegotiating the terms of the agreement with the City of Libby.



- Adoption of a city ordinance prohibiting the installation of new water supply wells (within city limits) in the Upper and Lower aquifers for the purpose of consumption or irrigation. The ordinance, passed in 1986, is still in effect.
- IP continues to offer incentives to residents who want to utilize city water.
- All city residents are currently connected to city water.

## OU2

The OU2 remedial design began in March 1989. Remedial action began in October 1989.

### Soils and Source Area NAPL Extraction

Three source areas were identified in the 1988 OU2 ROD. These source areas were removed because they are a source to groundwater contamination. The remedy was to excavate soils in these waste areas until groundwater was reached. The excavated soil was then treated on the landfarm. Once the material met the cleanup goals, it would be stored in an LTU. Excavation limits were defined as the depth to groundwater or until remaining soils did not exceed the 88 milligrams per kilogram (mg/kg) PAHs cleanup goal.<sup>2</sup> Excavated areas were backfilled with clean fill.

The LTU consists of two one-acre lined impoundments. In 1998, to accelerate the completion of the soil remedy, the PRPs constructed an additional 10-acre land treatment area called the Expanded Landfarm (ELF) (Figure 2). The ELF has been operating since about 1998 with periodic cultivation and irrigation. The ELF system has been effective at degrading PAHs and PCP; however, it has not been as effective at degrading dioxin/furan compounds. In recent years, soils have remained in the ELF because the dioxins in the soils exceed the cleanup level.

A technical memorandum was submitted to the Agencies on July 9, 2018, which contained a proposed land treatment closure approach based on the recent soil sample results. The Agencies and IP are working together to assess whether to reclassify the LTU as a Corrective Action Management Unit (CAMU) to allow for an in-place closure that meets ARARs.

The SAETS, constructed in 1991, recovers NAPL and contaminated groundwater from the Upper Aquifer in the waste pit area. The SAETS currently consists of the bioreactor system and the coalescing separator system, located in the bioreactor building. Three components make up the two sub-systems: 1) three extraction wells, 2) two oil/water separators and 3) bioreactor tanks and ancillary equipment. The fixed-film bioreactors have degraded more than 33,000 pounds of total PAHs and 6,600 pounds of PCP since 1991.

In the mid-1990s, a NAPL recovery program separate from the SAETS, was implemented in the vicinity of the former tank farm area to monitor for NAPL and to remove NAPL, if practical. The NAPL recovery and monitoring program is ongoing and consists of twenty-nine wells. Over 70 gallons of light NAPL (LNAPL) has been recovered from two wells (3031.1 and 3039.1) since 1993.

### Groundwater

The remedy for the Upper Aquifer originally consisted of two in-situ bioremediation systems: the intermediate injection system and the boundary injection system. The intermediate injection system, located in the tank farm area, operated from 1987 to 1997. The boundary injection system, located about 1,000 feet downgradient of the intermediate system, operated from 1993 to 2003. Operation discontinued because both systems were no more effective than natural attenuation in reducing dissolved-phase PCP and PAHs to cleanup levels, due to the presence of trapped NAPL in the Upper Aquifer.

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<sup>2</sup> Contaminated soil was excavated based on the exceedance of the Total Carcinogenic PAHs cleanup goal. The 1988 ROD selected total carcinogenic PAHs as the indicator cleanup level because PAHs were ubiquitous in the three waste areas and were found to be collocated with other COCs.

Since completion of the bioremediation efforts and entering the long-term groundwater monitoring phase, the remedy has undergone numerous changes and adjustments. Initiation of a comprehensive groundwater monitoring program began in the fall of 1991 to evaluate the overall distribution of contamination in the Upper Aquifer. The dissolved phase plume in the Upper Aquifer currently extends about 1,600 feet north and west of the former mill property line. The outermost downgradient extent of the plume is more than a half-mile upgradient of the Kootenai River. PCP, the most widespread groundwater COC, defines the dissolved-phase plume.

NAPL is distributed throughout the Upper Aquifer in a complex manner and is most frequently observed near the base of the Upper Aquifer near the former waste pit where the source area extraction wells are screened. The estimated area of Upper Aquifer impacted by NAPL is about 40 acres.

Based on recommendations in the 2010 FYR Report, additional groundwater characterization work for the Upper Aquifer was undertaken to better delineate the extent of the dissolved-phase plume, understand the nature and extent of NAPL in the Upper Aquifer, evaluate newer remedial technologies, and develop a numerical groundwater flow and transport model.

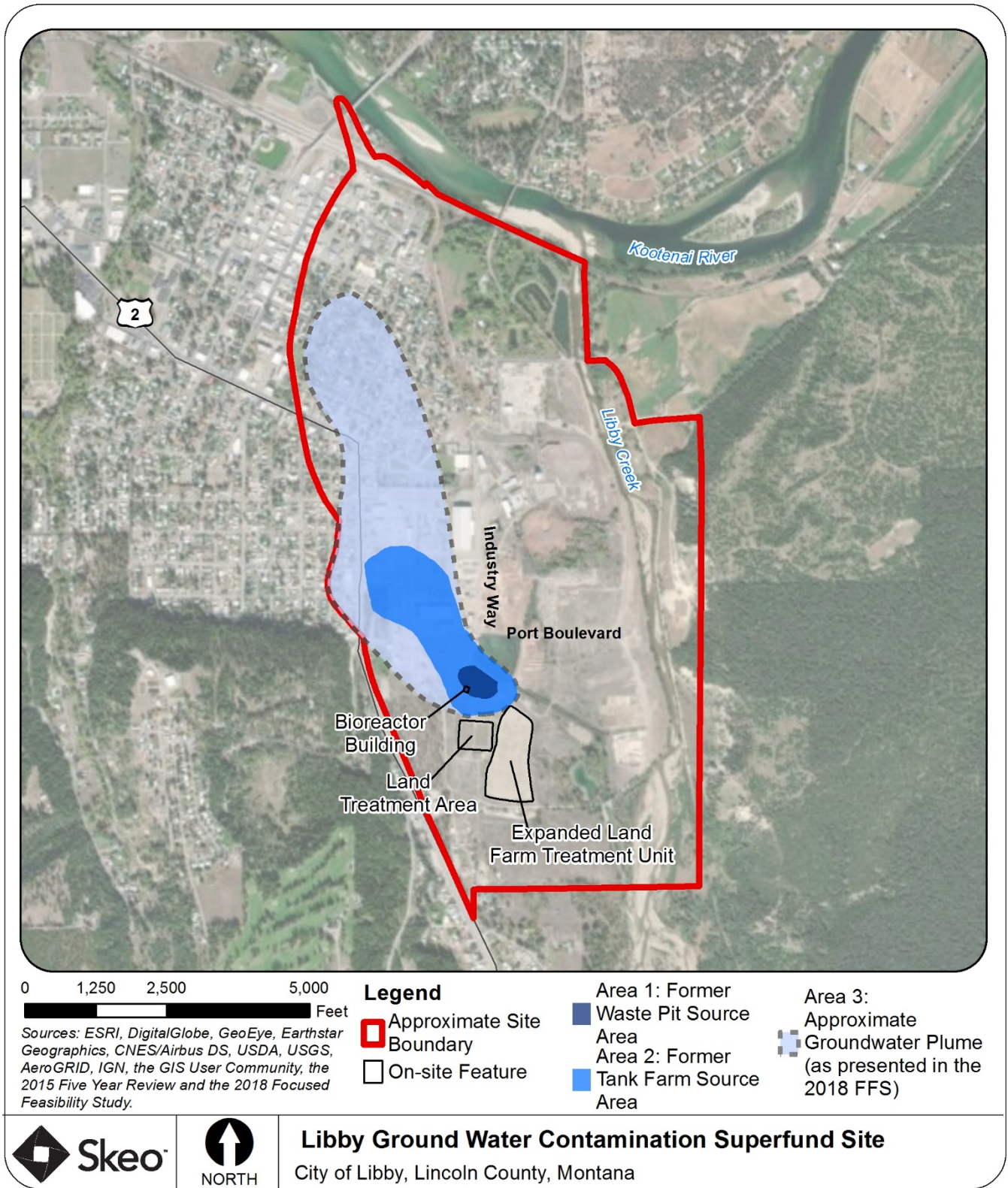
IP completed the following additional studies and activities between 2011 and 2016:

- Conducted a vapor intrusion investigation from 2011 to 2013 to assess vapor intrusion as a potential exposure pathway. Results indicated no evidence of any vapor intrusion.
- Re-evaluated groundwater cleanup levels based on current federal and state standards, resulting in the updated 2020 ROD Amendment with revised RAOs and cleanup levels' incorporation.
- Conducted laboratory treatability studies to evaluate hot water/steam-enhanced extraction and ISB technologies for removing NAPL and reducing dissolved-phase COCs in groundwater.
- Led field pilot study for ISB to determine specific parameters related to how well it might work at the Site.
- Collected additional NAPL and groundwater samples needed to support conceptual design and development of remedial alternatives.

All of this information was compiled in a comprehensive Focused Feasibility Study (FFS) Report, which was used to support the recently amended remedy in the 2020 ROD Amendment.

Remedy construction for additional ISB activities will begin following the completion of remedial design, in 2021 or 2022.

**Figure 2: Detailed Site Map**



*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

**Institutional Control (IC) Review**

The EPA’s 1986 ROD required a city ordinance prohibiting drilling new water supply wells within the city limits. Additionally, the Buy Water Plan was initiated as an interim remedy to provide residents with monetary compensation for using city water in lieu of their existing wells. The city ordinance is still in place today and IP continues to subsidize a portion of the city water cost for residents. There are some wells located within the city limits that existed prior to the ordinance. These wells are used for irrigation and not for household use. The EPA is attempting to strengthen public awareness of groundwater contamination particularly for owners of existing wells. A well survey will also be conducted as part of the implementation of the proposed controlled groundwater area (CGA).

Currently, there are no restrictions on the installation of wells or groundwater use outside the city boundary on county land. Outside of the city ordinance boundaries, there are areas with current groundwater contamination, and areas that groundwater contamination could migrate to. To address this issue, the EPA is proposing a CGA that will expand into county areas and prohibit well installation. Notices will be placed on properties outside of city limits, but within the proposed CGA boundary, to inform future purchasers of the CGA restrictions. IP has agreed to expand the Buy Water Plan to the entire CGA area. Property owners with existing wells in the proposed CGA, and who are not on city water, will be offered the opportunity to be connected to city water. IP will offer to provide those landowners with compensation to help offset the cost of city water, in exchange for abandoning, or capping and locking the well. For current landowners who have wells but are also on city water, IP will offer to abandon, or cap and lock the well. If the well is used for irrigation, IP will offer compensation for the increased cost of using city water.

As required in the 1988 OU2 ROD, a deed restriction is in place on the former mill property identifying the locations of the waste disposal pit area, former butt dip area and the former tank farm area, and restricting the future land use of these source areas. The deed restriction does alert the owner of the presence of a Superfund Site and prohibits actions that would interfere with the remedy. The soil cleanup goals for the Site are based on commercial/industrial land use. Although current property zoning is commercial and industrial, and expected to remain so, no mechanism is in place to ensure future land use at all areas within the Site does not change<sup>3</sup>. The ELF and LTUs may require additional restrictions based on the long-term plan for these disposal areas.

**Table 3: Summary of Planned and/or Implemented Institutional Controls (ICs)**

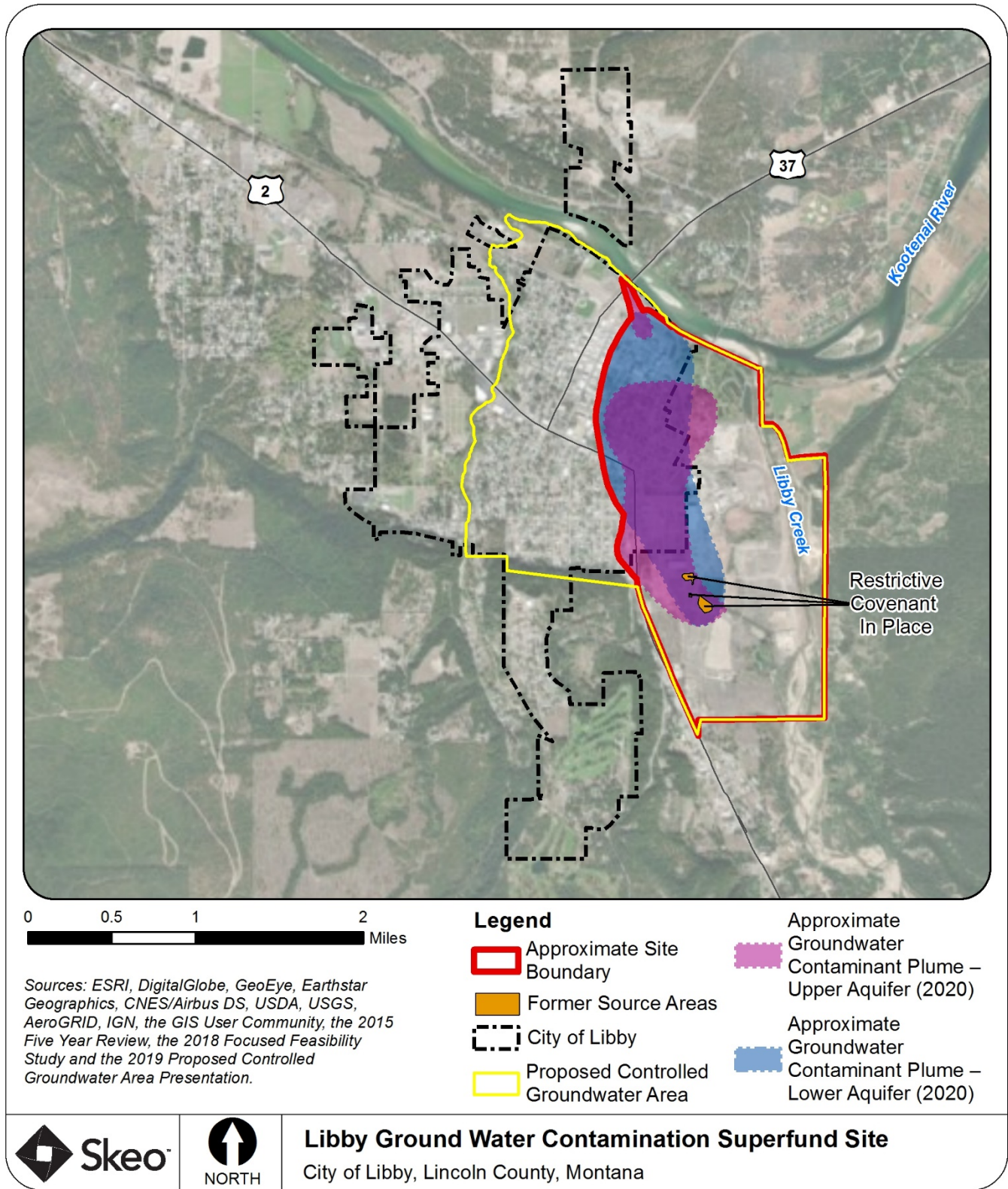
<b>Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions</b>	<b>ICs Needed</b>	<b>ICs Called for in the Decision Documents</b>	<b>Impacted Parcel(s)</b>	<b>IC Objective</b>	<b>Title of IC Instrument Implemented and Date (or planned)</b>
Groundwater	Yes	Yes	City of Libby	Prohibit installation of groundwater wells used for human consumption or irrigation	City ordinance for properties within City of Libby corporate limits (1986) Buy Water Plan (1986)
	Yes	Yes	Impacted parcels outside the City of Libby in Lincoln County		CGA (proposed) Buy Water Plan (1986)

<sup>3</sup> EPA and DEQ are working with the Port of Lincoln County on a deed restriction to prohibit residential use of this property pursuant to the Libby Asbestos NPL Site remedial implementation.

<b>Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions</b>	<b>ICs Needed</b>	<b>ICs Called for in the Decision Documents</b>	<b>Impacted Parcel(s)</b>	<b>IC Objective</b>	<b>Title of IC Instrument Implemented and Date (or planned)</b>
Soil in source areas	Yes	Yes	Source areas: waste disposal pit area, the former butt dip area and the former tank farm, and other Site property.	Prohibit activities that could disturb the source areas and treatment areas and restrict land use in these areas	Restrictive covenant attached to deed (1993)



**Figure 3: Institutional Control Map**



*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA’s response actions at the Site.

### **Systems Operations/Operation and Maintenance (O&M)**

The Annual Landfarm Operations Reports describe operations and maintenance (O&M) and long-term monitoring activities performed at the LTUs. Operations include periodic cultivation and irrigation of the soils in the ELF. Once the soils in the ELF meet cleanup levels, soils are transferred to the LTU. Leachate collected in the LTU sumps undergoes quarterly sampling. All water collected from the sumps is directly discharged into the on-site infiltration trench. Three basic monitoring activities occur at the landfarm: 1) soil sampling in the treatment zone to evaluate contaminant degradation, soil moisture, and compliance with cleanup levels, 2) sampling of leachate from the collection sumps, and 3) berm integrity inspections. In 2018, confirmation soil samples were collected from the ELF to assess PCP, PAH and dioxin degradation. Sampling indicates PAHs and PCP were below their respective remediation goals. However, dioxin concentrations remain above the remediation goal. In general, samples are close to the dioxin cleanup goals with the exception of a single congener which ranges from one to three orders of magnitude above its cleanup goal. The EPA is currently reevaluating if the soil remedy is capable of meeting the dioxin soil remediation goals within the LTU.

The SAETS Annual Operations Reports for each operational year describe O&M and long-term monitoring activities associated with the SAETS and performed at the Site. O&M activities at the Site have evolved as conditions have changed, but current O&M of the SAETS is adequate to ensure consistent system operation. The SAETS operation inspections occur nearly five days a week. The SAETS removed approximately 13.24 million gallons of oil-contaminated groundwater from the Upper Aquifer in 2018. In 2018, the bioreactor treatment system averaged nearly 85 percent removal for total PAHs and 69 percent removal for PCP while operating in the series mode. The SAETS will continue operation until the ISB remedy is ready for implementation.

Long-term groundwater monitoring at the Site occurs annually and includes collection of groundwater samples for chemical analysis and water levels from the monitoring well network. Upper and Lower Aquifer monitoring is conducted in accordance with the 2005 Final Groundwater Monitoring Plan.

The Lower Aquifer Monitoring Program is designed to collect groundwater data at appropriate locations and frequencies to monitor the location of the contaminant plume and any changes in contaminant concentrations resulting from remedial actions in the Upper Aquifer. The plan divides the Lower Aquifer wells into two networks: Group 1L – Perimeter Monitoring Wells and Group 2L – Interior Monitoring Wells. Group 1L wells are sampled every two years and Group 2L wells are sampled every year and analyzed for COCs.

The Upper Aquifer monitoring plan was designed to collect groundwater data at appropriate locations and frequencies to monitor the location of the contaminant plume and monitor any changes in contaminant concentrations resulting from remedial actions. The plan divides the Upper Aquifer wells into two networks: Group 1U – Perimeter Monitoring Wells and Group 2U – Interior Monitoring Wells. Group 1U wells are sampled every two years and Group 2U wells are sampled every year and analyzed for COCs. The monitoring plan for both the Upper and Lower Aquifer will be updated in 2020 or 2021.

Groundwater monitoring activities in the Upper and Lower Aquifer are described in the Data Review section of this FYR report. The Site's monitoring program receives annual examination to determine if the program can eliminate any wells and/or analyses.

### III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report as well as the recommendations from the previous FYR Report and the status of those recommendations.

**Table 4: Protectiveness Determinations/Statements from the 2015 FYR Report**

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	<p>The interim remedy at OU1 currently protects human health and the environment because the city is implementing and enforcing its ordinance that prohibits use of contaminated groundwater within the city limits and there are no known users of contaminated groundwater outside of the city limits. However, for the remedy to be protective in the long term, it must include additional institutional controls to prohibit groundwater use outside of the city limits.</p>
2	Short-term Protective	<p>The remedy at OU2 currently protects human health and the environment because no known completed exposure pathways exist. As with OU1, a city ordinance prohibits groundwater use within the city limits and there is no known groundwater use in contaminated areas of Lincoln County. Areas with remaining soil contamination are fenced and some land use restrictions are in place. However, for the remedy to be protective in the long term, it must include the following additional actions:</p> <ul style="list-style-type: none"> <li>• Implement additional institutional controls to restrict land use and activities which may interfere with remedial activities in all areas with remaining waste;</li> <li>• Modify groundwater ARARs in a decision document;</li> <li>• Assess risk-based cleanup levels and residual soil contamination; and</li> <li>• Appropriately modify the remedy modifications to ensure RAO achievement.</li> </ul>
Sitewide	Short-term Protective	<p>Because the remedial actions at all OUs currently protect human health and the environment, the Site currently protects human health and the environment.</p>



**Table 5: Status of Recommendations from the 2015 FYR Report**

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	The city ordinance does not include all properties overlying the contaminant plume.	Implement additional institutional controls to restrict use of contaminated groundwater in all affected areas.	Addressed in Next FYR	The EPA and MDEQ, in conjunction with IP are developing a proposed CGA.	Not applicable
2	The current OU2 remedy may not attain RAOs.	Complete focused remedial investigation and feasibility study and, if modifications to existing remedy are deemed appropriate by EPA, record modified remedy in a decision document.	Completed	PRPs completed the FFS in April 2018. The Agencies published the Proposed Plan in August 2019. The ROD Amendment was issued in April 2020.	3/20/2020
2	Land use controls do not limit future land uses or protect all areas with waste at certain locations on site.	Implement additional institutional controls to restrict land use and protect areas with waste in place for those locations.	Addressed in Next FYR	Prior to closure of the LTU and the ELF, the EPA will consider this issue.	Not applicable
2	Groundwater cleanup levels may no longer be valid.	A decision document is necessary to incorporate Circular DEQ-7 Montana Numeric Water Quality Standards.	Completed	The ROD Amendment updated the groundwater cleanup levels. The ROD Amendment was issued in 2020.	Not applicable
2	Soil cleanup levels may no longer be valid.	Assess risk from residual contamination and determine if soil remedy can meet appropriate cleanup levels.	Addressed in Next FYR	Prior to the closure of the LTUs, the EPA will review the soil cleanup goals to ensure they are protective and will ensure appropriate long-term disposal of treated soils.	Not applicable

**IV. FIVE-YEAR REVIEW PROCESS**

**Community Notification, Community Involvement and Site Interviews**

The EPA provided public notice by newspaper postings in The Western News on November 1, 2019, The Kootenai Valley Record on October 29, 2019, and in The Montanian on October 30, 2019 (Appendix D). The notice stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the report will be made available at the Site’s information repository, Lincoln County Health Department, located at 408 Mineral Avenue in Libby.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy implemented to date. The interviews are summarized below.

Lincoln County Board member, George Jameson, feels that remedial activities seem appropriate and expressed a positive impression of the project. Mr. Jameson feels that information about site activities should be updated and placed in the library or the Board of Health website to keep the community better informed.

David Cosgriff, O&M contractor, provided an overview of the O&M activities at the Site, indicating there have not been any significant changes in maintenance, monitoring or sampling of the current systems.

Brent Teske, Mayor of Libby, observed that there is not much public awareness of the Site, although with the updated remedy and the proposed CGA, people are becoming better informed.

IP, the PRP, indicated that overall, progress is being made and the remedy is being updated to enhance the performance of the current remedy.

Kathi Hooper, Lincoln County Board of Health, is impressed with the level of research involved with identifying an updated remedy. Ms. Hooper feels the EPA is doing a good job keeping the people informed about risk associated with the Site, but generally that the public is not well informed about the Site's activities due to a lack of interest.

### **Data Review**

During this FYR period, the EPA collected the following data including: groundwater monitoring data for the Upper and Lower aquifers (annual reports from 2015, 2016, 2017 and 2018 and monitoring well installation report from 2019), FFS investigation activities (2011 to 2016), ELF soil data, and SAETS operational data. The data from the FFS were used to support the OU2 ROD Amendment and are discussed above in the Response Action Summary section of this FYR Report. The ELF soil data and SAETS operational data are discussed above in the O&M section of this FYR Report. This data review will discuss groundwater monitoring conducted at the Site since the 2018 FFS to provide a current understanding of the extent of the contaminant plume and any changes in contaminant concentrations.

The FFS Report concluded that the COC plumes (referred to as Area 3 in the 2020 AROD) in the three subunits of the Upper Aquifer are stable and concentrations are decreasing in the outermost portions of the plume and in some wells in the former tank farm area. Based on the plume extent mapped as part of the FFS and subsequent studies, contaminated groundwater is not discharging to or impacting the Kootenai River.

Since the FFS was conducted, groundwater monitoring generally supported these conclusions in the Upper Aquifer. Concentrations of PCP and other COCs were generally consistent with the extent of contamination observed during the FFS. However, starting in 2016, PCP concentrations increased above the MCL downgradient of the previously-mapped outermost extent of the PCP in the Lower Aquifer. In response to the increase in PCP concentrations, IP installed additional wells in 2018 (Lower Aquifer) and 2019 (Lower Aquifer and Upper Aquifer) (Figure H-1 in Appendix H). The newly-installed Upper Aquifer well also exhibited concentrations above the PCP MCL and additional wells were installed. The 2019 data collected from the new monitoring wells was provided in the 2020 *Draft Monitoring Wells Installed During 2019 – Investigation Field Activity and Data Summary Report for Libby*. The data allowed IP to update the water table and potentiometric surface elevations, the horizontal and vertical groundwater flow paths, and the lateral and vertical extent of PCP in the aquifers.

#### *Lower Aquifer*

The primary COC in the Lower Aquifer is PCP. In 2018, only one Lower Aquifer well (well 6002) had concentrations of other COCs above respective groundwater cleanup levels. This well is located within the current estimated NAPL extent.

Prior to 2015, Lower Aquifer well 6500-2 contained PCP concentrations below the MCL of 1 µg/L. This well was used with other nearby Lower Aquifer wells to establish the downgradient extent of PCP in the Lower Aquifer. Since 2015, well 6500-2 has consistently exceeded the PCP MCL of 1 µg/L, steadily increasing from 2.2 to 40 µg/L. New Lower Aquifer wells 6504-1, 6504-2 and 6504-3 (Figure H-1) were installed in 2018 in response to the PCP MCL exceedance in well 6500-2. PCP concentrations ranged from 11 to 340 µg/L in the 6504 cluster, based on annual sampling events in 2018 and 2019. New Lower Aquifer wells 6505-2, 6505-3 and 6506-1 were installed in 2019 in response to the PCP MCL exceedance in Lower Aquifer well cluster 6504. Groundwater PCP

concentrations in these wells are below the laboratory reporting limit of 0.5 µg/L based on two sampling events in 2019.

An updated Lower Aquifer plume map incorporating these results is provided in Figure H-2 in Appendix H. It is unknown at this time whether the increasing concentration in PCP observed in well 6500.2 and in new Lower Aquifer well cluster 6504 have existed historically or whether this represents a recent movement of dissolved phase PCP or NAPL in the Lower Aquifer. IP recommends quarterly monitoring of Lower Aquifer wells located near the downgradient extent of PCP for a period of one year to determine if additional investigation is needed.

#### *Upper Aquifer*

IP installed well 6505-1 in the Upper Aquifer deep subunit in 2019 to assess whether upward flow from the Lower Aquifer was occurring in the area of Lower Aquifer well 6504. PCP concentrations in new well 6505-1 ranged from 48 to 59 µg/L based on two sampling events in 2019. As a response to these results, IP installed new wells in the middle/deep subunit (6021-1, 6022-1, 6024-2, 6024-3 and 6025-2) and the shallow subunit (6023-1, 6024-1 and 6025-1). All wells were below the PCP MCL with the exception of 6021-1 (middle/deep subunit), located upgradient of 6050-1, which had a concentration of 150 µg/L in 2019.

Updated Upper Aquifer plume maps incorporating these results are provided in Figure H-3 (shallow subunit) and Figure H-4 (middle/deep subunit) in Appendix H. IP believes PCP MCL exceedances in Upper Aquifer wells 6021-1 and 6505-1 may be related to discrete flow of dissolved PCP or NAPL in the Upper Aquifer through strata previously not monitored or due to upward flow of dissolved PCP from the Lower Aquifer to the Upper Aquifer. To further monitor whether upward flow or lateral flow is impacting the area around wells 6505.1 and 6021.1, IP recommends quarterly monitoring of Upper Aquifer wells located near the downgradient extent of PCP for a period of one year to determine if additional investigation is needed.

#### **Site Inspection**

The Site inspection took place on 11/5/2019. Participants included EPA RPM Andrew Schmidt, Tom Richardson with PRP IP, David Cosgriff from IP consultant Arrowhead Engineering, and Treat Suomi from EPA FYR support contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Appendices F and G provide the site inspection checklist and photos.

Site inspection participants met at the site field office and lab at 231 Port Boulevard to conduct the site inspection and observe remedy components. After discussing current site status, participants walked the Site to observe the waste pit treatment area, bioreactor building, monitoring wells, injection wells, and LTUs. Wells on surrounding properties were observed. Many monitoring wells in the area neighborhoods were not secure and had standing water. The O&M contractor indicated that due to the use of salt on the roads in the winter, the bolts corrode frequently, but they would work on a way to ensure they are secure. Site visit participants then viewed the newly-installed monitoring wells. These wells were secure and appeared to be in good condition. In addition, site visit participants saw well installation work occurring across the Kootenai River.

Upon returning to the Site, participants visited an on-site well, which had been damaged by trucks operating as part of tenants' normal industrial/commercial activities. As a result of this event, the PRP intends to send letters to all LCPA tenants to emphasize the need to protect on-site wells from damage.

## **V. TECHNICAL ASSESSMENT**

**QUESTION A:** Is the remedy functioning as intended by the decision documents?

#### *OU1*

The interim remedy for OU1 is functioning as intended. The remedy for OU1 involved providing an alternative water supply source for Libby residents through the Buy Water Plan and adoption of a city ordinance prohibiting

the installation of groundwater wells for human consumption or irrigation. For this to continue, the City of Libby and IP need to reach agreement for the continuation of these Institutional Controls and/or a Controlled Ground Water Area petition from the Department of Natural Resources and Conservation to provide similar protections for areas outside the City limits.

#### *OU2 - Groundwater*

The current remedy for OU2 is not functioning as intended due to the inability to meet RAOs in the intended timeframe. The treatment system continues to remove NAPL from the source area, but significant additional material remains, much of it as immobile, residual NAPL that will continue to act as a long-term source of dissolved contaminants in groundwater. IP completed the FFS in 2018 and the EPA issued the ROD Amendment in April 2020 and updated the remedy for three areas of the Site based on the results from the FFS. Once implementation begins, the remedy will be evaluated to determine progress toward meeting RAOs.

In a response to the increase in PCP concentrations in downgradient wells, IP installed additional wells in 2018 (Lower Aquifer) and 2019 (Lower Aquifer and Upper Aquifer). PCP was detected in several of the new wells and additional wells were installed to further delineate the PCP plume extent. PCP concentrations in the Upper Aquifer well clusters 6023, 6024, and 6025 and Lower Aquifer well clusters 6505 and 6506 were below the PCP MCL. The new wells appear to delineate the extent of the plumes and will be part of the regular monitoring program moving forward after the O&M plans are updated. IP recommends quarterly monitoring of select Upper and Lower aquifer wells near the downgradient extent of PCP for one year to evaluate whether additional investigation is needed in this area.

Institutional controls are in place to prohibit installation of new groundwater wells in the City of Libby. There are some wells located within the city limits that existed prior to the ordinance. The EPA is attempting to strengthen public awareness of groundwater contamination, particularly for owners of existing wells. A well survey will also be conducted during the implementation of the proposed CGA. In addition, no restrictions are in place to prohibit installation of new wells outside city limits in Lincoln County, where the source areas and plume origin are located. As described above in the “Institutional Control Review” section, a proposed CGA will prohibit future wells outside of city limits in Lincoln County. As part of the proposed CGA, IP will extend the Buy Water Plan to all areas within the CGA.

#### *OU2 - Soil*

Components of the soil remedy are functioning as intended. Contaminated soil was excavated from the source area to the depth of groundwater. Excavated areas were backfilled with clean fill. Contaminated soils are treated biologically in the ELF and LTU. The RAOs and cleanup levels for dioxins in soils have not been achieved, and therefore, treatment of contaminated soils must continue until the cleanup levels are met, or appropriate disposal of treated soils is achieved. In recent years, the soil dioxin concentrations remained elevated in the ELF, preventing removal of that soil to the LTU. The EPA is reviewing the effectiveness of the ELF and LTU in meeting the dioxin cleanup levels. The dioxin cleanup level is also under review. The Agencies and IP are working together to assess reclassifying the LTU as a CAMU to allow for an in-place closure that would meet ARARs.

Institutional controls are in place to prohibit activities that could disturb waste left in place beneath clean fill. Industrial land use forms the basis for soil cleanup levels. Although current property zoning is for commercial and industrial uses, and is expected to remain so, no mechanism is in place to ensure future land use at all areas within the Site does not change. IP-owned parcels may require additional restrictions in the future, including restrictions on disturbing soils in the ELF or LTU areas.

**QUESTION B:** Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

The exposure assumptions and RAO for OU1 remain valid. The RAO specified in the 1986 ROD was to significantly reduce or eliminate human exposure to contaminated groundwater. The Buy Water Plan and the city

ordinance are in place, and the RAO has been met within the City of Libby. The EPA is considering a CGA to further protect groundwater users in the county areas near the Site.

The exposure assumptions and RAOs for the OU2 remedy for soil and the Lower Aquifer remain valid. The OU2 RAO, to reduce human exposure to both soil and groundwater COCs is valid. The exposure assumption for soil is continued industrial and commercial use, which remains valid. The exposure assumption for Lower Aquifer is that contamination will not migrate or further degrade the Upper Aquifer and there will be no potential for human contact or ingestion of groundwater from the Lower Aquifer, which remain valid.

The excavation soil cleanup goal for total carcinogenic PAHs remains valid based on the current toxicity for benzo(a) pyrene (Table I-1 in Appendix I). The soil cleanup goals for the LTU provided in the 1997 ESD may no longer be valid for dioxin (Table I-1 in Appendix I). However, the areas were excavated to groundwater. The excavation areas were delineated based on the co-occurrence with total PAHs and waste was removed and the areas backfill with clean fill. As part of the reclassification and closure of the LTUs, the EPA will evaluate the soil cleanup goals and ensure they are protective. The EPA will also review the soil remedy to ensure it is protective based on the updated toxicity for dioxin.

The OU2 remedy specific to the Upper Aquifer was updated in the 2020 ROD Amendment. The 2020 ROD Amendment updated the groundwater cleanup goals based on the current toxicity data as well as the RAOs.

A 2013 evaluation determined that vapor intrusion does not pose a risk under current site conditions. Conditions have not changed since 2013. As conditions change, the EPA will ensure reassessment of the potential risk from vapor intrusion.

**QUESTION C:** Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

## VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations	
<b>OU(s) without Issues/Recommendations Identified in the FYR:</b>	
<i>None</i>	

<b>Issues and Recommendations Identified in the FYR:</b>	
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<b>OU: 2</b>	<b>Issue Category: Remedy Performance</b>			
	<b>Issue:</b> Soil dioxin concentrations have remained elevated in the ELF so that removal to the LTU has not occurred. It is unclear if the soil remedy will attain cleanup goals. Also, dioxin toxicity has changed, and the cleanup goal may no longer be valid.			
	<b>Recommendation:</b> Review the soil remedy and determine if modifications are needed, and/or if on-site disposal of treated soils can occur. Record any soil modified cleanup goals in a decision document as determined appropriate by the EPA.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	PRP	EPA/State	9/25/2022

<b>OU: 1, 2</b>	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> Institutional controls are in place to prohibit groundwater use and the installation of new groundwater wells in the City of Libby, but no restrictions are in place to prohibit groundwater use and the installation of new groundwater wells in Lincoln County. Additionally, there are some wells located within the city limits that existed prior to the ordinance and that may still be used for irrigation purposes			
	<b>Recommendation:</b> Implement the proposed CGA for areas previously identified in Lincoln County.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	PRP	EPA/State	9/25/2022

<b>OU: 2</b>	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> Institutional controls are in place to prohibit activities that could disturb waste left in place beneath clean fill. Industrial land use forms the basis for soil cleanup levels. Although current property zoning is for commercial and industrial uses, and is expected to remain so, no mechanism is in place to ensure future land use at all areas within the Site does not change.			
	<b>Recommendation:</b> Review the soil institutional controls and implement additional restrictions as needed for the ELF and LTU, and for the remainder of the Site in general if necessary.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	PRP	EPA/State	9/25/2023

**OTHER FINDINGS**

Additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- *Conduct quarterly monitoring of select Upper and Lower aquifer wells near the downgradient extent of PCP for one year to evaluate whether additional investigation is needed in this area.*
- *Secure wells located along roadways.*
- *Repair on-site well and ballasts.*
- *Update O&M and Monitoring Plans*
- *Add more documents in the site repository*

## VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
<i>Operable Unit:</i> 1	<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The OU1 remedy currently protects human health and the environment. However, in order for the remedy to be protective in the long term the proposed CGA should be implemented for areas in Lincoln County.	

Protectiveness Statement	
<i>Operable Unit:</i> 2	<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The OU2 remedy currently protects human health and the environment. However, in order for the remedy to be protective in the long term, the following actions need to be taken: review the soil remedy for the LTU and determine if modifications are needed; review the soil remedy to ensure it is protective based on updated dioxin toxicity; implement the proposed CGA for areas in Lincoln County; and implement additional soil institutional controls for land use controls and restrictions on remaining waste areas including the waste pit area, ELF, and LTU as needed.	

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Short-term Protective	
<i>Protectiveness Statement:</i> The sitewide remedy currently protects human health and the environment. However, in order for the remedy to be protective in the long term, the following actions need to be taken: review the soil remedy for the LTU and determine if modifications are needed; review the soil remedy to ensure it is protective based on updated dioxin toxicity; implement the proposed CGA for areas in Lincoln County; and implement additional soil institutional controls for land use controls and restrictions on remaining waste areas including the waste pit area, ELF, and LTU as needed.	

## VIII. NEXT REVIEW

The next FYR Report for the Libby Ground Water Contamination Superfund site is required five years from the completion date of this review.

## APPENDIX A – REFERENCE LIST

- Record of Decision Libby Ground Water Superfund Site Lincoln County, Montana. EPA Region 8. December 1986.
- Record of Decision Libby Ground Water Superfund Site Lincoln County, Montana. EPA Region 8. December 1988.
- Explanation of Significant Differences Libby Ground Water Contamination. EPA Region 8. September 1993.
- Five-Year Review for Libby Ground Water Superfund Site Lincoln County, Montana. EPA Region 8. January 1995.
- Explanation of Significant Differences Libby Ground Water Contamination. EPA Region 8. January 1997.
- Second Five-Year Review Report for Libby Ground Water Site Libby, Lincoln County, Montana. EPA Region 8. March 2000.
- Third Five-Year Review Report for Libby Ground Water Site Libby, Lincoln County, Montana. EPA Region 8. March 2005.
- Fourth Five-Year Review Report for Libby Ground Water Site Libby, Lincoln County, Montana. EPA Region 8. March 2010.
- Fifth Five-Year Review Report for Libby Ground Water Site Libby, Lincoln County, Montana. EPA Region 8. September 2015.
- 2016 Annual Groundwater Monitoring Report for the Upper and Lower Aquifer for Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. March 2017.
- Conceptual and Numerical Groundwater Flow and Transport Model for Libby Groundwater Site, Libby, Montana. Prepared by URS. October 2016.
- Technical Memorandum: NAPL Characterization Study for the Upper Aquifer for Libby Groundwater Site, Libby, Montana. Prepared by AECOM. April 2017.
- Focused Feasibility Study for the Upper Aquifer for Libby Groundwater Site, Libby, Montana, Revision 2. Prepared by AECOM. April 2018.
- 2017 Annual Groundwater Monitoring Report for the Upper and Lower Aquifer for Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. May 2018.
- Third Quarter Progress Report – 2018, Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. October 2018.
- 2018 Annual Landfarm Operations Report for Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. February 2019.
- 2018 Annual Operations Report, Source Area Extraction and Treatment System for Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. February 2019.
- 2018 Annual Groundwater Monitoring Report for the Upper and Lower Aquifer for Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. March 2019.



Technical Memorandum: Lower Aquifer Well Cluster 6504 Drilling and Sampling Results for Libby Groundwater Site, Libby, Montana. Prepared by AECOM. March 2019.

Lower Aquifer Monitoring Well Installations – 2019 for Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. July 2019.

Proposed Plan for Record of Decision Amendment, Upper Aquifer Component of Operable Unit 2 for Libby Groundwater Contamination Superfund Site, Libby, Montana. EPA Region 8. August 2019.

Record of Decision Amendment, Upper Aquifer Component of Operable Unit 2 for Libby Groundwater Contamination Superfund Site, Libby, Montana. EPA Region 8. March, 2020.

Final Monitoring Wells Installed During 2019 – Investigation Field Activity and Data Summary Report, Libby Groundwater Site, Libby, Montana. Prepared by Arrowhead Engineering, Inc. April 2020.

## APPENDIX B – SITE CHRONOLOGY

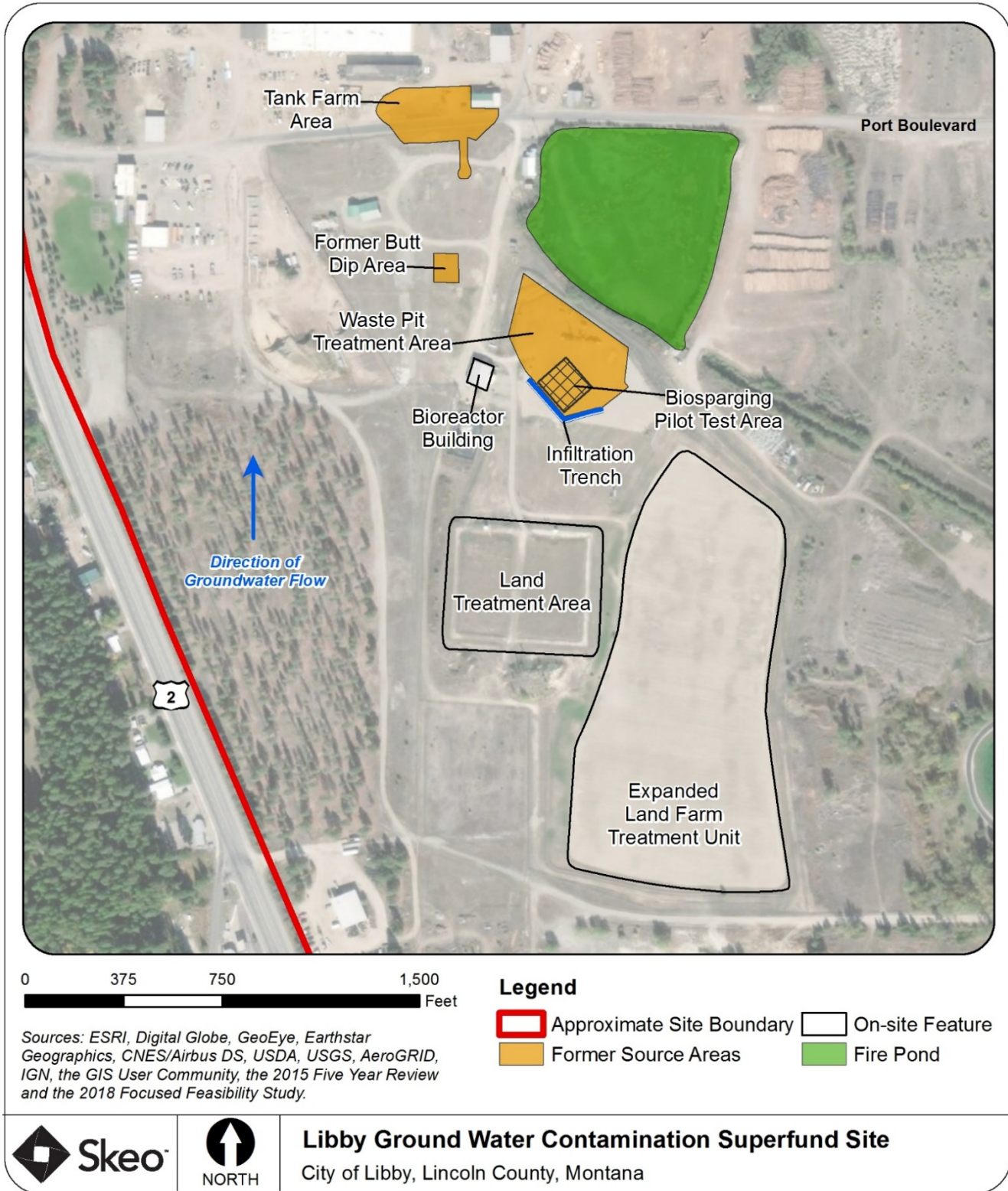
**Table B-1: Site Chronology**

Event	Date
J. Neils Lumber Company began lumber yard and wood-treating operations at the Site	1946
Then-owner St. Regis Company discontinued wood-treating operations at the Site	1969
The EPA discovered contamination in nearby residential drinking water well	July 1, 1979
The EPA conducted a preliminary assessment of the Site	January 1, 1980
The EPA conducted a site inspection	August 1, 1981
The EPA listed the Site on the NPL	September 8, 1983
St. Regis entered into an Administrative Order on Consent	October 1983
The PRP started the remedial investigation/feasibility study for OU1 and OU2	March 9, 1985
The PRP completed the remedial investigation/feasibility study for OU1 EPA signed the OU1 ROD	September 26, 1986
The PRP completed the remedial design for OU1	October 1, 1986
The PRP completed the remedial action for OU1	November 1, 1986
The PRP (Champion, successor to St. Regis) completed the remedial investigation/ feasibility study for OU2 the EPA signed the OU2 ROD	December 30, 1988
The PRP began remedial design activities for OU2	March 27, 1989
The Court approved a Consent Decree for the Site The PRP began remedial action for OU2	October 18, 1989
The PRP completed the remedial design for OU2	September 26, 1991
The EPA issued an ESD for OU2 to modify cleanup levels and implement a technical impracticability waiver for the Lower Aquifer contamination	September 14, 1993
The EPA prepared a Preliminary Close-Out Report for OU2 the EPA filed a Construction Complete notice for the Site	September 20, 1993
Champion (PRP) sold mill property to Stimson Lumber Company Restrictions added to property deed	November 2, 1993
The EPA signed the Site's first FYR Report	January 24, 1995
The EPA issued an ESD for OU2	January 22, 1997
The EPA expanded the LTU	1998
The EPA shut down the intermediate injection system based on information from the then-current site review	1999
Champion submitted a Technical Impracticability Evaluation Report for the Upper Aquifer to the EPA	January 11, 1999
The EPA signed the Site's second FYR Report	March 30, 2000
IP merged with Champion and assumed responsibility for site liability, including O&M of remedial systems	June 20, 2000
Stimson Lumber Company sold mill property to LCPA	2003
The EPA signed the Site's third FYR Report	March 31, 2005
The EPA denied a technical impracticability waiver of Applicable or Relevant and Appropriate Requirement groundwater standards for the Upper Aquifer	May 2009
PRPs completed a plume stability analysis	October 1, 2009
The EPA began a focused remedial investigation and feasibility study for OU2 to address compliance with RAOs, pursuant to an amendment to the existing Consent Decree	January 27, 2010
The EPA signed the Site's fourth FYR Report	March 29, 2010
PRPs completed investigation of Upper Aquifer dissolved plume	February 17, 2011
PRPs completed source area characterization	May 14, 2012
PRPs initiated the preparation of an FFS to evaluate alternatives to remediate contaminants in the Upper Aquifer	March 13, 2013
PRPs completed bench-scale test of steam-enhanced groundwater extraction	August 29, 2013
PRPs completed vapor intrusion assessment	October 14, 2013

Event	Date
PRPs submitted updated conceptual site model	January 13, 2014
PRPs submitted technical memorandum of remedial alternatives for the Upper Aquifer	January 21, 2014
PRPs completed bench-scale test of in-situ biosparging	March 14, 2014
The EPA signed the Site's fifth FYR Report	September 25, 2015
PRPs completed the FFS Report for the Upper Aquifer	April 25, 2018
The EPA released the Proposed Plan for OU2	August 2019
The EPA signed the OU2 ROD Amendment	April 6, 2020

# APPENDIX C – REMEDIAL FEATURES SITE MAP

Figure C-1: Remedial Features



*Disclaimer:* This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

## APPENDIX D – PRESS NOTICE



### **The U.S. Environmental Protection Agency, Region 8 Announces the Second Five-Year Review for the Libby Ground Water Contamination Superfund Site, Libby, Montana**

The U.S. Environmental Protection Agency (EPA), in cooperation with the Montana Department of Environmental Quality (DEQ), is conducting the sixth five-year review (FYR) of the Libby Ground Water Contamination Superfund site (the Site) in Libby, Montana. The purpose of the FYR is to make sure that the cleanup actions completed to date are adequately protecting human health and the environment. The five-year review is scheduled to be completed by August 2020.

The Site is a former lumber mill and wood-treating operation located on Highway 2 in the City of Libby, Montana. EPA added the Site to the National Priorities List (NPL) in 1983. Historical operating practices and the release of wood-treating fluids at the Site resulted in impacts to soil and the underlying groundwater.

Operable Unit (OU) 1 addressed immediate public exposure to contaminated groundwater and required the development of institutional controls to prevent domestic use of the contaminated groundwater. OU2 consists of soil and groundwater impacted by wood-treating operations and releases, and required remediation of the soils and the upper aquifer contaminated groundwater. Soil and groundwater remediation has been ongoing at the Site since the late 1980s under the direction of the EPA and DEQ.

**We want to hear from you!** Community members are always encouraged to share information that may help EPA make determinations regarding the protectiveness and effectiveness of the remedies at the site. On November 5<sup>th</sup> from 4:00-5:00, EPA staff will be hosting in-person interviews at the EPA Information Center (108 E 9th St, Libby, MT 59923). You may also contact EPA if you would like to send your comments:

Katherine Jenkins, EPA Community Involvement Coordinator  
Phone: 303-312-6351 Email: [jenkins.katherine@epa.gov](mailto:jenkins.katherine@epa.gov)  
Mailing Address: U.S. EPA Region 8 (EPR-SR)  
1595 Wynkoop Street, Denver, CO 80202-1129

**Additional site information is available at:**

Lincoln County Health Department  
418 Mineral Ave.  
Libby, Montana 59923

EPA Superfund Records Center  
1595 Wynkoop Street  
Denver, CO 80202-1129  
303-312-7273

**Or online at:** [www.epa.gov/superfund/libby-asbestos](http://www.epa.gov/superfund/libby-asbestos)

## APPENDIX E – INTERVIEW FORMS

<b>Libby Ground Water Contamination SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name: Libby Ground Water Contamination</b>	
<b>EPA ID: MTD980502736</b>	
<b>Interviewer name: Andrew Schmidt</b>	<b>Interviewer affiliation: EPA</b>
<b>Subject name: George Jameson</b>	<b>Subject affiliation: Lincoln County Board of Health</b>
<b>Subject contact information:</b>	
<b>Interview date: 11/5/2019</b>	<b>Interview time: 1:45 p.m.</b>
<b>Interview location: Libby Department of Health</b>	
<b>Interview format (circle one):</b> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">In Person</span> Phone    Mail    Email    Other:	
<b>Interview category:</b> Local Government	

1. What is your overall impression of the remedial activities at the Site?

My interaction with the EPA is as my role as a board member and these responses are my personal opinions. Remedial activities seem well reasoned and appropriate.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Positive – though I am not well versed on maintenance and reuse activities. The EPA has been diligent to pursue appropriate activities instead of pushing to delist the Site.

a) Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site (as appropriate, if individual was present during cleanup)?

I was not present during earlier cleanup. The site risks have been clearly communicated although interest seems to be scant.

b) How do you learn about what’s happening at the Site now?

From Andrew Schmidt and I also researched the Site before we moved here 10 years ago.

c) Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

I doubt that most people care as long as they have a feeling that they are safe. The information is there if someone is interested.

3. What is your assessment of the current performance of the remedy in place at the Site?

It is mixed success. But it is not unexpected at this type of site. I am pleased with the EPA's work with the PRP to reach remedial decisions and institutional controls.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

Some but they seem to mainly be based on real or perceived conflict about lost use of resources.

5. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

Not to my knowledge.

6. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?

No – but that is largely a function of interest level. Information is available but the notices don't seem effective but likely meet notification requirements. I recommend the information be updated and moved to the library. The EPA website doesn't seem to have all the documents. The Libby Board of Health provides a fair number of documents. I recommend documents be provided to the board of health for posting on its website.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

Yes – document repository talked about earlier. Persist with PRP to continue remediation.

It builds trust to have an RPM that is a good listener and provide well-supported rationales to our inquiries.

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes.

<b>Libby Ground Water Contamination SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name: Libby Ground Water Contamination</b>	
<b>EPA ID: MTD980502736</b>	
<b>Interviewer name: Andrew Schmidt</b>	<b>Interviewer affiliation: EPA</b>
<b>Subject name: David Cosgriff</b>	<b>Subject affiliation:</b>
<b>Subject contact information: email: <a href="mailto:david@aelibby.com">david@aelibby.com</a>, ph: 406-293-1011</b>	
<b>Interview date: November 8, 2019</b>	<b>Interview time: Not Applicable</b>
<b>Interview location: Email</b>	
<b>Interview format (circle one):</b> In Person      Phone      Mail <u>Email</u> Other:	
<b>Interview category: O&amp;M/ Remedial Action Contractor</b>	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

See Response #1 – next page.

2. What is your assessment of the current performance of the remedy in place at the Site?

See Response #2 and #3 – next page.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

See Response #2 and #3.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

See Response #4 – next page.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

See Response #5 – next page.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

Not in last five years beyond response to items 2 and 3 above.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

See Response #7 – next page.



8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

A major advantage with adjustments to O&M activities is being able to communicate with the agencies if we identify something that should be considered and/or changed. The agencies have been responsive in our discussions. A monthly status conference call for the project could be useful to maintain the information flow between the stakeholders.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes, you have my consent to use my name.

**Response #1** – There are two active remediation systems operating at the Libby GW Site. The pump-and-treat, source area extraction and treatment system (SAETS) and the landfarm (Expanded Landfarm). Both of these systems have been operating in accordance with their operations and monitoring plans. The SAETS requires more maintenance than the Expanded Landfarm due to more mechanical system components. The maintenance is typically based on issues observed during the nearly daily inspections of the system. The site operator makes the repairs as needed to keep the system running per the work plan. Given the remote nature of the Libby GW site, I maintain a level of parts and components in stock to reduce the time the system is inoperable for repairs. We do not have a reuse program associated with the SAETS.

The irrigation system on the Expanded Landfarm (ELF) was upgraded in 2019 to allow for more adequate coverage of irrigation water with less field work on the part of the field technician. Eventually, the system should operate on timers so the field technician will only need to start the system in the morning and stop the system in the evening. We don't have a reuse program associated with the ELF.

**Response #2 & 3** - The SAETS has been operating since 1990 and has recovered and disposed of approximately 33,400 gallons of recovered product. Even though that is a significant quantity of recovered product (NAPL), it doesn't seem to be significant when compared to the overall quantity of residual NAPL currently in the upper aquifer within the waste pit area. Therefore, the SAETS doesn't seem to be significantly treating the NAPL in the waste pit area. In addition to the recovered NAPL, the system is also treating dissolved-phase creosote and PCP constituents. Overall, the system has degraded approximately 36,000 pounds of total PAHs (creosote compounds) and 7,100 pounds of PCP since 1993. Again, this is a significant quantity of PAHs and PCP degraded, but not a large percentage of the total quantity of PAHs and PCP likely in place in the waste pit area within the upper aquifer.

The Expanded Landfarm has been operating since approximately 1998 with active tilling and moisture management. The system is effective at degrading the PAH compounds and PCP in the impacted soil. However, landfarming is not effective for degrading dioxin/furan compounds. Therefore, we have not successfully treated a lift in the ELF for a number of years due to the dioxin/furan remediation levels not being met. We are currently looking into the other options for operating the ELF using a risk-based approach for closure if the dioxin/furan concentrations are not achieved. If this approach gets approved, then active treatment of the soil and closure of the land treatment units will be possible.

**Response #4** – There is not a continuous onsite presence monitoring the system. The field technician performs a daily inspection of the system (approximately 5 days per week) and records observations on checklists and in the appropriate log books. The Site Operations are as follows:

## **Site Operations, Monitoring and Maintenance Management:**

### **Includes Tasks for Field Technician and On-site Project Manager**

Tasks Include:            Manage/Complete Site Operations and Monitoring

- Daily/Weekly/Monthly Monitoring of Systems:
  - 1.) Injection System Buildings
  - 2.) Land Farms
  - 3.) LTU Leachate Collection and Surface Water Management
  - 4.) Bio-reactor/Oil-Water Separators
  - 5.) General Site Condition
- Daily Inspection of Hazardous Waste Storage Area
- Monthly Oil Monitoring and Removal Program
- Perform Scheduled System Maintenance (Routine)
- Maintain All Operations Log and Data Sheets
  - Provide Basic Transportation for daily activities
- Manage On-Site Laboratory Operations
- Review Daily/Weekly Data
- Coordinate Free Product Shipping
- Coordinate Repair and Maintenance
  - Mechanical (Bioreactor, On-Site Lab, etc.)
  - Electrical
- Purchasing and Receiving
- Maintain Libby Files and Report Files
- Respond to Call-Outs (Alarms)
- Manage Payment of Site O&M Invoices
- Coordinate IP Contracting Requirements for hiring Contractors

**Response #5** – There has not been any significant changes in maintenance, monitoring or sampling of the current remediation system since they were placed online at their start dates. There have been minor adjustments to the monitoring and/or sampling as new information was gained from previous operating knowledge.

**Response #7** – In the 1990s, it was determined that we could track the plume in the Upper Aquifer using dissolved oxygen as an indicator compound for the plume contaminants. Basically, if there was elevated dissolved oxygen (e.g. > 2 milligrams per liter [mg/L]), then contaminant concentrations were likely very low or non-detect. In subsequent years after about 2010, it was determined that collecting COC concentrations within the plume was valuable for tracking changes over time due to natural attenuation. Additional sampling for MNA parameters has been conducted as part of an MNA assessment for the plume in 2017 and 2018. The Groundwater Monitoring Plan will be updated once these new wells have been installed and MNA parameters will likely be part of the plan.

<b>Libby Ground Water Contamination SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name: Libby Ground Water Contamination</b>	
<b>EPA ID: MTD980502736</b>	
<b>Interviewer name: Andrew Schmidt</b>	<b>Interviewer affiliation: EPA</b>
<b>Subject name: Brent Teske</b>	<b>Subject affiliation: Libby Mayor and Lincoln County Emergency Manager</b>
<b>Subject contact information:</b>	
<b>Interview date: 11/5/2019</b>	<b>Interview time: 2:45 p.m.</b>
<b>Interview location: Libby City Hall</b>	
<b>Interview format (circle one):</b> <input checked="" type="radio"/> In Person <input type="radio"/> Phone <input type="radio"/> Mail <input type="radio"/> Email <input type="radio"/> Other:	
<b>Interview category:</b> Local Government	

1. What is your overall impression of the remedial activities at the Site?

It's considerably different from the asbestos site. The Site is back over here (the surface) and the activities. The activities are behind the fence and quiet. There is not much public awareness of the Site. They know more about the plume. The updates seem like they are doing what the science is allowing them to do in terms of the groundwater.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Pretty low key and below the radar. What they are doing over at the source area, a lot of people don't see it. I think they are doing what they can. As far as cleanup below ground with the science about the microbes, I don't know what's really going on down there. There won't be any reuse until it is cleaned up and I don't know when that will happen.

a) Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site (as appropriate, if individual was present during cleanup)?

Remembering back to the mid-1980s when this all came to light, there was a lot of talk and misinformation. You heard things about it percolating out of the ground.

It will be interesting with these new wells to see how big this plume will end up being. We are already getting hits outside where they had them before. That will be interesting to see if it hits the river, if it hasn't already. I had thought it would parallel the river and now we are finding some tests in close proximity. Is that going to expand the understanding of the plume? That will be EPA's next challenge – ensuring the public is aware of what's happened and what is going to happen.

I'd really like to see once we get some data to push out what it is going to look like.

I am surprised they haven't tested the fish. It would be interesting to see what, if anything, you get if you test fish.

b) How do you learn about what's happening at the Site now?

I am directly connected between the EPA and the guys that are working down here. I am more connected than the average citizen.

- c) Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

I think they did when we put the institutional controls in place with the well drilling and irrigation. I think people understood then. And then there was a lull. Now with the CGA and these wells out on 5th Street, people started talking and it brought it back in the limelight that there are things out there that are not in the institutional control. I think it is a lot better now, but for a long time, things were pretty quiet.

3. What is your assessment of the current performance of the remedy in place at the Site?

I think the current remedy is working well. The examples of the wells discovered on 5th Street were because they were not in the initial institutional control area. They were outside the city limits. For the city, the institutional control is working really well. Every once in a while, we hear of a rogue well and sometimes it is and sometimes it isn't. I haven't heard anything about anyone being sick from exposure.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

No – other than those down there on 5th Street. They went from a well they used forever to smelling stuff. You could smell an oily smell on the surface. We had a pretty wet year, that year. But I cannot think of anything else that has recently come to mind. Single wells for two or three rental properties. Well was there for 20 years and then it percolated up.

5. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

Not that I am aware of.

6. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

I think they were as informed as they wanted to be until the CGA came up. And if more information comes up about the plume, then I think more information might be needed. With new information and the new public interest, it has probably come back into the limelight again.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

The only recommendation would be to keep the public informed. Even if they choose not to be informed, keep them up to date on the CGA and the groundwater. The question I get is – will we ever be able to pump groundwater? If we can keep them informed – it is here, these are the restrictions – that is better than letting it be silent and then something happens, and folks get upset.

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes.

<b>Site Name: Libby Ground Water Contamination</b>	
<b>EPA ID: MTD980502736</b>	
<b>Interviewer name: Andrew Schmidt</b>	<b>Interviewer affiliation: EPA</b>
<b>Subject name: Tom Richardson</b>	<b>Subject affiliation: International Paper</b>
<b>Subject contact information: Tom.Richardson@ipaper.com</b>	
<b>Interview date: 11/5/2019</b>	<b>Interview time: 4:00 pm</b>
<b>Interview location: EPA Information Center in Libby, MT</b>	
<b>Interview format (circle one):</b> <u>In Person</u> Phone    Mail    Email    Other:	
<b>Interview category: Potentially Responsible Party (PRP)</b>	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Overall, we are making good strides to take care of this. I think we are overall in good shape. Apparently, those bolts are all rusted out due to the salt from the roads and stuff. But they are figuring that out.

2. What is your assessment of the current performance of the remedy in place at the Site?

The current performance of the remedy that is in place. It needs some enhancement and that's why we are working on putting the new plan in place.

3. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since the implementation of the cleanup?

The only real complaints I hear are from one or two people and they seem a bit speculative. And I don't know that I can draw a straight line between the fact that there was manufacturing here or that there is not manufacturing here?

4. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

I feel perfectly up to speed on stuff.

5. Do you have any comments, suggestions or recommendation regarding activities and schedules at the Site?

No – making progress toward the new remedy and the CGA in place.

6. Do you consent to have you name included along with your responses to this questionnaire in the FYR Report?

Yes.

<b>Libby Ground Water Contamination SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name: Libby Ground Water Contamination</b>	
<b>EPA ID: MTD980502736</b>	
<b>Interviewer name: Andrew Schmidt</b>	<b>Interviewer affiliation: EPA</b>
<b>Subject name: Kathi Hooper</b>	<b>Subject affiliation: Libby Department of Health</b>
<b>Subject contact information:</b>	
<b>Interview date: 11/5/2019</b>	<b>Interview time: 1pm</b>
<b>Interview location: Libby Department of Health Annex</b>	
<b>Interview format (circle one):</b> <input checked="" type="radio"/> In Person <input type="radio"/> Phone <input type="radio"/> Mail <input type="radio"/> Email <input type="radio"/> Other:	
<b>Interview category:</b> Local Government	

1. What is your overall impression of the remedial activities at the Site?

My overall impression – I think that there has been a lot of research done. I was impressed by all the research involved with the pilot projects and determining what remedial activities are done.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

It is a long-term project with no end in sight. The progress seems to have been slow, although the contamination has not spread as I understand.

I don't think that it has had a big impact on use of the site as far as the Port Authority goes. I don't know where they would be in there wasn't a Superfund site there, but I don't think this is the only holdup to the use of the port.

- a) Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the site (as appropriate, if individual was present during cleanup)?

I am sure there is always more – there could do a door to door campaign – but I think EPA has done a good job, you can hold the public meeting, but it doesn't mean the public shows up.

- b) How do you learn about what's happening at the site now?

Through work – the Board of health – George Jamison.

- c) Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

Yes – I think the EPA has done a good job explaining both risks to people and the cleanup in a way that is understandable to people. I think it is clear what the risk to people would be.

3. What is your assessment of the current performance of the remedy in place at the Site?

I believe that the current remedy has prevented the plume from expanding but my understanding is that it hasn't reduced the size of the plume but that new remedies are being looked at or selected.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

More recently there is perhaps only one individual having complaints. Because it has come up on surveys the Health department has sent out asking about how we can better serve the community there is one response we got to say, “keep the creosote out of the river”.

5. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?  
Nothing specific.
6. Do you feel the community is well-informed regarding the Site’s activities and remedial progress? If not, how might the EPA convey site-related information in the future?

I don’t think the community is well informed, but it isn’t because the EPA isn’t trying. If the public doesn’t show up, they cannot be well informed. I don’t know how many people even know about the site.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

No – nothing specific. I believe that if people have questions about the site, the information is available and there are obvious places they can go to get information.

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

Yes





Name	Title	Date	Phone No.
Problems/suggestions <input type="checkbox"/> Report attached: _____			
4. <b>Other Interviews</b> (optional) <input type="checkbox"/> Report attached: _____			
<b>III. ON-SITE DOCUMENTS AND RECORDS VERIFIED</b> (check all that apply)			
<b>1. O&amp;M Documents</b>			
<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
<b>2. Site-Specific Health and Safety Plan</b>			
<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
<input checked="" type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
<b>3. O&amp;M and OSHA Training Records</b>			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
<b>4. Permits and Service Agreements</b>			
<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____			
<b>5. Gas Generation Records</b>			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
<b>6. Settlement Monument Records</b>			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
<b>7. Groundwater Monitoring Records</b>			
<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks: _____			
<b>8. Leachate Extraction Records</b>			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
<b>9. Discharge Compliance Records</b>			
<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____			
<b>10. Daily Access/Security Logs</b>			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			

**IV. O&M COSTS**

**1. O&M Organization**

- |  |  |
|--|--|
| <input type="checkbox"/> State in-house            | <input type="checkbox"/> Contractor for state            |
| <input type="checkbox"/> PRP in-house              | <input checked="" type="checkbox"/> Contractor for PRP   |
| <input type="checkbox"/> Federal facility in-house | <input type="checkbox"/> Contractor for Federal facility |
| <input type="checkbox"/> _____                     |  |

**2. O&M Cost Records**

- |   |   |
|---|---|
| <input type="checkbox"/> Readily available                    | <input type="checkbox"/> Up to date             |
| <input type="checkbox"/> Funding mechanism/agreement in place | <input checked="" type="checkbox"/> Unavailable |

Original O&M cost estimate: \_\_\_\_\_  Breakdown attached

Total annual cost by year for review period if available

From: _____	To: _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: _____	To: _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: _____	To: _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: _____	To: _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: _____	To: _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

**3. Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: \_\_\_\_\_

**V. ACCESS AND INSTITUTIONAL CONTROLS**     Applicable     N/A

**A. Fencing**

1.    **Fencing Damaged**     Location shown on site map     Gates secured     N/A  
 Remarks: \_\_\_\_\_

**B. Other Access Restrictions**

1.    **Signs and Other Security Measures**     Location shown on site map     N/A  
 Remarks: \_\_\_\_\_

**C. Institutional Controls (ICs)**

1.	<b>Implementation and Enforcement</b>	
	Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Type of monitoring (e.g., self-reporting, drive by):	
	Frequency: _____	
	Responsible party/agency: <u>PRP and City of Libby</u>	
	Contact _____	
	Name	Title
		Date
		Phone no.
	Reporting is up to date	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
	Reports are verified by the lead agency	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
	Specific requirements in deed or decision documents have been met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	Violations have been reported	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Other problems or suggestions: <input checked="" type="checkbox"/> Report attached	
2.	<b>Adequacy</b> <input type="checkbox"/> ICs are adequate <input checked="" type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A	
	Remarks: <u>Additional institutional controls are planned including a CGA that would apply to some parts of the county. Additional land use institutional controls may be needed in the source area.</u>	
<b>D. General</b>		
1.	<b>Vandalism/Trespassing</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident	
	Remarks: _____	
2.	<b>Land Use Changes On Site</b> <input checked="" type="checkbox"/> N/A	
	Remarks: _____	
3.	<b>Land Use Changes Off Site</b> <input checked="" type="checkbox"/> N/A	
	Remarks: _____	
<b>VI. GENERAL SITE CONDITIONS</b>		
<b>A. Roads</b>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	<b>Roads Damaged</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A	
	Remarks: _____	
<b>B. Other Site Conditions</b>		
	Remarks: <u>Overall the site is well maintained and has a consistent presence.</u>	
<b>VII. LANDFILL COVERS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
<b>A. Landfill Surface</b>		
1.	<b>Settlement</b> (low spots) <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident	
	Area extent: _____	Depth: _____
	Remarks: _____	
2.	<b>Cracks</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident	
	Lengths: _____      Widths: _____	Depths: _____
	Remarks: _____	

3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	<b>Holes</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	<b>Vegetative Cover</b>	<input checked="" type="checkbox"/> Grass	<input type="checkbox"/> Cover properly established
	<input checked="" type="checkbox"/> No signs of stress	<input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	<b>Alternative Cover</b> (e.g., armored rock, concrete)		<input checked="" type="checkbox"/> N/A
	Remarks: _____		
7.	<b>Bulges</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	<b>Wet Areas/Water Damage</b>	<input checked="" type="checkbox"/> Wet areas/water damage not evident	
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Area extent: _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Area extent: _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Area extent: _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Area extent: _____
	Remarks: _____		
9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
	<input checked="" type="checkbox"/> No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		
<b>B. Benches</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	<b>Flows Bypass Bench</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
2.	<b>Bench Breached</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
3.	<b>Bench Overtopped</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
<b>C. Letdown Channels</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			

1.	<b>Settlement</b> (Low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
	Area extent: _____		Depth: _____
	Remarks: _____		
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
	Material type: _____		Area extent: _____
	Remarks: _____		
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	<b>Undercutting</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	<b>Obstructions</b>	Type: _____	<input type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Area extent: _____	
	Size: _____		
	Remarks: _____		
6.	<b>Excessive Vegetative Growth</b>	Type: _____	
	<input type="checkbox"/> No evidence of excessive growth		
	<input type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Area extent: _____	
	Remarks: _____		
<b>D. Cover Penetrations</b>			
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1.	<b>Gas Vents</b>	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
	Remarks: _____		
2.	<b>Gas Monitoring Probes</b>		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
	Remarks: _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
	Remarks: _____		
4.	<b>Extraction Wells Leachate</b>		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
			<input type="checkbox"/> Good condition

<input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: _____	
5.	<b>Settlement Monuments</b> <input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A Remarks: _____
<b>E. Gas Collection and Treatment</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	<b>Gas Treatment Facilities</b> <input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
2.	<b>Gas Collection Wells, Manifolds and Piping</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: _____
<b>F. Cover Drainage Layer</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	<b>Outlet Pipes Inspected</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____
2.	<b>Outlet Rock Inspected</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____
<b>G. Detention/Sedimentation Ponds</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	<b>Siltation</b> Area extent: _____         Depth: _____ <input type="checkbox"/> N/A <input type="checkbox"/> Siltation not evident Remarks: _____
2.	<b>Erosion</b> Area extent: _____         Depth: _____ <input type="checkbox"/> Erosion not evident Remarks: _____
3.	<b>Outlet Works</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____
4.	<b>Dam</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____
<b>H. Retaining Walls</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	<b>Deformations</b> <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Deformation not evident Horizontal displacement: _____         Vertical displacement: _____ Rotational displacement: _____ Remarks: _____

2.	<b>Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks: _____			
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Siltation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	<b>Vegetative Growth</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input type="checkbox"/> Vegetation does not impede flow			
Area extent: _____		Type: _____	
Remarks: _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Area extent: _____		Depth: _____	
Remarks: _____			
4.	<b>Discharge Structure</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks: _____			
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	<b>Performance Monitoring</b>	Type of monitoring: _____	
<input type="checkbox"/> Performance not monitored			
Frequency: _____		<input type="checkbox"/> Evidence of breaching	
Head differential: _____			
Remarks: _____			
<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
<b>A. Groundwater Extraction Wells, Pumps and Pipelines</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Pumps, Wellhead Plumbing and Electrical</b>		
<input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating <input checked="" type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A			
Remarks: <u>One well casing has suffered damage from having something dropped on it. Maintenance and repairs are planned.</u>			
2.	<b>Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances</b>		
<input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance			
Remarks: _____			
3.	<b>Spare Parts and Equipment</b>		
<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided			
Remarks: _____			
<b>B. Surface Water Collection Structures, Pumps and Pipelines</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A

<p>1. <b>Collection Structures, Pumps and Electrical</b></p> <p><input type="checkbox"/> Good condition    <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>2. <b>Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances</b></p> <p><input type="checkbox"/> Good condition    <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>3. <b>Spare Parts and Equipment</b></p> <p><input type="checkbox"/> Readily available    <input type="checkbox"/> Good condition    <input type="checkbox"/> Requires upgrade    <input type="checkbox"/> Needs to be provided</p> <p>Remarks: _____</p>
<p><b>C. Treatment System</b>                      <input checked="" type="checkbox"/> Applicable    <input type="checkbox"/> N/A</p>
<p>1. <b>Treatment Train</b> (check components that apply)</p> <p><input type="checkbox"/> Metals removal                      <input checked="" type="checkbox"/> Oil/water separation                      <input checked="" type="checkbox"/> Bioremediation</p> <p><input type="checkbox"/> Air stripping                              <input checked="" type="checkbox"/> Carbon adsorbers</p> <p><input type="checkbox"/> Filters: _____</p> <p><input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____</p> <p><input type="checkbox"/> Others: _____</p> <p><input checked="" type="checkbox"/> Good condition                      <input type="checkbox"/> Needs maintenance</p> <p><input type="checkbox"/> Sampling ports properly marked and functional</p> <p><input type="checkbox"/> Sampling/maintenance log displayed and up to date</p> <p><input checked="" type="checkbox"/> Equipment properly identified</p> <p><input type="checkbox"/> Quantity of groundwater treated annually: _____</p> <p><input type="checkbox"/> Quantity of surface water treated annually: _____</p> <p>Remarks: _____</p>
<p>2. <b>Electrical Enclosures and Panels</b> (properly rated and functional)</p> <p><input type="checkbox"/> N/A                              <input checked="" type="checkbox"/> Good condition                      <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>3. <b>Tanks, Vaults, Storage Vessels</b></p> <p><input type="checkbox"/> N/A                      <input checked="" type="checkbox"/> Good condition                      <input type="checkbox"/> Proper secondary containment                      <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>4. <b>Discharge Structure and Appurtenances</b></p> <p><input type="checkbox"/> N/A                              <input checked="" type="checkbox"/> Good condition                      <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>5. <b>Treatment Building(s)</b></p> <p><input type="checkbox"/> N/A                              <input checked="" type="checkbox"/> Good condition (esp. roof and doorways)                      <input type="checkbox"/> Needs repair</p> <p><input checked="" type="checkbox"/> Chemicals and equipment properly stored</p> <p>Remarks: _____</p>
<p>6. <b>Monitoring Wells</b> (pump and treatment remedy)</p>





## APPENDIX G – SITE INSPECTION PHOTOS



LTU and LTU sprinkler system



Building housing the LTU leachate collection system



Inside the LTU leachate collection system





Warning signage on site



Warning signage on site





Standing water in a neighborhood well



Unsecured well





ISB pilot test area



Bioreactor inside the groundwater treatment building





Former Tank Farm source area



On-site fire pond



Monitoring wells at a business on site



# APPENDIX H – DATA REVIEW FIGURES<sup>4</sup>

Figure H-1: New Monitoring Well Location Map

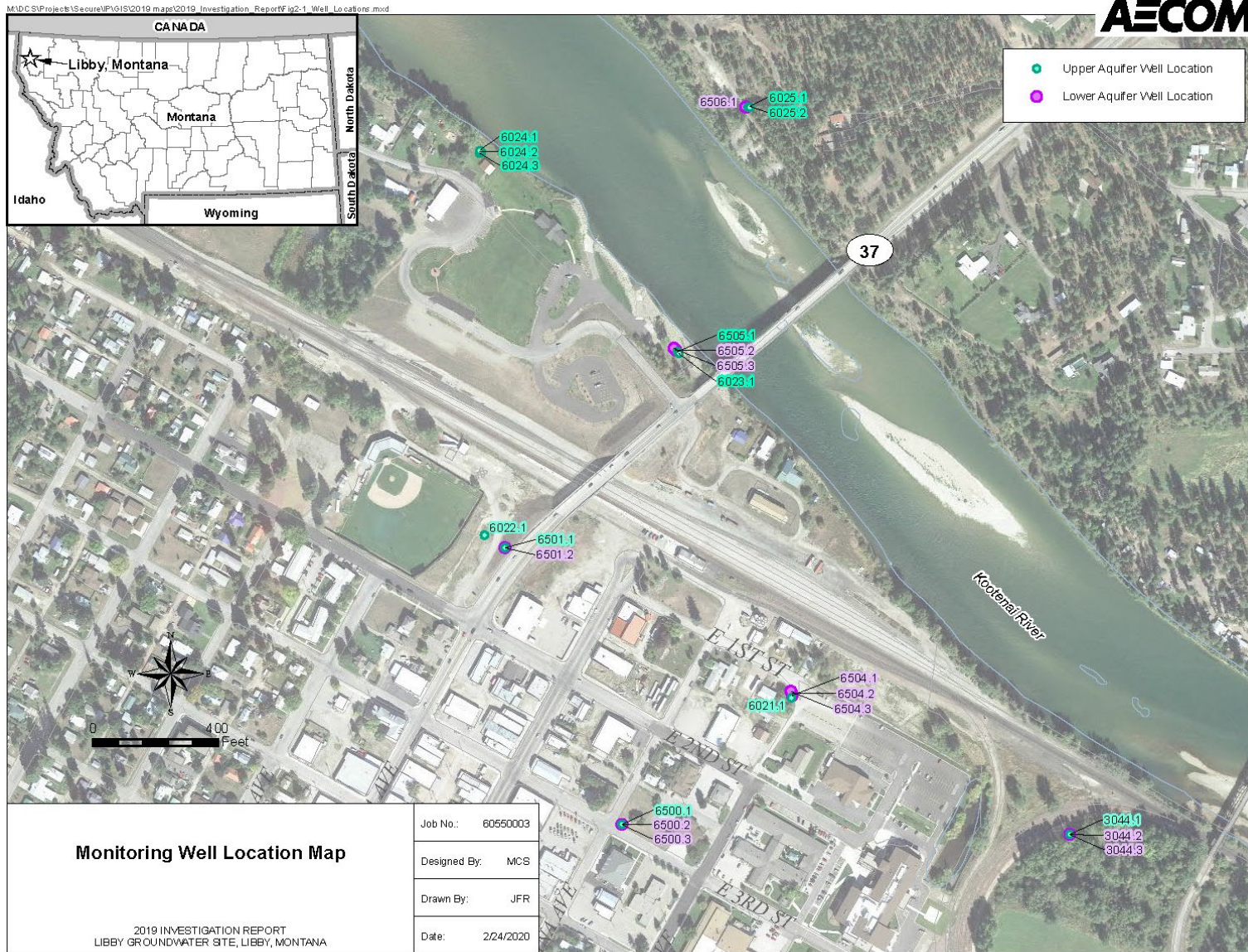


Fig. 2-1

<sup>4</sup> Source of all figures: Final Monitoring Wells Installed During 2019 – Investigation Field Activity and Data Summary Report



Figure H-2: PCP Concentrations in Lower Aquifer (2019)

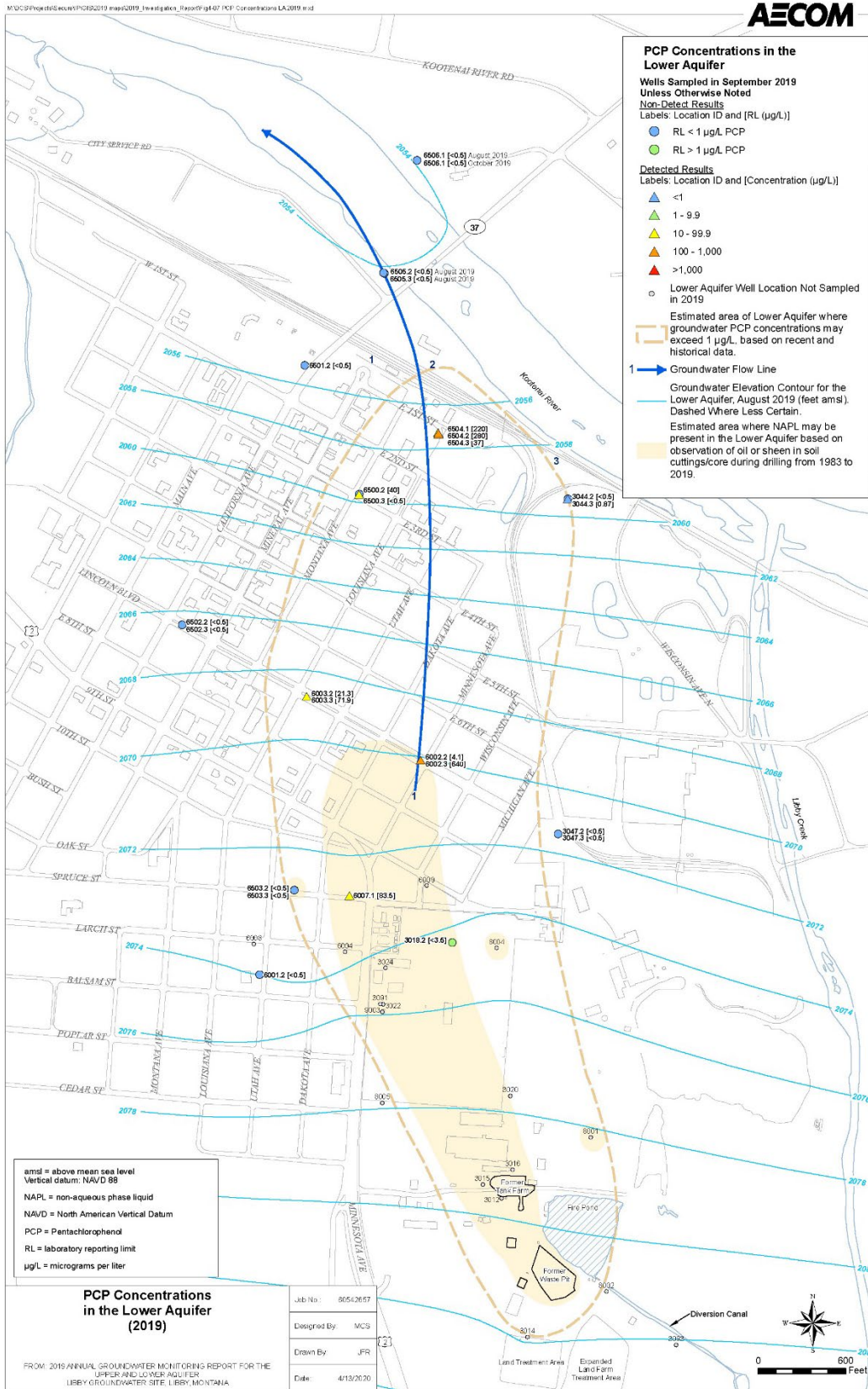


Fig. 4-7

**Figure H-3: PCP Concentrations in Upper Aquifer, Shallow Subunit (2019)**

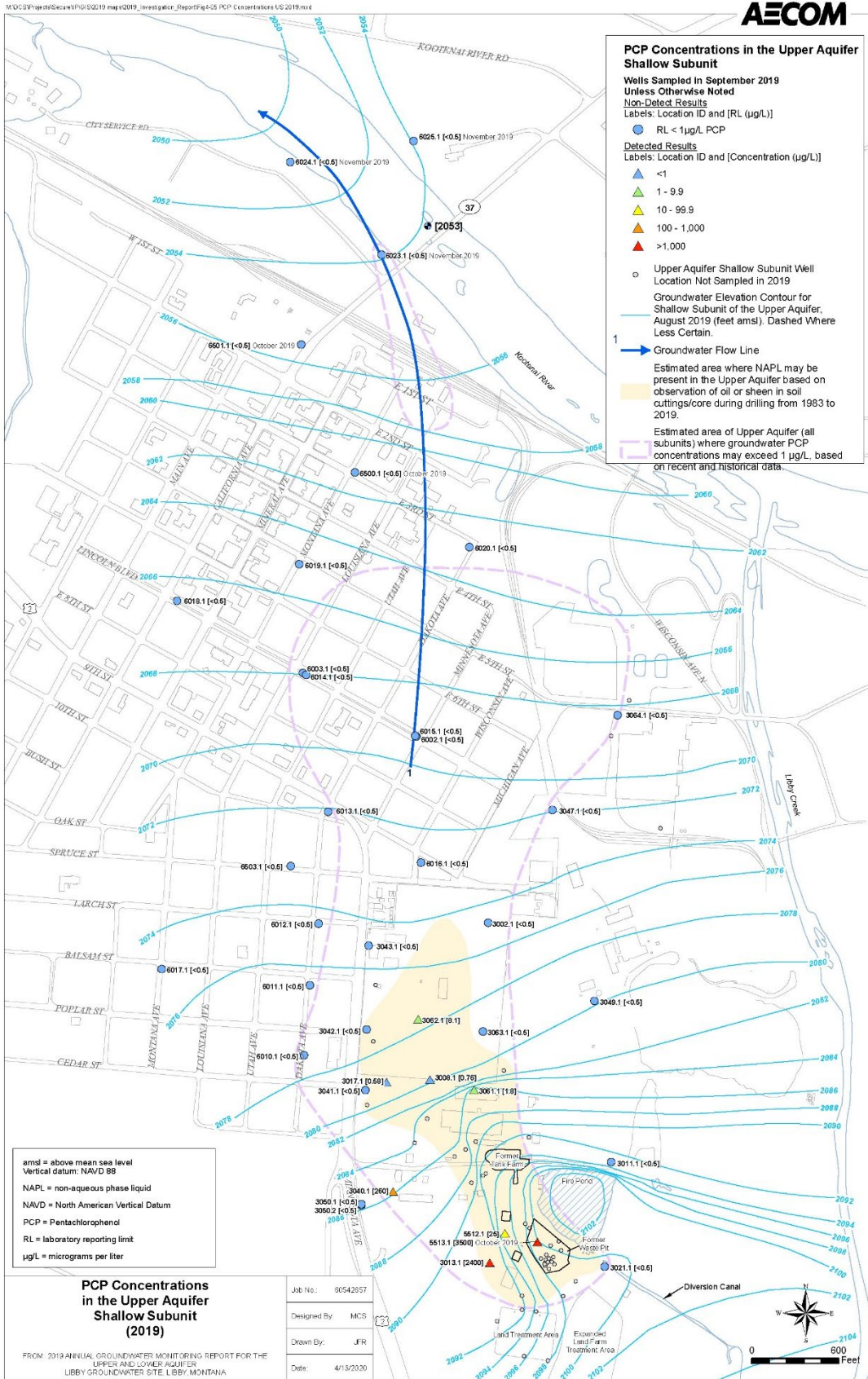


Fig. 4-5



**Figure H-4: PCP Concentrations in Upper Aquifer, Middle/Deep Subunit (2019)**

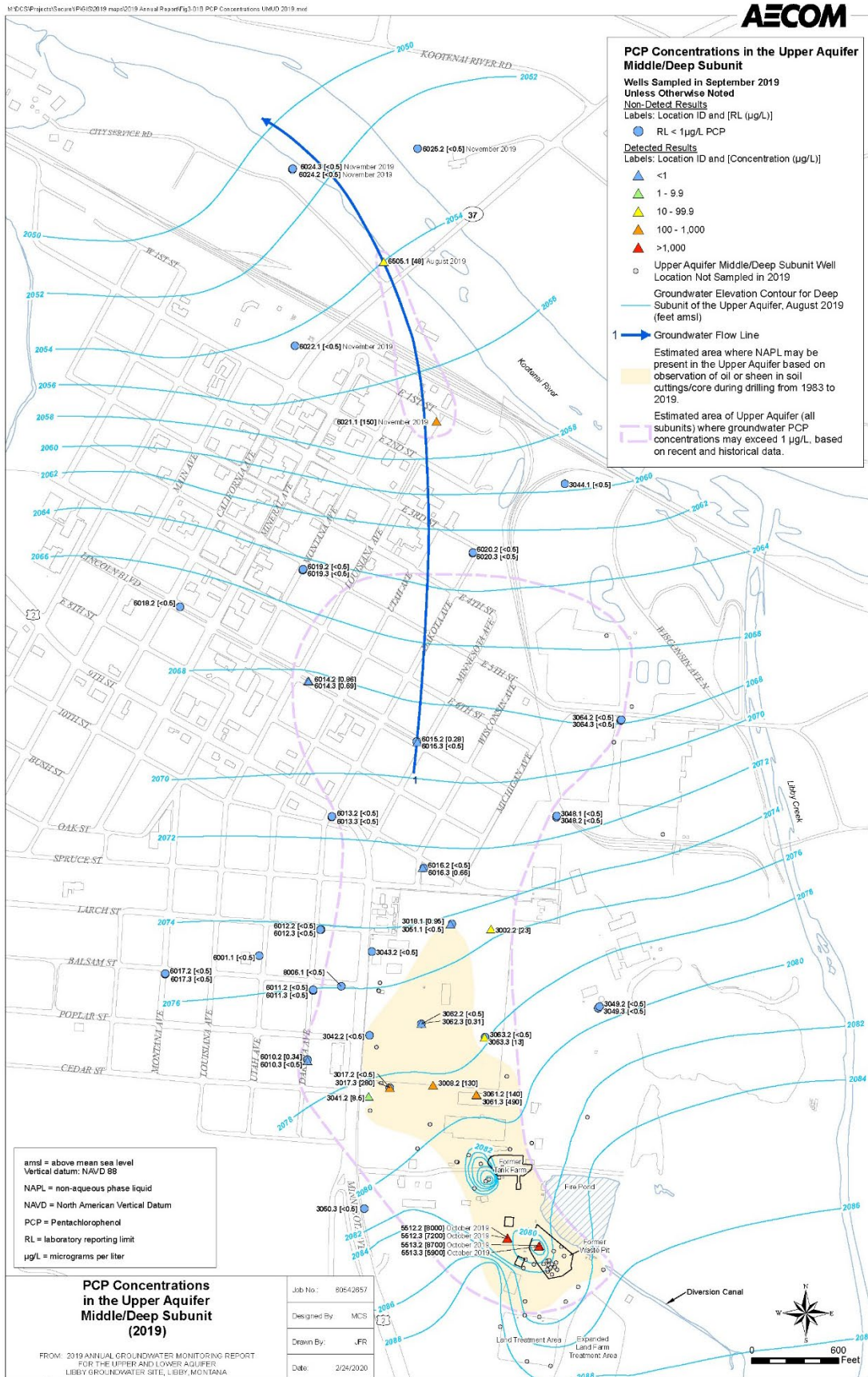


Fig. 4-6

## APPENDIX I – SCREENING-LEVEL RISK REVIEW

**Table I-1: Soil Screening Level Risk Review**

Soil COC	Cleanup Goals (mg/kg)	Industrial RSL for Soil <sup>a</sup> (mg/kg)		Risk Calculated Based on Industrial RSL	
		10 <sup>-6</sup> Risk	HQ = 1.0	Risk <sup>b</sup>	HQ <sup>c</sup>
Acenaphthene	166	NA	45,000	NA	0.004
Anthracene	33	NA	230,000	NA	0.0001
Fluorene	250	NA	30,000	NA	0.008
Fluoranthene	250	NA	30,000	NA	0.008
Chrysene	59,400	2,100	NA	3 x 10 <sup>-5</sup>	NA
Benzo(a)anthracene	594	21	NA	3 x 10 <sup>-5</sup>	NA
Benzo(b)fluoranthene	594	21	NA	3 x 10 <sup>-5</sup>	NA
Benzo(k)fluoranthene	5,940	210	NA	3 x 10 <sup>-5</sup>	NA
Benzo(a)pyrene	59	2.1	220	3 x 10 <sup>-5</sup>	0.3
Indeno (1,2,3-c,d)pyrene	594	21	NA	3 x 10 <sup>-5</sup>	NA
Dibenzo(a,h)anthracene	59	2.1	NA	3 x 10 <sup>-5</sup>	NA
PCP	36	4	2,800	9 x 10 <sup>-6</sup>	0.01
Dioxin TCDD	0.0029	0.000022	0.00072	1 x 10 <sup>-4</sup>	<b>4</b>
Total Carcinogenic PAHs <sup>d</sup>	88	2.1	220	4x10 <sup>-5</sup>	0.4

*Notes:*  
RSL = regional screening level  
HQ = hazard quotient  
**Bold** = Exceeds the EPA's target cancer risk range 1 x 10<sup>-6</sup> to 1 x 10<sup>-4</sup> or the non-cancer HQ of 1.  
a. The EPA soil RSLs, dated November 2019, are available at <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables> (accessed February 12, 2020).  
b. Risk calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10<sup>-6</sup> risk: risk = (cleanup goal / cancer-based RSL) x 10<sup>-6</sup>.  
c. Noncancer HQ calculated using the following equation: HQ = cleanup goal / noncancer-based RSL.  
d. Based on the benzo(a)pyrene equivalence.