PREASSESSMENT SCREEN:

LIBBY GROUNDWATER CONTAMINATION SUPERFUND SITE
LINCOLN COUNTY, MT

Prepared by:

State of Montana
Natural Resource Damage Program

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CONTENTS

1.0 INTRODUCTION

The Libby Groundwater Contamination Superfund Site (Site) is a former lumber mill and wood-treating facility in Lincoln County, Montana, located partially within the city of Libby (Figure 1 and Figure 2). The Site is bounded to the north by the Kootenai River and Libby Creek runs through the eastern portion of the Site. From 1946 to 1969, the St Regis Paper Company conducted wood-treating operations at the Site. Wood was treated with creosote (predominantly made up of polycyclic aromatic hydrocarbons [PAHs]) and pentachlorophenol (PCP) in an aromatic solvent carrier fluid. Operations at the Site and use of these chemicals led to contamination of Site soils and groundwater. The Environmental Protection Agency (EPA) has delineated two aquifer units at the Site (Upper and Lower), which they state are separated by the Intermediate Zone. All three of these hydrogeologic units have been affected by Site contamination.

Contamination was first discovered in groundwater in 1979 and EPA conducted an initial site investigation in 1980 (EPA 2020a). EPA added the Site to the National Priorities List in 1983. Contaminants of concern at the Site include PCP, PAHs, benzene, dioxins and furans, and arsenic. The Site has two operable units (OUs):

- OU1 – Alternative drinking water supply, and
- OU2 – Affected environmental media, including contaminated soils, upper aquifer groundwater, and lower aquifer groundwater.

In 1986, EPA issued a Record of Decision (ROD) for OU1 (OU1 ROD; EPA 1986) that focused on reducing human exposure to contaminated groundwater. This included the implementation of Libby City Ordinance #1353, preventing installation of new groundwater wells for drinking water or irrigation purposes and additional requirements where the potentially responsible party provided financial incentives to avoid use of the contaminated groundwater within the city limits. In 1988, EPA issued a ROD for OU2 (OU2 ROD; EPA 1988) that prescribed remedial actions for the soil and groundwater contamination, as well as institutional controls to reduce human exposure. EPA issued an Explanation of Significant Differences (ESD) to the OU2 ROD in 1993 (1993 ESD; EPA 1993), determining through a technical impracticability waiver that it is technically infeasible to remediate the Lower Aquifer. The ESD also removed soil treatment levels for pyrene, naphthalene, and phenanthrene in Site soils. Numeric remediation criteria for the Upper Aquifer were updated to reflect updated federal and state maximum contaminant levels and risk calculations in another ESD, issued in 1997 (1997 ESD; EPA 1997).

The groundwater remedy was modified in a 2020 ROD Amendment (2020 ROD Amendment; EPA 2020b) after finding that the remedial actions implemented in the Upper Aquifer were no more effective than natural attenuation. The ROD Amendment replaced the current source area extraction and treatment system with in-situ biosparging, added biosparging to the area downgradient of the source area, and continued monitored natural attenuation for the dissolved plume area. Construction of the groundwater remedy specified in the 2020 ROD Amendment is on-going and expected to be completed in 2025.

When hazardous substances harm (or “injure”) natural resources that are held in trust for the public, Federal and State laws provide mechanisms that authorize natural resource Trustees to seek compensation from potentially responsible parties (PRPs) for those injuries. Regulations outlining a process for conducting natural resource damage assessments (NRDAs) for the release of hazardous substances have been promulgated by the U.S. Department of the Interior (DOI) at 43 CFR Part 11 (hereafter, the DOI regulations). These regulations are not mandatory; however, assessments performed in compliance with these regulations have the force of a rebuttable presumption under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [42 USC § 9607(f)(2)(C)].

The Montana Natural Resource Damage Program (NRDP) acts as the representative of the Governor of the State of Montana, the Trustee of natural resources for the State of Montana. The Trustee is evaluating whether to proceed with an NRDA for the Site. A Preassessment Screen (PAS) is the first step in the NRDA process based on the DOI regulations. NRDP prepared this PAS and determined whether readily available information suggests that the Trustee can make a successful claim and should proceed with an NRDA for the Site.

1.1 Intent of the Preassessment Screen

Subpart B of the DOI regulations provide guidelines for conducting a PAS. The purpose of a PAS is to provide "a rapid review of readily available information," focusing on resources for which a Federal, State, or Tribal agency can assert trusteeship, to ensure that there is "a reasonable probability of making a successful claim before monies and efforts are expended in carrying out an assessment" [43 CFR § 11.23(b)]. A PAS is not intended to serve as a complete assessment of natural resources injuries or damages. This PAS was prepared using existing data to evaluate whether the Trustee has a reasonable probability of making a successful claim.

1.2 Criteria to be Addressed by the Preassessment Screen

The content and requirements of a PAS include five criteria that are used to evaluate whether to proceed with an assessment [43 CFR § 11.23(e)]:

1) A discharge of oil or a release of a hazardous substance has occurred
2) Natural resources for which the Federal or State agency or Indian Tribe may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the discharge or release
3) The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury to those natural resources
4) Data sufficient to pursue an assessment are readily available or likely to be obtained at reasonable cost
5) Response actions, if any, carried out or planned, do not or will not sufficiently remedy the injury to natural resources without further action.

The remainder of this document provides the information to satisfy these criteria, following Subpart B of the DOI regulations. Section 2 provides information about the Site and the release of hazardous substances [43 CFR § 11.24]. Section 3 is a preliminary identification of resources potentially at risk [43 CFR § 11.25]. Section 4 documents the determination that all of the PAS criteria have been met, and Section 5 presents the Trustee's determination to proceed with an NRDA for the Site. This is followed by references cited in the text.

1.3 Potentially Responsible Parties

The PRPs at the Site include past and current owners and operators of the Site. EPA added the Site to the National Priorities List in 1983 and identified the St. Regis Paper Company as the primary PRP (EPA 2020b). Champion International Corporation (Champion) purchased and merged with the St. Regis Paper Company in 1985 and became the PRP. International Paper Company (IP) merged with Champion in 2000 and assumed Champion's liabilities, including its liabilities under a Consent Decree entered in federal district court. IP is the current responsible party for the Site.

2.0 SITE HISTORY AND HAZARDOUS SUBSTANCE RELEASES

This section includes Site information and documentation of releases of hazardous substances pursuant to the DOI regulations [43 CFR § 11.24]:

- Section 2.1 provides the location and description of the Site [43 CFR § 11.24(a)(4)]
- Section 2.2 describes the operational history at the Site [43 CFR § 11.24(a)(4)]
- Section 2.3 lists the hazardous substances released [43 CFR § 11.24(a)(2); 43 CFR § 11.24(a)(5)]
- Section 2.4 summarizes sources of hazardous substances [43 CFR § 11.24(a)(3)]
- Section 2.5 describes time, quantity, duration, and frequency of the hazardous substance releases [43 CFR § 11.24(a)(1)]
- Section 2.6 discusses whether damages being considered are barred by specific defenses or exclusions from liability under CERCLA [43 CFR § 11.24(b)] or the Clean Water Act (CWA) [43 CFR § 11.24(c)].

The PRPs were listed previously in Section 1.3 [43 CFR § 11.24(a)(6)].

2.1 Location and Description

The Site is located in and near Libby, Montana in Lincoln County (Figure 1). The Site is bounded by the Kootenai River to the north and the western portion of the Site is within Libby city limits. The western extent of the Site is defined by the extent of the groundwater contamination (Figure 2). Surface water features at the Site include Libby Creek, which runs along the eastern portion of the Site, the Fire Pond, and a public fishing pond (Figure 1; EPA 2020a). Groundwater is present beneath the Site in three aquifer units: the Upper Aquifer, the Intermediate Zone, and the Lower Aquifer (URS 2016).

A portion of the former mill property is currently being developed for industrial and commercial uses. The northwestern portion of the Site is largely residential.

2.1.1 Groundwater

The Site overlies approximately 150 feet of unconsolidated interbedded gravel, sand, silt, and clay of glacial and glaciofluvial origin (Arrowhead Engineering, Inc. [AEI] 2023). Groundwater is present beneath the Site in three water-bearing units: the Upper Aquifer, the Intermediate Zone, and the Lower Aquifer. All three units are contaminated from Site operations. All units contain interbedded water bearing and non-water bearing strata, but the Intermediate Zone contains fewer water bearing strata. Figure 3 shows a conceptual diagram of the aquifers below the Site.

The Upper Aquifer is an unconfined aquifer that extends to a depth of 50 to 75 feet below ground surface (ft bgs) (URS 2016). Groundwater is first encountered from 7 to 21 ft bgs. The shallowest groundwater is found in the waste pit area. Sand and gravel layers constitute approximately 80% of the total thickness of the Upper Aquifer and the average hydraulic conductivity is estimated to range from 100 ft/day to 1,000 ft/day (AEI, 2023). The hydraulic conductivity appears to increase to the north in the hydraulically downgradient direction, though it is highly variable throughout the Site. There is a steep horizontal and vertical hydraulic gradient around the Fire Pond because of surface water leakage from the pond (see section 2.1.2).

The Intermediate Zone extends from approximately 60-70 ft bgs to 100-110 ft bgs (AEI 2023) and sand and gravel constitute approximately 20% of the total thickness of this zone (URS 2016). The 2018 Focused

Feasibility Study states there has been little investigation into the hydraulic conductivity of this zone but it is expected to be low (approximately 2.5 ft/day) based on lack of water production during drilling and high content of fines (AECOM 2018).

The Lower Aquifer is semi-confined and extends from approximately 105 ft bgs to 160 ft bgs (URS 2016). It consists of clean to silty gravel and sand interbedded with sandy, gravelly, silt and clay layers, similar to the Upper Aquifer (AEI 2023), with sand and gravel constituting approximately 70% of the total thickness (URS 2016). There has been limited investigation into the hydraulic conductivity of the Lower Aquifer, but it is estimated to range from 10 to 100 ft/day based on low-yield pump testing, water production rates during drilling, electromagnetic conductivity measurements, and borehole sample descriptions (URS 2016). Underlying the Lower Aquifer is a glacial till, predominantly composed of clay and silt with varying content of gravel and sand and occasional cobbles/boulders (AESOM 2018). The glacial till is expected to extend more than 500 feet deep to the Precambrian bedrock.

The vertical hydraulic gradient at the site is largely downward (from the Upper Aquifer to the Lower Aquifer) with some areas of horizontal or upward gradients (Woodward-Clyde Consultants 1993).

2.1.2 Surface Water

Surface water bodies at the Site include Libby Creek, the Fire Pond, a public fishing pond, and the Kootenai River. In 1986, it was estimated that the Fire Pond leaked 5.2 cubic feet per second to the Upper Aquifer (URS 2016). This created a steep hydraulic gradient away from the pond and changes in groundwater flow paths in this area. It is unclear whether these conditions are the same in 2024.

Libby Creek runs through the eastern portion of the Site and different segments of the creek are gaining from groundwater or losing to groundwater. Immediately upstream of the Fire Pond it is likely a losing stream, but it may become gaining as it joins the Kootenai River (URS 2016).

The Kootenai River is the northern boundary of the Site and is a major river that groundwater discharges to (EPA 2020a). The Kootenai is used for recreational activities such as fishing and boating and water levels have been regulated by the Libby Dam since 1975 (URS 2016).

The OU2 ROD states that diversion water from Libby Creek recharged several ponds on site that were used for fire suppression (Fire Pond) or to float logs (Log Pond and Small Log Pond; Figure 4) (EPA 1988).

2.2 Site History

Wood treatment operations occurred at the Site between 1946 and 1969. The following sections describe the operational history of the Site as well as remedial actions that have taken place.

2.2.1 Operational History

The J. Neils Lumber Company began wood-treating operations at the Site in 1946. The St. Regis Paper Company purchased J. Neils Company (and the Site) in 1957 and continued wood treatment until 1969 (EPA 2005). Champion purchased the facility in 1985 and operated a lumber and plywood mill at the Site (WWC 1988a). Champion sold the mill to Stimson Lumber Company in 1993. Champion was purchased by IP in 2000. IP is the current responsible party for the Site. Stimson Lumber Company sold the mill property to the Lincoln County Port Authority in 2003 (EPA 2005).

Production at the wood treatment facility peaked in the late 1950s and gradually decreased until 1969 when the operations were discontinued. Various wood treating fluids were used during this time. Disposal and spills of these fluids caused contamination of the soil and groundwater at the Site. Further information on operations resulting in releases of hazardous substances can be found in Sections 2.3 through 2.5.

2.2.2 Remedial Activities

Response actions have been on-going since contamination was first discovered at the Site in 1979. Table 1 provides a summary of these actions. Briefly, EPA's initial site assessment in 1980 found creosote, PAHs, and PCP in multiple residential drinking wells (EPA 2020a) and EPA added the Site to the National Priority List in 1983. Figure 2 shows the approximate groundwater contamination plumes, last updated in 2024.

In 1985, Champion initiated the Buy Water Plan, which provided replacement water for private wells that were known or suspected to be contaminated. In addition, Champion began annual payments of $30,000 to the city of Libby to help offset the cost of providing irrigation water to residents that were newly connected to city water (EPA 2000).

The Site was divided into OU1 (alternative drinking water supply) and OU2 (affected environmental media, including contaminated soils, upper aquifer groundwater, and lower aquifer groundwater). In 1986, EPA issued a ROD that laid out an interim remedy for OU1, focusing on reducing human exposure to the contaminated groundwater. The OU1 ROD continued and expanded the Buy Water Program. In addition, payments of $30,000 per year to the city of Libby were to continue for 10 years in exchange for the city implementing an ordinance prohibiting the installation of new groundwater wells for drinking water or irrigation purposes (EPA 1986). The OU1 ROD also included other components of institutional controls.

In 1988, Champion completed the Remedial Investigation (RI) and feasibility study (FS) and EPA issued a ROD for OU2. The OU2 ROD included (EPA 1988):

- Excavation, consolidation, and treatment of contaminated soils from the unsaturated zone of source areas;
- In-place bioremediation of contaminated soils in the saturated zone of the waste pit area;
- Extraction of non-aqueous phase liquid (NAPL) and highly contaminated groundwater from the source area, treatment of contaminated water, and reinjection of treated water;
- In-situ enhanced bioremediation of the Upper Aquifer;
- A pilot test of in-situ bioremediation of the Lower Aquifer, to be followed by a ROD that would select the final remedy;
- Continuation of the City Ordinance prohibiting installation of new wells and continuation of the Buy Water Plan;
- Monitoring; and
- Deed restrictions.

The soil remedy consisted of excavating and consolidating soils from identified sources (waste pit area, former butt dip area, and former tank farm). The soils were then treated in a two-step biodegradation process. Soils were first treated in the waste pit area and then transferred to a land treatment unit (LTU). The LTU was expanded in 1998 to expedite treatment. The expanded treatment unit is referred to as the Expanded Landfarm (ELF). The ELF has been successful in meeting cleanup goals for PAHs and PCP, but not dioxins/furans. Soil remains in the ELF because of dioxin contamination (EPA 2020a). In December 2020, EPA issued a minor modification to the OU2 remedy, providing for closure of the land treatment unit as a Corrective Action Management Unit (CAMU) (EPA 2020c).

The groundwater remedy included multiple strategies to reduce the source of NAPL and treat contaminated groundwater. The Source Area Extraction and Treatment System (SAETS) was constructed in 1991 to recovery NAPL and highly contaminated groundwater from Upper Aquifer in the waste pit area. This water is treated in a bioreactor system and coalescing separator system. Treated groundwater is reinjected into the Upper Aquifer (EPA 2020a). Two in-situ bioremediation systems were installed to reduce concentrations of contaminants dissolved in groundwater downgradient of the NAPL source areas.

The Intermediate Injection system was installed in the tank farm area in 1987 and the Boundary Injection system was installed in 1993 approximately 1,000 feet downgradient of the Intermediate system. These systems were found to be no more effective than natural attenuation at reducing dissolved contaminant concentrations, so the Intermediate system was discontinued in 1997 and the Boundary system was discontinued in 2003 (EPA 2020a).

Monitoring of the groundwater in both the Upper and Lower Aquifers was also required to assess performance of the remedial actions (Upper Aquifer) and evaluate potential plume migration (both aquifers). If the plumes are found to be migrating, EPA will assess potential effects to the Kootenai River (EPA 2020a). In the mid-2010s, groundwater monitoring showed an increase in PCP concentrations in the Lower Aquifer downgradient of the previously mapped extent of the plume. PCP concentrations at this location have continued to increase and subsequent investigations have shown downgradient PCP contamination in the middle/deep subunit of the Upper Aquifer as well (EPA 2020a). The 2021 Groundwater Monitoring Report suggests that exceedances in the Upper Aquifer are likely due to discrete Upper Aquifer layers that have previously not been monitored (AEI 2022).

The OU2 ROD was modified in 1993 and 1997 through ESDs. The 1993 ESD issued a technical impracticability waiver for the Lower Aquifer, stating that cleanup of the Lower Aquifer was infeasible (EPA 1993). Instead, Champion was required to perform long-term monitoring of the Lower Aquifer to evaluate stability of the contaminated plume. Continued restrictions on private water supply wells (through the City Ordinance) were also required for the remedy to be protective of human health. In addition, soil cleanup levels for pyrene, naphthalene, and phenanthrene were removed. The 1997 ESD updated cleanup levels for the Upper Aquifer to reflect updated State and federal maximum contaminant levels (MCLs) and risk assessment calculations (EPA 1997).

In 1999, Champion requested a technical impracticability waiver for the Upper Aquifer, stating that the remedial actions were not feasible (WWC 1999). EPA denied this request in 2009 (EPA 2009). In 2020, EPA issued an amendment to the OU2 ROD that modified the remedy for the Upper Aquifer (EPA 2020b). The 2020 AROD required in-situ biosparging in the NAPL source area (rather than extraction and treatment) and in the area downgradient of the NAPL source area. Design and construction of these remedial actions are on-going.

Table 1. Summary of Remedial Actions

Year	Event
1979	• Groundwater contamination was first discovered at the Site in April 1979 when water from a newly installed residential drinking water well smelled of creosote (EPA 2020a).
1980	• EPA conducted an initial site assessment and found creosote, PAHs, and PCP in multiple residential wells (EPA 2020a).
1983	• In September, EPA added the Site to the National Priorities List and EPA and the St. Regis Paper Company entered an Administrative Order on Consent (EPA 2020a).
1985	• Champion purchased and merged with St. Regis Paper Company, becoming the Site PRP. Champion initiated the Buy Water Plan to provide replacement water for private wells that were known or suspected to be contaminated and began providing $30,000 per year to the city of Libby to help offset irrigation water costs for all residents within the City limits (EPA 2000).

Year	Event
1986	• In September, the OU1 ROD was finalized and laid out an interim remedy to reduce human exposure to contaminated groundwater. This included (EPA 1986): o A City Ordinance in Libby prohibiting the installation of new groundwater wells for drinking water or irrigation. o Continuation of the Buy Water Plan, under which Champion (the successor to St. Regis Paper Company) plugged and abandoned domestic wells with contaminated groundwater, connected those residents to city water, and provided financial compensation to residents for the increased cost of using city water. o Annual compensation from Champion to the city of Libby to ameliorate the financial burden posed by the ordinance, consisting of 10 annual payments of $30,000.
1988	• In April, the Phase IV Remedial Investigation (RI) was completed (WCC, 1988a). The RI characterized the subsurface conditions and nature and extent of contamination. • In November, the Feasibility Study (FS) was completed (WCC, 1988b). The FS evaluated alternatives for remediation of the Site. • In December, the OU2 ROD was finalized, specifying remedial actions for the site. These included (EPA 1988): o Excavation and consolidation of contaminated soils from source areas with enhanced biodegradation treatment in a land treatment unit; o In-place bioremediation of contaminated soils in the saturated zone of the waste pit area; o Extraction of NAPL and highly contaminated groundwater from the source area; o Treatment of contaminated groundwater in a fixed-bed bioreactor and reinjection of treated water through a rock percolation bed; o In-situ enhanced bioremediation in the Upper Aquifer; o Pilot test of in-situ bioremediation of the Lower Aquifer to be followed by a ROD that will select the final remedy for the Lower Aquifer; o Continuation of the City Ordinance and Buy Water Plan outlined in the OU1 ROD; o Monitoring of remediation actions (including the land treatment unit and the Upper and Lower aquifers); and o Deed restrictions to identify the locations of hazardous substances and treatment areas and restrict future use of those areas.
1989	• In October, EPA and Champion entered a Consent Decree requiring the cleanup (EPA 2000) and Champion initiated the remedial actions.
1991	• In the fall, a comprehensive groundwater monitoring program was initiated to evaluate the overall distribution of contamination in the Upper Aquifer and to assess the performance of the in-situ bioremediation system (EPA 2000).
1993	• In September, EPA issued the 1993 ESD in place of the additional ROD called for in the 1988 ROD. The 1993 ESD included (EPA 1993): o Continued restrictions on private water supply wells; o Determined that remediation of the Lower Aquifer was technically infeasible and removed applicable, relevant, and appropriate requirements (ARARs) for PCP, naphthalene, chrysene, and benzo(a)anthracene in the Lower Aquifer; o Required long-term monitoring of the Lower Aquifer; and o Modified soil cleanup levels for the land treatment unit by removing limitations on pyrene, naphthalene, and phenanthrene.

Year	Event
1997	• In January, EPA issued the 1997 ESD, modifying the remedial levels for the Upper Aquifer. The 1997 ESD modified the remediation levels for PCP, 2,3,7,8-tetrachlorodibenzo-p-dioxin (dioxin TCDD), carcinogenic PAHs, noncarcinogenic PAHs, and dioxins/furans (EPA 1997). • In June, Champion augmented the Buy Water Plan to incentivize well owners to plug and abandon their wells. Champion offered to reimburse well owners in the amount of $2,000 (EPA 2000). • Champion requested to discontinue operation of the Intermediate Injection System, part of the Upper Aquifer remedy, based on the system's inability to meet remedial goals. EPA approved this request, and the system was removed in 1998 (EPA 2000).
1999	• In January, Champion requested a technical impracticability waiver for the Upper Aquifer, stating that the remedial actions were not practicable based on performance monitoring and remediation timeframe (Woodward-Clyde 1999).
2000	• Champion merged with International Paper Company (IP) with IP assuming Champion's liabilities and becoming the PRP for the Site (EPA 2020a).
2003	• In March, Champion discontinued the Boundary Injection System, part of the Upper Aquifer in-situ enhanced bioremediation, after receiving approval from EPA to do so (EPA 2005).
2008	• IP provided $400,000 to the City of Libby to subsidize the City's citizen's increased financial burden associated with having the groundwater ordinance in place for the fiscal years 2008-2009 and 2009-2010, laid out in an agreement dated December 16, 2008. As part of the agreement, the City agreed to keep the ordinance in place.
2009	• In March, EPA denied the request for a technical impracticability waiver of the Upper Aquifer (EPA 2009).
2010	• IP and the City of Libby entered into an agreement (May 18, 2010) under which IP paid $1,150,000 to the City of Libby to compensate for the past financial burden of the groundwater ordinance. The agreement also included annual payments of $250,000, subject to an inflation escalator, to compensate for future financial burden associated with the groundwater ordinance. IP made these annual payments through 2020, for a total of $3,034,860.00.
2020	• In April, EPA issued the 2020 AROD, amending the Upper Aquifer remedy provided in the 1988 OU2 ROD. The 2020 AROD included (EPA 2020b): o Replacement of the source area extraction and treatment with in-situ biosparging in the NAPL source area; o Addition of in-situ biosparging in the area downgradient of the NAPL source area; and o Continuation of monitored natural attenuation for the dissolved plume. • In December, EPA issued a minor modification to the OU2 ROD allowing for closure of the LTU as a CAMU.

2.3 Hazardous Substances Released

Hazardous substances EPA has identified at the Site are listed in Table 2 (EPA 1988).

Table 2. Site Contaminants of Concern

Hazardous Substance	CAS #	Media
PCP	87-86-5	Groundwater and Soil
PAHs:		
acenaphthene	83-32-9	Groundwater and Soil
anthracene	120-12-7	
fluoranthene	206-44-0	
fluorene	86-73-7	

naphthalene	91-20-3	
pyrene	129-00-0	
benz(a)anthracene	56-55-3	
benzo(a)pyrene	50-32-8	
benzo(b)fluoranthene	205-99-2	
benzo(k)fluoranthene	207-08-9	
chrysene	218-01-9	
dibenz(a,h)anthracene	53-70-3	
indeno(1,2,3-c,d)pyrene	193-39-5	
Benzene	71-43-2	Groundwater
Arsenic	7740-38-2	Groundwater
Dioxins/furans (including 2,3,7,8-TCDD)	1746-01-6	Soil

2.4 Sources of Hazardous Substances

Wood treating operations used various fluids that resulted in impacts to soil and groundwater. These fluids were complex mixtures of different blends of chemical products used over time, product process residues, and spent mixtures (EPA 2020b). Creosote and PCP were the primary wood treating fluids. PCP crystals were dissolved in an aromatic solvent similar to diesel fuel (5% PCP and 95% carrier). In the mid-1960s, 10% of wood treatment was believed to use fluoride, chrome, arsenic, dinitrophenol, zinc chloride, boric acid, and ammonium salt. A 50/50 mixture of creosote and fuel oil (PS400) was occasionally used for some wood-treating orders (EPA 2020b).

The 1988 RI contains the following information about releases of hazardous substances at the Site (WWC, 1988a):

> "Wood treating fluids and constituents are known to have been disposed of and spilled at several different locations at the mill during the early operation of the plant. Waste water, formed as vapor in the retorts, was placed in the waste pits after treatment by a condenser and oil separator. This discharge was estimated in the Phase III report at approximately 95 percent water, 3 percent light oil fractions, and 2 percent creosote. In addition to the waste water discharge to the pits, sludges which build up in the bottom of the wood treating fluid tanks were periodically removed and hauled to the waste pits. Spills of treating fluids are known to have occurred in the tank farm area and at the butt dip tank. Spills around the storage tanks are reported to have occurred several times a month for the first few years of operation. The fluids were transferred by air pressure and control was difficult. Spills and recovery attempts varied greatly in quantity, preventing accurate estimates of the total quantity lost. Also, the butt dip treatment tank occasionally foamed over due to overheating the treating fluid. No accurate estimate of loss from the butt-dip tanks can be made with the available information."

2.5 Time, Quantity, Duration, and Frequency of Releases

Releases of hazardous substances likely began in 1949 with the commencement of wood treatment operations. Direct releases (discharges and spills) likely ceased in 1969 when wood treating operations were discontinued. However, contaminants continued to be released from the Site soils and aquifer, with groundwater contamination spreading beyond the property boundary. NAPL source areas are still present on the Site.

The quantity of NAPL that was released is unknown and estimates are highly uncertain. The estimated volume of NAPL released ranges from 773,000 gallons to 4.89 million gallons (URS 2016). NAPL has since migrated horizontally and vertically in the subsurface in both the non-aqueous form and dissolved form.

2.6 Damages Excluded from Liability

The Trustee evaluated whether the damages being considered are barred by specific defenses or exclusions from liability under CERCLA or the CWA [43 CFR §§ 11.24(b) and (c)]. The possible exclusions of liability include whether damages:

- Resulting from the releases were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement or other comparable environmental analysis, that the decision to grant the permit or license authorizes such commitment of natural resources, and that the facility or project was otherwise operating within the terms of its permit or license, so long as, in the case of damages to an Indian tribe occurring pursuant to a Federal permit or license, the issuance of the permit or license was not inconsistent with the fiduciary duty of the United States with respect to such Indian Tribe; or
- Resulted from releases of a hazardous substance from which such damages resulted have occurred wholly before the enactment of CERCLA; or
- Resulted from the application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act, 7 USC 135–135k; or
- Resulted from any other Federally permitted release, as defined in Section 101 (10) of CERCLA; or
- Resulted from the release or threatened release of recycled oil from a service station dealer described in Section 107 (a)(3) or (4) of CERCLA if such recycled oil is not mixed with any other hazardous substance and is stored, treated, transported or otherwise managed in compliance with regulations or standards promulgated pursuant to Section 3014 of the Solid Waste Disposal Act and other applicable authorities; or
- Resulted from a discharge that meets one or more of the exclusions provided in Section 311 (a)(2) or (b)(3) of the CWA.

While the wood treating operations occurred wholly before 1980, the releases of hazardous substances have continued. Injuries to natural resources and future releases to the groundwater will continue indefinitely given the technical impracticability waiver granted for the Lower Aquifer and the continued leaching of the NAPL source both horizontally and vertically into the groundwater.

Therefore, the Trustee has determined that none of the potential injuries resulting from hazardous substance releases at the Site meet any of the above exclusion criteria, nor are they subject to any other exceptions to liability provided under Sections 107 (f), (i), and (j); and 114(c) of CERCLA.

3.0 PRELIMINARY IDENTIFICATION OF POTENTIALLY INJURED NATURAL RESOURCES

This section presents a preliminary identification of natural resources potentially at risk from hazardous substances released from the Site pursuant to NRDA regulations. Section 3.1 describes pathways of exposure [43 CFR § 11.25(a)]. Section 3.2 summarizes the areas and resources that have been exposed to hazardous substances [43 CFR § 11.25(b)]; and presents concentrations of hazardous substances in these areas [43 CFR § 11.25(d)], including in exposed water [43 CFR § 11.25(c)]. Section 3.3 describes natural

resources and services that are potentially affected because of exposure to hazardous substances [43 CFR § 11.25(e)].

3.1 Preliminary Identification of Pathways

Hazardous substances were released to soil and groundwater. Investigations have shown NAPL in the subsurface that continues to impact groundwater. NAPL is primarily dense non-aqueous phase liquids (DNAPL), though some light NAPL (LNAPL) exists at the Site as well (URS 2016). DNAPL (which is denser than water) was transported downward/vertically through the Upper Aquifer into the Intermediate Zone and then to the Lower Aquifer (see Figure 3). The Intermediate Zone has lower hydraulic conductivity but allows water (and contaminants) to pass through. Site contaminants are found in both the Upper Aquifer and the Lower Aquifer. DNAPL is most frequently observed near the base of the Upper Aquifer near the former waste pit and at the base of the Lower Aquifer in the vicinity of the former waste pit and tank farm source areas (URS 2016). Dissolved contaminants are also present in groundwater, emanating from the NAPL source areas. Groundwater contamination has spread both horizontally and vertically through the subsurface.

The Kootenai River receives groundwater discharge from the region, including from the Site. Recent groundwater monitoring has shown groundwater contamination in wells closer to the Kootenai River than previously reported (EPA 2020a). Exceedances near the Kootenai are shown in Figure 5. It is possible that surface water and sediments in the Kootenai River downgradient of the Site have been injured by the hazardous substances through discharge of contaminated groundwater. Additional information may be needed to evaluate this pathway.

3.2 Areas and Resources Exposed to Hazardous Substances

Contamination is evident in Site groundwater. Groundwater sampling conducted since 1979 has shown contamination in the Upper Aquifer and the Lower Aquifer (AEI 2022). Presumably, contamination in the Lower Aquifer resulted from transport of contaminants through the Intermediate Zone. Figure 5 through Figure 9 show groundwater contamination for different contaminants at different points in time.

3.3 Potentially Affected Natural Resources and Services

Natural resources affected or potentially affected include, but are not limited to, the following, all of which fall within the jurisdiction of the Trustee:

- Groundwater resources (Upper Aquifer, Intermediate Zone, and Lower Aquifer); and
- Surface water and sediments in the Kootenai River.

To date, the Trustee is unaware of any investigations into potential contamination of the Kootenai River. However, recent groundwater monitoring results have shown that contaminant plumes extend further downgradient than originally assumed, putting contaminated groundwater closer to the Kootenai River. Without further investigation, it is unknown whether the Kootenai River surface water and sediments have been impacted.

The natural resource services that have been potentially affected by the release of and exposure to hazardous substances from the Site include both ecological and human use services. Natural resource services are the physical and biological functions performed by the resource, which are the result of the physical, chemical, or biological quality of the resource [43 CFR § 11.14(nn)]. Natural resource services also include human uses of natural resources [43 CFR § 11.14(nn)]. Potentially affected human use of natural resources include groundwater use for consumption, irrigation, livestock, and other uses.

Injuries to the Kootenai River could also potentially impact ecological and human use services provided by the River, such as aquatic habitat and recreational use of the River.

4.0 PRELIMINARY PAS CRITERIA DETERMINATIONS

This section presents an evaluation of the preassessment determination criteria [43 CFR § 11.23(e)]. The information presented and summarized in this section confirms:

- A release of hazardous substances has occurred.
- Natural resources have been or likely have been adversely affected by releases of hazardous substances.
- The quantity and concentration of the released hazardous substances are sufficient to potentially cause injury.
- Data sufficient to pursue an assessment are readily available or likely to be obtained at reasonable cost.
- Response actions will not sufficiently remedy the injury to natural resources without further action.

The information supporting these conclusions is presented below.

4.1 Criterion 1 – A discharge of oil or a release of a hazardous substance has occurred

Site investigations show that releases of hazardous substances have occurred at the Site. Hazardous substances released include, but are not limited to, PCP, PAHs, dioxins/furans, benzene, and arsenic.

4.2 Criterion 2 – Natural resources for which the Trustee may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the release

Site data indicate that groundwater, a natural resource for which the Trustee may assert trusteeship, has been adversely affected by the releases of hazardous substances. Hazardous substances are present in groundwater at concentrations sufficient to cause injury.

It is possible that surface water and sediments in the Kootenai River have been adversely affected by the release of hazardous substances, though additional investigations may be needed to adequately investigate this.

4.3 Criterion 3 – The quantity and concentration of the released hazardous substance is sufficient to potentially cause injury to natural resources

The quantity and concentration of the released hazardous substances is sufficient to cause injury natural resources including, but not limited to groundwater resources.

The definition of injury in the DOI regulations includes the following:

> Concentrations of substances in excess of drinking water standards, established by Sections 1411–1416 of the SDWA, or by other Federal or State laws or regulations that establish such standards for drinking water, in groundwater that was potable before the discharge or release [43 CFR § 11.62(c)(1)].

Applicable drinking water standards include the National Primary Drinking Water Regulations under the SDWA (USEPA, 2018b) and the Circular DEQ-7 Montana Numeric Water Quality Standards (MDEQ, 2019). Hazardous substances released at the Site that exceed these criteria in groundwater include, but may not be limited to, PCP and PAHs, with potential exceedances of arsenic and benzene.

4.4 Criterion 4 – Data sufficient to pursue an assessment are readily available or are likely to be obtained at reasonable cost

Data relevant to assessing natural resource damages at the Site have been collected as part of remedial activities. Such data include information on hazardous substance sources, releases, pathways, and concentrations in the environment. Additional data collection efforts are ongoing.

In the DOI regulations, reasonable cost means, in pertinent part, that "the Injury Determination, Quantification, and Damage Determination phases have a well-defined relationship to one another and are coordinated and the anticipated cost of the assessment is expected to be less that the anticipated damage amount" [43 CFR § 11.14 (ee)]. Although the specific elements of injury determination, quantification, and damage determination have not yet been developed for this Site, the Trustee anticipates a well-defined and coordinated process. The Trustee expects that additional data collection, if any, to assess trust resources and services can be conducted at reasonable cost, as defined in the regulations, and that these costs will be less than the anticipated damage amount.

4.5 Criterion 5 – Response actions carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action

Response activities have not remedied natural resource injuries. Because there is a technical impracticability waiver for the Lower Aquifer, the Trustee anticipates injuries to that aquifer to last indefinitely. Remedial actions to date have not been successful in remediating the Upper Aquifer to below cleanup levels. Additional remedial actions are being designed and implemented at the Site to address contamination in the Upper Aquifer, but full remediation is expected to take 41 years (EPA 2022). Rehabilitation, restoration, or replacement of natural resources is required to reduce future injuries and compensate the public for interim losses of natural resources and the services they provide.

Some compensation to the city of Libby has been provided in the past to offset the cost of providing irrigation water to all residents and compensate the City and its citizens for the increased financial burden associated with the groundwater ordinance. A total of $4,944,860.00 was provided to the City between 1986 and 2020. These payments were necessary under remedy to ensure protection of human health by reducing exposure to groundwater. Payments ceased in 2020. These payments are not expected to have fully compensated the public for the loss of the Upper and Lower Aquifer groundwater since 1980.

5.0 DETERMINATION

Following the review of the information as described in this PAS, the Trustee has made the determination that the criteria specified in the DOI regulations have been met. The Trustee has further determined that there is a reasonable probability of making a successful claim for damages with respect to natural resources over which the Trustee has trusteeship. Therefore, the Trustee has determined that an assessment of natural resource damages is warranted.

6.0 REFERENCES

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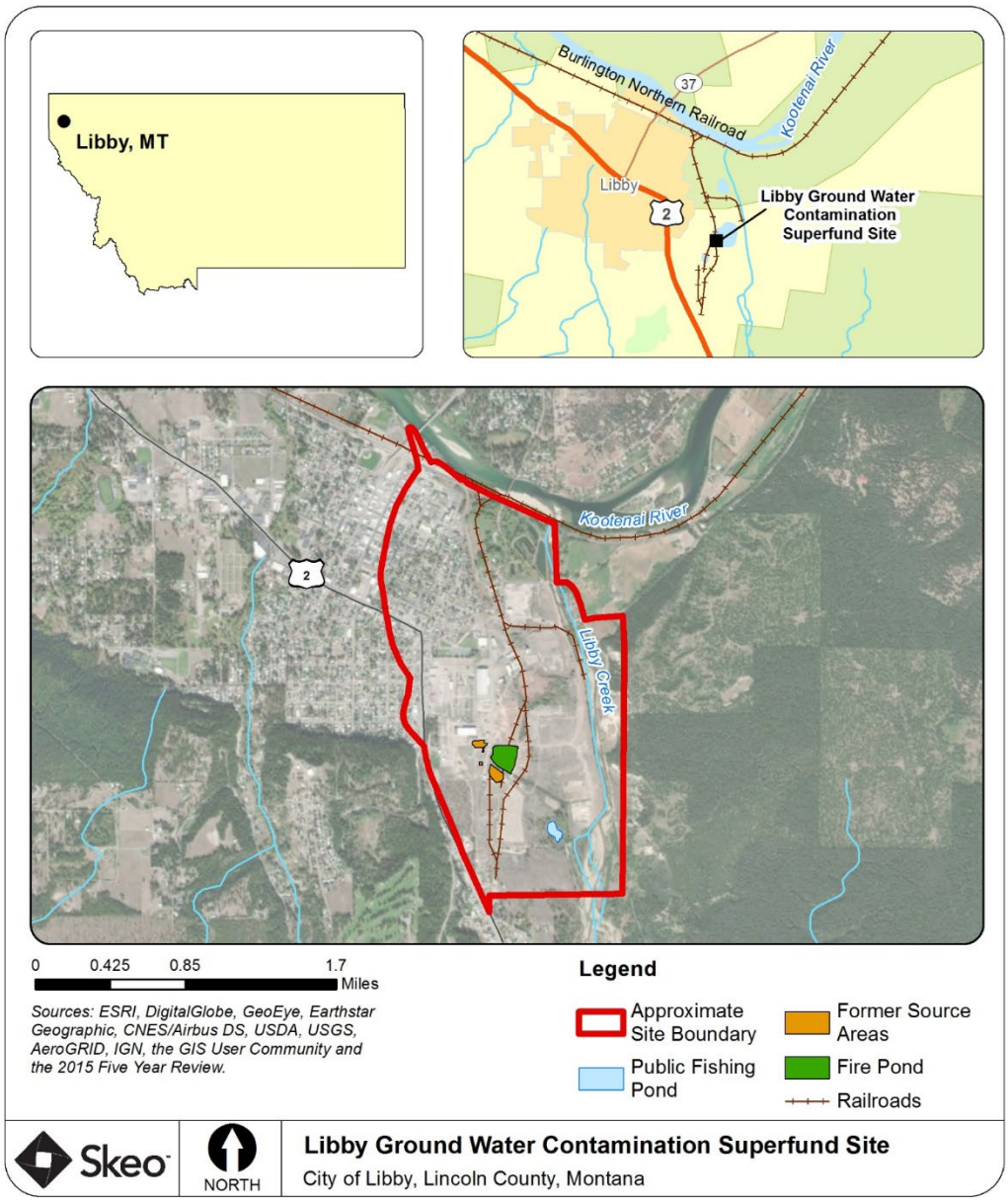

Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Figure 1. Site Vicinity Map (source: EPA 2020a)

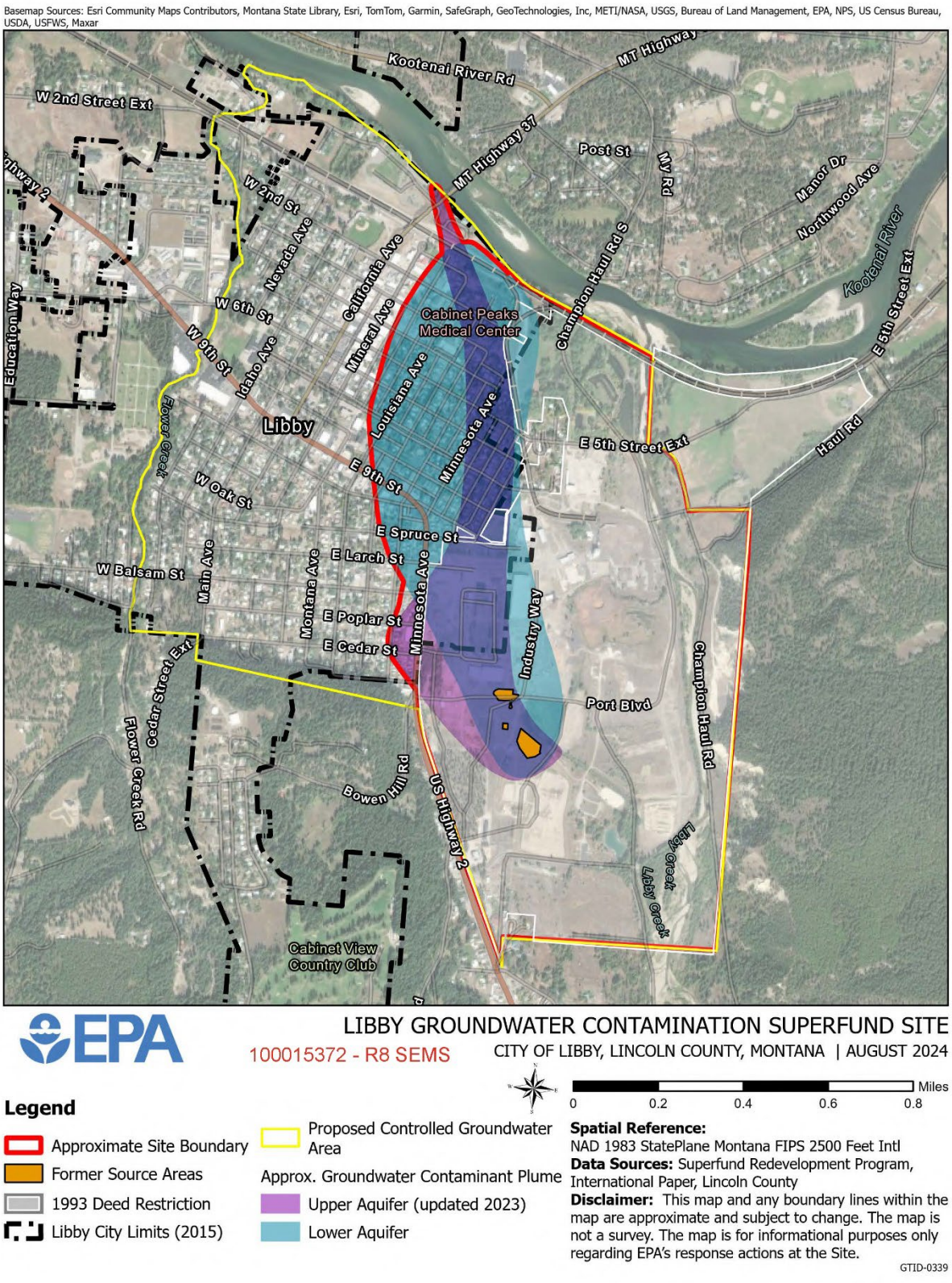

Figure 2. Site Institutional Controls Map (source: EPA 2024)

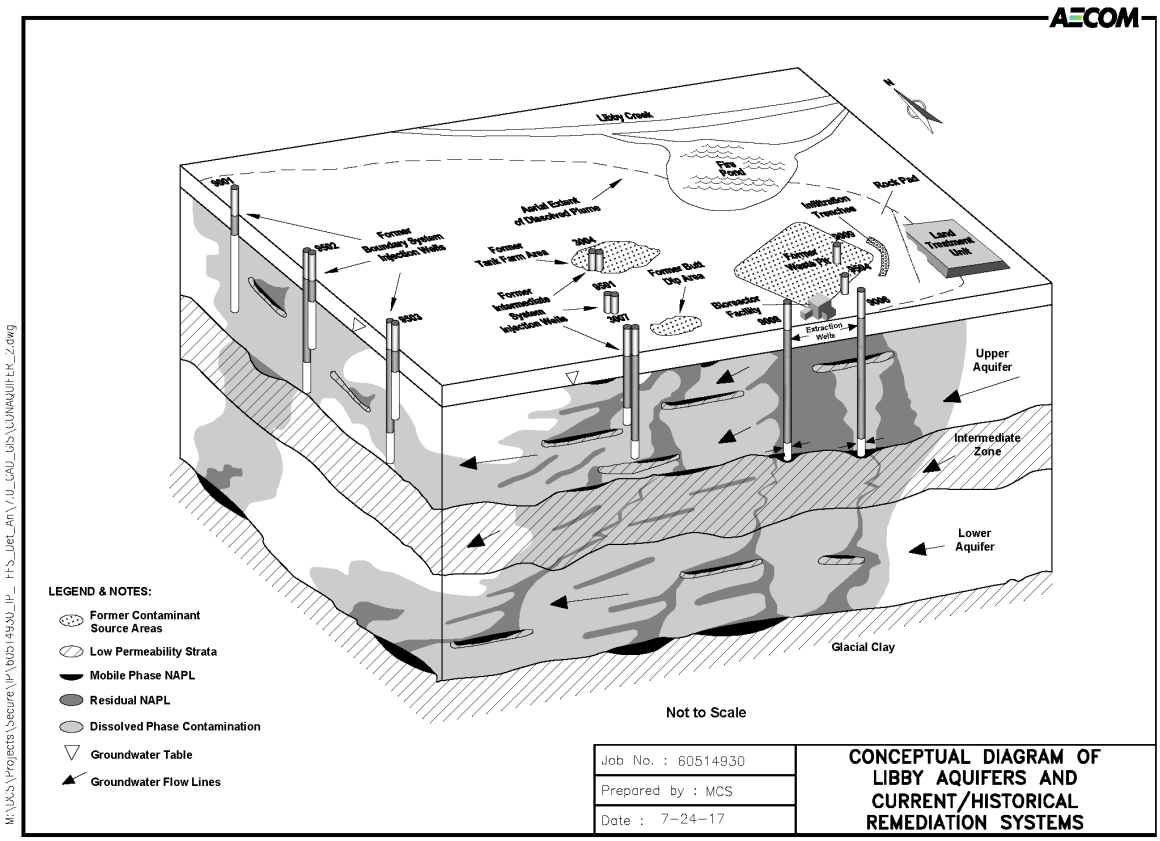

Figure 3. Conceptual Diagram of Libby Aquifers and Current/Historical Remediation Systems (source: AECOM 2018)

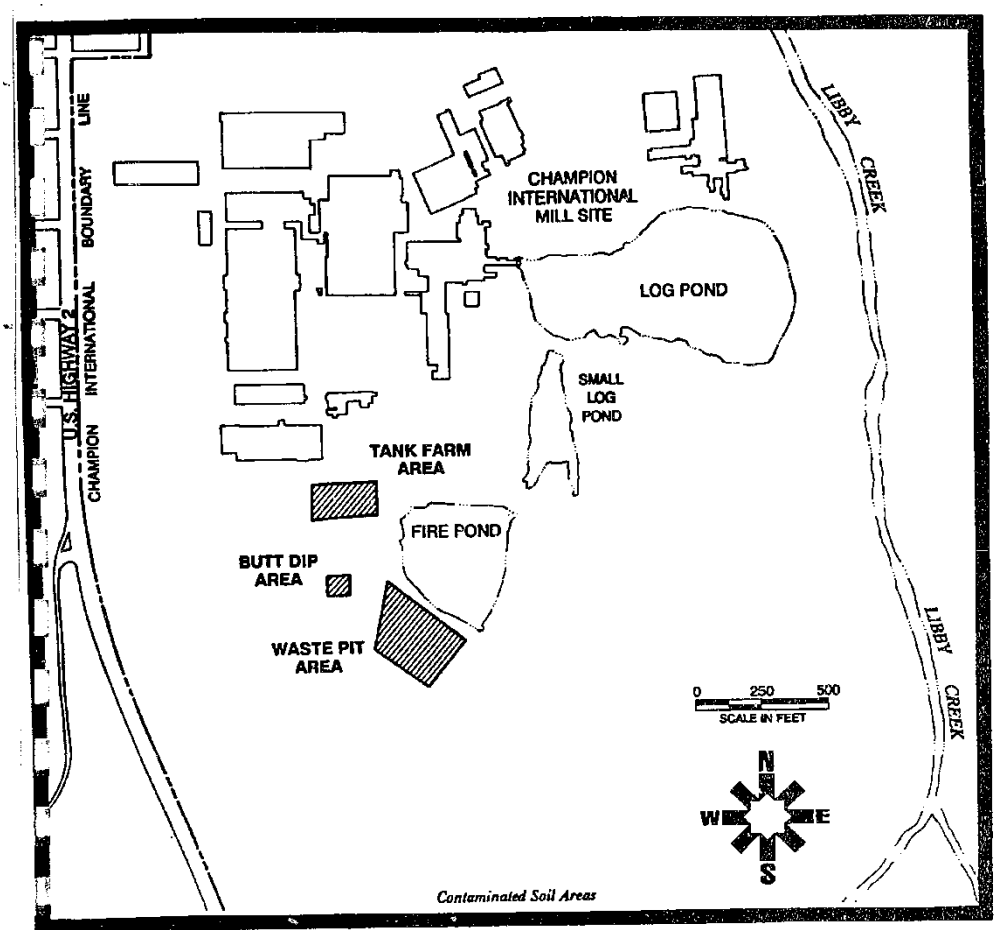

Figure 4. Site Source Areas and Surface Water (source: EPA 1988)

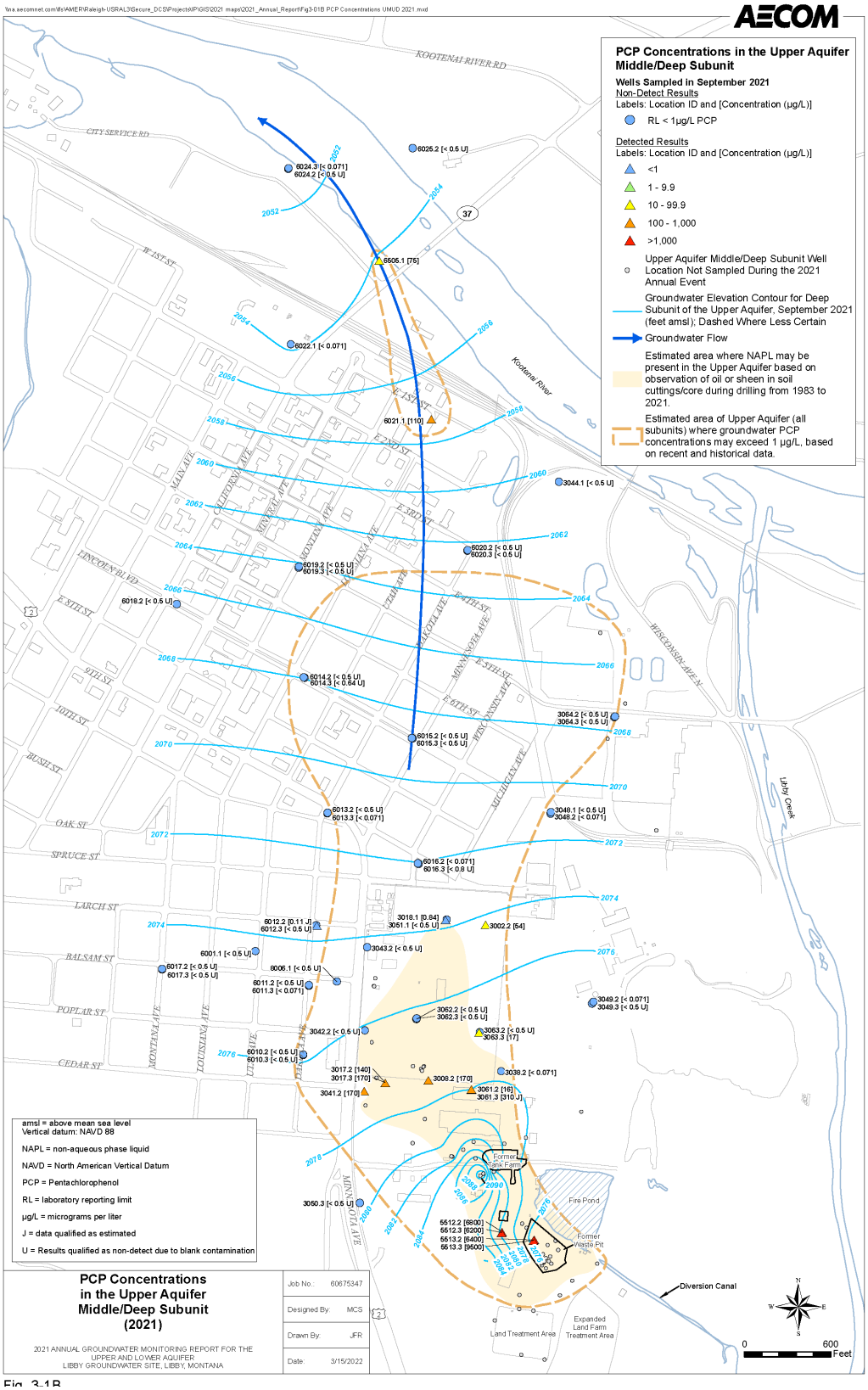

Fig. 3-1B

Figure 5. 2021 PCP Groundwater Monitoring Results for the Middle/Deep Subunit of the Upper Aquifer (AEI 2022)

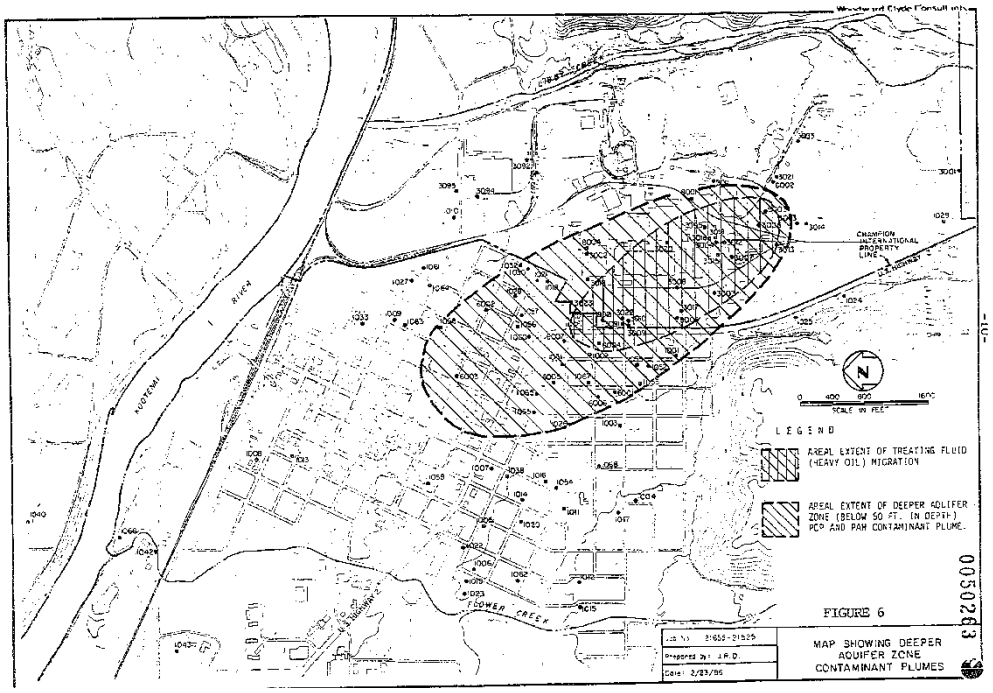

Figure 6. Map of Lower Aquifer Contaminant Plumes from the 1986 OU1 ROD (EPA 1986)

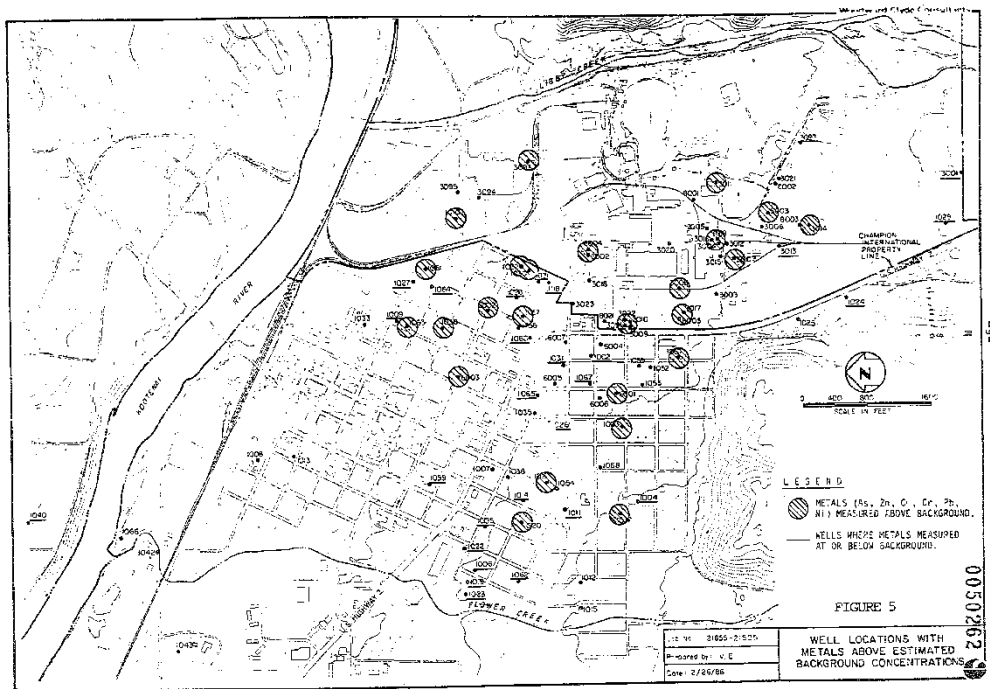

Figure 7. Map of Well Locations with Metals in Groundwater Above Background Levels from the 1986 OU1 ROD (EPA 1986)

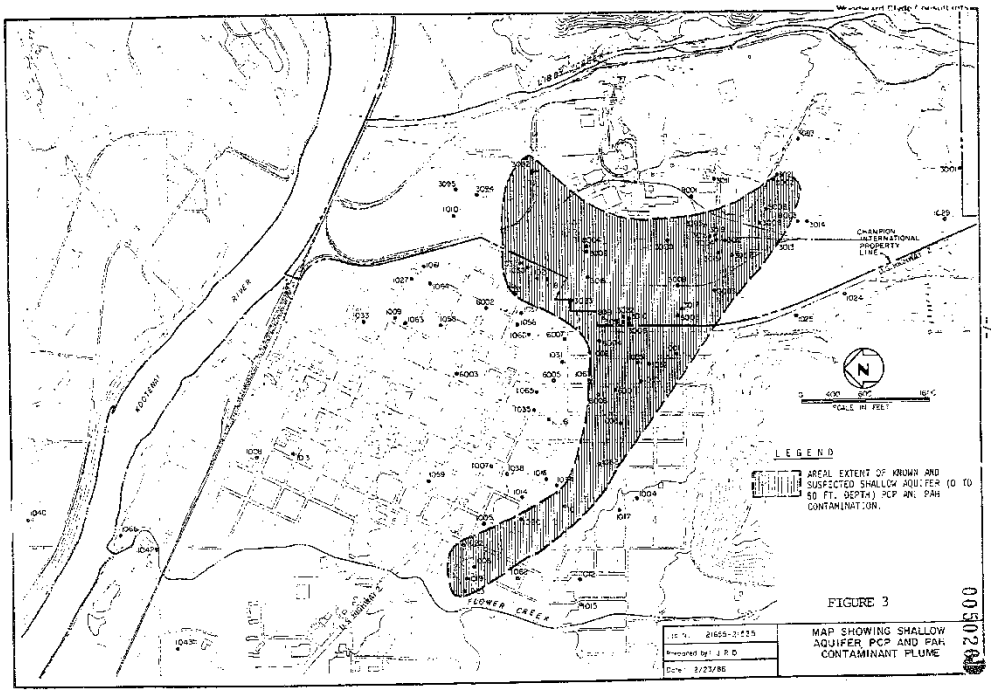

Figure 8. Map of PCP and PAH Contaminant Plume in the Upper Aquifer from the 1986 OU1 ROD (EPA 1986)

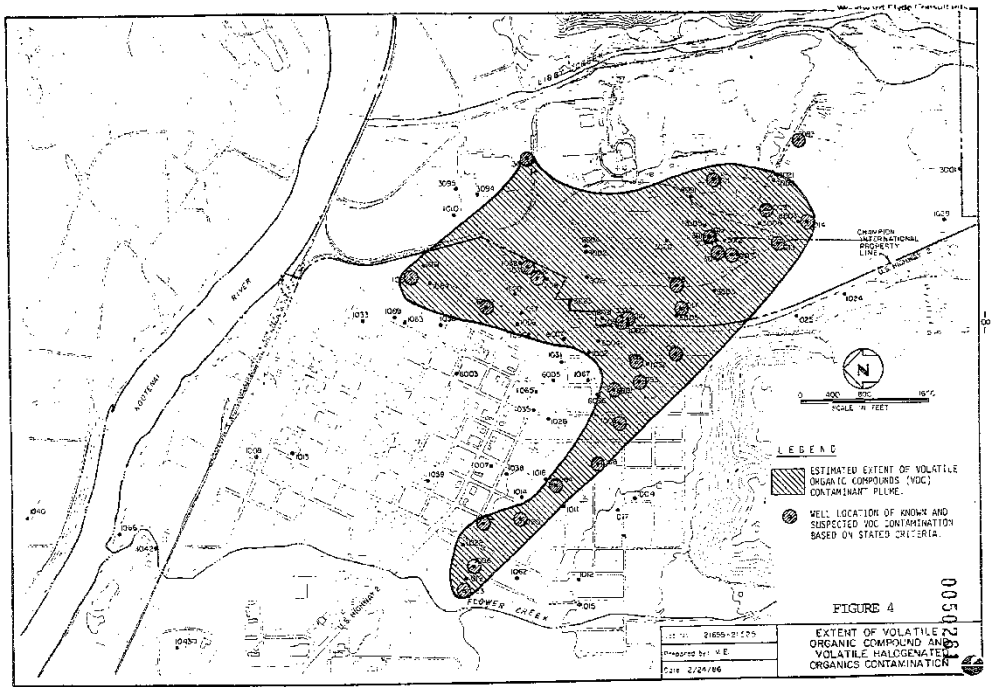

Figure 9. Map of Volatile Organic Compound and Volatile Halogenated Organics Contamination in Site Groundwater from the 1986 OU1 ROD (EPA 1986)