EPA/ROD/R08-92/058
1992

EPA Superfund
Record of Decision:

IDAHO POLE CO.
EPA ID: MTD006232276
OU 01
BOZEMAN, MT
09/28/1992

DECISION SUMMARY

DECLARATION

RECORD OF DECISION
IDAHO POLE NATIONAL
PRIORITIES LIST SITE

BOZEMAN, MONTANA

Montana Department of Health and Environmental Sciences
Solid and Hazardous Waste Bureau
Cogswell Building
Helena Montana 59620

in cooperation with the
United States Environmental Protection Agency
Region VIII - Montana Operations Office
Federal Building, 301 South Park Street, Drawer 10096
Helena, Montana 59626-0096

September 1992

Decision Summary

TABLE OF CONTENTS

Decision Summary

LIST OF FIGURES

LIST OF TABLES

SITE NAME AND LOCATION

Idaho Pole Company Site
Bozeman, Montana

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for the Idaho Pole Company site (the Site), in Bozeman, MT. The Montana Department of Health & Environmental Sciences, in consultation with the United States Environmental Protection Agency (EPA), selected the remedy in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the NCP. The Environmental Protection Agency concurs in the selected remedy. The attached index identifies the items that comprise the administrative record upon which the selection of the remedial action is based.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This is the final action for the only operable unit for the Site. The operable unit includes all known sources and contaminated media at the Site. This action addresses the principal threats remaining and provides for treatment of contaminated soils and ground water. Some treatment residuals and soils contaminated at lower levels will remain onsite, such that the Site will require long-term management.

The contaminants of concern at the Site are pentachlorophenol (PCP), polynuclear aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. This Record of Decision establishes cleanup levels for those contaminants of concern at the Site. The major components of the selected remedy include:

- Excavation and surface land biological treatment of approximately 19,000 cubic yards of contaminated soils from the pasture area and the area between Cedar Street and U.S. Interstate Highway 90 (I-90) including ditch sediments or bottoms, and the former roundhouse area;

- Hot water and steam flushing of soils underlying the pole plant facility and I-90 in order to recover hazardous substances;

- Separation and disposal of oily wood treating fluid extracted from soils;

- Closure of onsite treatment units in compliance with RCRA Subtitle C requirements;

- Ground water cleanup using extraction and biological treatment and return of water to the ground water aquifer to enhance in situ biological degradation and to control potential migration of contaminants;

- Treatment of contaminated residential wells exceeding maximum contaminant levels (MCLs) or risk based concentrations of the contaminants of concern at the distribution point in addition to institutional controls preventing new access to contaminated ground water; and

- Continued residential and ground water monitoring to determine movement of contaminants and compliance with remedial action requirements.

Both soils and ground water will be remediated as one operable unit at the Site. Soils will be excavated from three general areas: the area between Cedar Street and I-90 (includes Cedar Street ditch) and the pasture (includes the substation ditch) and the former roundhouse area. Biological treatment will take place in land treatment units. The former roundhouse area soils are predominantly PAH contaminated while the other soils are predominantly PCP contaminated.

Ground water treatment will focus in the area underneath the oily wood treating fluid plume. Extraction wells will be centrally located within the contaminated ground water and injection wells will be placed along the perimeter of the oily wood treating fluid plume. Extracted ground water will be biologically treated. Treated ground water will be injected in order to deliver oxygen and nutrients back to the aquifer. Ideally this will create a hydraulic barrier to reduce or eliminate continued transfer of hazardous substances from the oily wood treating fluid plume to ground water. Additionally, nutrients will diffuse downgradient, providing for biodegradation of the downgradient contaminated ground water plume. If it is not possible to reinject all of the treated ground water, discharge to the publicly owned treatment works or treatment and discharge to surface water under a Montana Pollutant Discharge Elimination System (MPDES) permit may be required.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable and satisfies the preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Because this remedy may result in hazardous substances remaining onsite above health based levels, the five year review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment.

RECORD OF DECISION

IDAHO POLE COMPANY NATIONAL PRIORITIES LIST SITE

INTRODUCTION

Based on the Remedial Investigation/Feasibility Study, the Proposed Plan, the public comments received, including those from the Potentially Responsible Parties, Environmental Protection Agency comments, and other new information, the Montana Department of Health & Environmental Sciences presents the Record of Decision for the Idaho Pole Company site (the Site). The Record of Decision presents a brief outline of the Remedial Investigation/Feasibility Study, actual and potential risks to human health and the environment, and the selected remedy. The state followed EPA guidance**[1]** in preparation of the Record of Decision. The Record of Decision has the following three purposes:

1. Certify that the remedy selection process was carried out in accordance with the requirements of the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA), 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan (NCP);

2. Outline the engineering components and remediation goals of the selected remedy; and

3. Provide the public with a consolidated source of information about the history, characteristics, and risks posed by the conditions at the Site, as well as a summary of the cleanup alternatives considered, their evaluation, and the rationale behind the selected remedy.

The Record of Decision is organized into three distinct sections:

- The Declaration functions as an abstract for the key information contained in the Record of Decision and is the section of the Record of Decision signed by the Director of the Montana Department of Health and Environmental Sciences and the EPA Regional Administrator;

- The Decision Summary provides an overview of the site characteristics, the alternatives evaluated, and the analysis of those options. The Decision Summary also identifies the selected remedy and explains how the remedy fulfills statutory requirements; and

- The Responsiveness Summary addresses public comments received on the Proposed Plan, the Remedial Investigation/Feasibility Study and other information in the administrative record.

I. SITE NAME LOCATION, AND DESCRIPTION

Idaho Pole Company
Bozeman, MT

The Idaho Pole Company site (the Site) is located near the northern limits of Bozeman, Montana (approximately 22,660 inhabitants) and occupies approximately 50 acres in the east half of Section 6 and the west half of Section 5, Township 2S, Range 6E of Gallatin County. The Site, illustrated in Figure 1, is located in a light industrial use area. The Site is bounded by the Montana Rail Link railroad tracks to the south. Commercial property is west of the Site. Rocky and Mill Creeks are to the north and east. North of the pole plant is a semi-rural neighborhood of twelve residences with a population of about 30 individuals. Most residences have a few acres of land used for pasture, hay or grass production and vegetable gardens. Nine of the residences continue to use ground water for domestic purposes.

Rocky Creek flows along the northern edge of the Site. It combines with Bozeman Creek about ½ mile from the Site to form the East Gallatin River. Wetlands exist within the Site, generally near Rocky Creek; the 100 year floodplain is close in towards Rocky and Mill Creeks and is within Site boundaries. Figure 1 shows the Site relative to the town and surrounding area.

Significant features of the Site include the Idaho Pole Company (IPC) pole plant and surrounding land as shown in the Site Plan, Figure 2. The IPC facility is currently in operation to treat white wood poles. The Site also includes Burlington Northern Railroad (BN) property, Montana Rail Link property, land owned by the Montana Power Company (MPC), including the East Gallatin substation, privately owned land west and east of Rocky Creek, and a portion of U.S. Interstate 90 (I-90).

---

[1] Guidance on Preparing Superfund Decision Documents: The Proposed Plan, the Record of Decision, Explanation of Differences, the Record of Decision Amendment, Interim Final, EPA/540/G, July 1989.

II. SITE HISTORY

The IPC wood treating facility began operation in 1945 using creosote to preserve wood. In 1952, the company switched to pentachlorophenol in carrier oil (similar to fuel oil) for the wood treating solution. IPC wood treating equipment has included butt and pole length treating vats. In 1975, a pressurized heated retort was added for treating full length poles. The pole length vats were removed in the early 1980's. There is also a drying area where treated poles are stored prior to shipment. IPC continues wood treating with a pressurized heated retort and butt dipping vat.

In 1978, the Montana Department of Fish, Wildlife and Parks notified Montana Department of Health & Environmental Sciences (MDHES) of a suspected release of oily wood treating fluid from the plant. MDHES found evidence of a release in ditches near the facility and near Rocky Creek. Consequently, MDHES issued a compliance order on September 29, 1978, notifying IPC of statutory violations and directing the company to stop uncontrolled releases and to clean up spilled treating fluid.

In an attempt to slow or eliminate movement of the oily wood treating fluid through ground and surface water and into private wells, IPC installed and operated an interceptor drain with a sump and an interceptor trench adjacent to I-90. Absorbent pads were also used in the culverts and ditches to intercept and collect oily wood treating fluid. Culverts under I-90 have been dammed to prevent runoff of contaminated surface water to Rocky Creek. However, during high runoff periods, discharge through the culverts has occurred.

In 1984, IPC conducted a remedial investigation without MDHES or EPA oversight to identify the sources and extent of contamination at the Site. IPC drilled monitoring wells to collect ground water samples and also collected soil and surface water samples. MDHES and EPA concluded that IPC's remedial investigation report was not sufficient to identify contaminant sources and to characterize the nature and extent of contamination. EPA proposed the facility for the National Priorities List of Superfund sites in 1984. The listing was final in 1986, making the site eligible for federal funds for enforcement, investigation and remediation.

In 1989, MDHES assumed the lead agency role through a cooperative agreement with EPA and began the remedial investigation and feasibility study (RI/FS) following the EPA approved Work Plan and EPA guidance. The RI defined the nature and extent of contamination and provided data to complete the baseline health and Ecological Risk Assessments. The FS included the development, screening and evaluation of potential site remedies.

Enforcement Actions

EPA issued general notice letters and information requests to the potentially responsible parties (PRPs), IPC and BN, in February 1988. The PRPs responded with general information about their activities at the Site: IPC described treatment plant operations and BN outlined historic railroad and roundhouse activities.

In June 1988, EPA issued special notice letters to IPC and BN to initiate RI/FS negotiations between the PRPs, EPA and MDHES. Issuance of the special notice letters triggered a 60 day moratorium during which EPA would take no action to proceed with the RI/FS. Both PRPs responded with good faith offers to conduct the RI/FS and the moratorium was extended an additional 30 days. IPC prepared a draft RI/FS Work Plan and offered comments on EPA's draft Administrative Order on Consent. BN assumed a secondary role in the negotiations.

Negotiations ended unsuccessfully in January 1989. In March 1989, MDHES requested and received the lead agency role for a Fund financed RI/FS for the Site.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public participation is required by CERCLA sections 113 and 117. These sections require that before adoption of any plan for remedial action to be undertaken by the President (EPA) or by a State (MDHES) or by anyone (PRPs), the lead agency shall:

1. Publish a notice and brief analysis of the Proposed Plan and make such plan available to the public; and

2. Provide a reasonable opportunity for submission of written and oral comments and an opportunity for a public meeting at or near the Site regarding the Proposed Plan and any proposed findings relating to cleanup standards. The lead agency shall keep a transcript of the meeting and make such transcript available to the public. The notice and analysis published under item #1 shall include sufficient information to provide a reasonable explanation of the Proposed Plan and alternative proposals considered.

Additionally, notice of the final remedial action plan (Record of Decision) adopted shall be published and the plan shall be made available to the public before commencing any remedial action. Such a final plan shall be accompanied by a discussion of any significant changes to the preferred remedy presented in the Proposed Plan along with the reasons for the changes and a response (Responsiveness Summary) to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the public comment period.

MDHES has conducted required community participation activities through presentation of the Proposed Plan, a 60 day public comment period, a public hearing and presentation of the selected remedy in the Record of Decision. Specifically included in the Record of Decision is a Responsiveness Summary that summarizes public comments and MDHES and EPA responses. The Record of Decision documents changes, if any, to the preferred remedy as a result of public comments.

The Proposed Plan for the Site was released for public comment on April 16, 1992. The Proposed Plan was made available to the public in both the administrative record located at the Bozeman Public Library and at MDHES offices in Helena, MT, and information repositories maintained at MDHES offices in Helena, the Bozeman Public Library, the Gallatin County Environmental Health office and the State Library in Helena. The Proposed Plan was distributed to the MDHES IPC Site mailing list. The notice of availability of the Proposed Plan was published in the Bozeman Chronicle on April 16, 1992. A public comment period was initially designated from April 16, 1992 through May 16, 1992, but requests from the PRPs resulted in a 30 day extension to June 16, 1992.

A public hearing was held in Bozeman, MT on April 30, 1992. At this hearing, representatives from EPA and the MDHES answered questions about problems at the Site and the remedial alternatives under consideration as well as the preferred remedy. A portion of the hearing was dedicated to accepting oral comments from the public. A court reporter transcribed the entire hearing and MDHES made the transcript available to the public on May 22, 1992. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this Record of Decision. Also, community acceptance of the selected remedy is discussed in section VII, Summary of Comparative Analysis of Alternatives, of the Decision Summary.

IV. SCOPE AND ROLE OF RESPONSE ACTION

To address potential threats posed by hazardous substances at the Site, MDHES organized the Site into one operable unit and through the RI identified three specific types of contaminated media. These are:

- Contamination in the ditch & creek sediments;
- Contamination of the ground water aquifer; and
- Contamination in soils.

The contaminants of concern in these media include pentachlorophenol and other chlorinated phenols, polynuclear aromatic hydrocarbons, polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

In order to develop an effective remedy two categories of alternatives have been defined: soils (including sediments) and ground water. The selected remedy will include both soil and ground water alternatives and will address all contaminated media exceeding cleanup levels.

V. SITE CHARACTERISTICS

Site Geology and Hydrology

As shown in Figure 3, the Site is located near Rocky Creek. The Rocky Creek floodplain lies in the Upper East Gallatin subarea. There are only a few delineated horizons at the Site: a surficial clay, an intermediate silt at 25 feet below ground surface (bgs), a silty clay at 35 feet bgs and a second silty clay at 50 feet bgs.

Several feet of fill material have been placed in the pole plant area overlying the surficial clay. Horizontal and vertical variations in the subsurface units play an important role in ground water and contaminant movement. The horizons are of variable thickness and permeability and are generally continuous but probably not over the entire Site. Aquifers are associated with each of the permeable zones. Bedrock depth has not been established. The principal surface water features are Rocky Creek and Mill Creek on the northern and eastern edges of the Site. There are also several intermittently flowing ditches that carry surface runoff from rain or snow melt and high ground water. Bozeman Creek is about 1/4 mile to the west of the Site but is not in the direction of ground water flow from the Site. No attempt was made to evaluate

Bozeman Creek's relationship to ground water.

The Rocky and Mill Creek 100 year floodplain is close to the streams while the 500 year floodplain reaches near the IPC facility and into the nearby residential neighborhood. Anticipated remedial activity will occur within the 500 year floodplain.

Ground water elevation at the Site is generally within 12 feet of ground surface. During recharge times, levels may actually reach ground surface. The alluvial aquifers are fairly transmissive. Ground water occurs in thin sand and gravel seams that are laterally and vertically discontinuous. The degree of interconnection is difficult to determine.

There are 16 wells downgradient within 1/4 mile of the Site. Many other wells are downgradient but are across potential hydrogeologic boundaries. Aquifer flow is basically to the northeast at a gradient of .011 ft/ft. Currently, one ground water supply at an occupied residence is contaminated with pentachlorophenol greater than the promulgated maximum contaminant level (MCL) of 1.0 ug/L.

Mill Creek is used during the irrigation season as an upstream diversion from Bozeman Creek. Mill Creek remains bank full throughout the summer thereby creating a ground water mound and limiting the amount of contaminated ground water that may flow into Mill Creek.

Rocky Creek appears to form a hydrologic divide along the northern and eastern edges of the Site. A series of flow monitoring stations were operated during the RI. Continuous recorders on both stream stage levels and ground water levels indicated that ground water discharges to Rocky Creek at least a portion of the year. Very low contaminant levels were measured in Rocky Creek during low flow conditions but other sampling events showed dilution of contaminants of concern to below detection limits.

Nature and Extent of Contamination

Wood treating operations at the Site are among the suspected sources of contamination. Past disposal practices pertaining to the sludges accumulated in the thermal treatment vats are unknown. Two boil overs of wood treating fluids occurred in 1981 and 1987. These spills were associated with the retort building and the butt vat. One of the two long vats that was decommissioned in 1978 was also reported to have leaked significant amounts of treating fluids.

Contaminants of concern

Hazardous substances that have been released at the Site, include the following:

Pentachlorophenol and other chlorinated phenols

A mild acid with an hydroxyl group, pentachlorophenol is a hazardous substance as defined by CERCLA 101(14). Pentachlorophenol ionizes in solution to form pentachlorophenate anion. The pH dependent ionization leads to higher solubility for pentachlorophenol than its normal aqueous solubility of 14.0 mg/L. Once pentachlorophenol dissolves in water, its adsorptive behavior begins to control its fate. As aqueous solubility decreases, the adsorption increases. Ground water Ph is generally in the neutral range at the Site, rendering pentachlorophenol more mobile in ground water than the other contaminants of concern. Site aquifers are comprised of fairly transmissive sands and gravels, resulting in rapid migration of pentachlorophenol.

Pentachlorophenol is known to be biodegradable under both aerobic and anaerobic conditions. Anaerobic degradation rates are generally 10 to 100 times slower than aerobic degradation; therefore, if remediation time is critical, a method of oxygen enhancement is recommended (Woodward-Clyde, 1988). Other related chlorinated phenols have been identified at the Site. Chlorinated phenols are present in pentachlorophenol as manufacturing byproducts. They may also result from breakdown of pentachlorophenol. Pentachlorophenol is identified as a probable human carcinogen.

Polynuclear aromatic hydrocarbons

Several polynuclear aromatic hydrocarbons (PAHs), defined as hazardous substances by CERCLA 101(14), have been identified at the Site. These include: anthracene, benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(c,d)pyrene, benzo(g,h,i)perylene, phenanthrene, chrysene, fluoranthene, fluorene, naphthalene and pyrene. The majority of the compounds do not contain active functional groups and have low aqueous solubilities.

The low molecular weight PAHs are comparatively more soluble in water than high molecular weight PAHs and have lower organic carbon partition coefficients. This indicates that these low molecular weight compounds will be more mobile in the environment than the high molecular weight PAHs.

PAH compounds are known to be biodegradable under both aerobic and anaerobic conditions. The rate of transformation of PAH compounds by soil microorganisms is related to the compound's molecular weight as well as the acclimation of the soil microbes to the PAH compounds. Thus, the low molecular weight PAHs biologically degrade at a faster rate than the high molecular weight PAHs. The four and five ringed PAHs found at the Site are suspected probable human (B2) carcinogens. The two and three ringed PAHs found at the Site are not probable human carcinogens; however, they present noncarcinogenic health hazards.

Polychlorinated dibenzo-p-dioxins and Polychlorinated dibenzofurans

Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) are hazardous substances as defined by CERCLA 101(14). PCDDs and PCDFs are a family of aromatic compounds that appear to be primarily byproducts of chemical manufacturing or combustion processes involving precursor compounds and heat.

The biological degradation rate of these compounds appears to be very slow when compared to other organic compounds. Because PCDDs and PCDFs have very low vapor pressures, they do not readily evaporate or volatilize to the atmosphere. The compounds adhere tightly to soil particles and do not migrate readily or leach into ground water or surface water unless the contaminated soil particles themselves migrate via erosion processes (Freeman, 1989). The family of compounds are suspected probable human carcinogens of varying toxicity. One isomer, 2,3,7,8-tetrachlorophenol dibenzo-p-dioxin (TCDD), has been determined to be the most toxic. Concentrations of the other less toxic isomers must be multiplied by toxicity equivalence factors to determine their risk relative to 2,3,7,8-TCDD. The toxicity equivalence for each PCDD and PCDF analyzed for a sample is added together to result in one concentration value and the summation is expressed as TCDD toxicity equivalence (TE).

Contaminated media

The estimated areas and volumes of contaminated media presented in this section were calculated by determining the approximate volumes of media with contaminant concentrations at or above the proposed Site-specific cleanup level for each media.

The spillage of oily wood treating fluid has resulted in soil, including ditch sediments, and ground water contamination onsite and offsite in the surrounding vicinity. In addition, since the oily wood treating fluid is lighter or less dense than water, a product layer exists beneath the Site, above ground water.

Site contamination exists in three media:

- contaminated sediments in the Cedar Street ditch, the substation ditch, the L Street ditch, a small stretch of Rocky Creek, and portions of the Bohart Lane ditch;
- contaminated surface and subsurface soils in the vicinity of the pole plant facility extending north to the pasture and in the former roundhouse area; and
- contaminated ground water that migrates from the pole plant area north and northeast towards Rocky Creek and a residential area.

These contaminated media are illustrated in Figure 4, the Site Conceptual model. The drawing visually describes contaminant movement from the treatment plant area, past I-90

and the pasture and towards Rocky Creek. The various compounds identified are assumed transformations of pentachlorophenol to lesser chlorinated phenols. Potential pathways of contaminant migration in addition to specific populations and environments that could be affected by the contaminants are described in section VI, Summary of Site Risks.

Sediments

Contaminants of concern in ditch sediments are pentachlorophenol, 2,4,6-trichlorophenol, PAHs (anthracene, benzo(a)pyrene, fluoranthene and pyrene), and PCDDs/PDCFs (TCDD TE). Table 1 summarizes average and maximum concentrations of contaminants in ditch sediments and includes data for other compounds evaluated.

Areas and volumes of contaminated intermittent ditch sediments or soils were estimated assuming a depth of contamination of three feet below ground surface. There were two ditches identified for remediation: the substation ditch that receives surface runoff from the interceptor trench area and the Cedar Street ditch that receives runoff from the retort area. The other intermittent ditches investigated did not have contaminants of concern exceeding cleanup levels. Table 2 summarizes estimated areas and volumes of Site sediments and other contaminated media identified for remediation.

TABLE 2
ESTIMATED CONTAMINATED AREAS AND VOLUMES

	AREA (acres)	VOLUME
sediments	0.6	2683 yd^3
soils	7.4	39,304 yd^3
ground water	61.4	210 million gal

Because only one sample to measure TCDD TE was taken from each ditch, the extent of ditch sediments to be remediated is based upon pentachlorophenol and B2 PAH contamination levels. Volumes for remediation were estimated assuming that the amount of sediment in the two ditches that exceeded the preliminary remediation goal of 10 mg/kg pentachlorophenol or 1.0 mg/kg for B2 PAHs was the same as the amount of sediment that exceeded the cleanup level of 1.0 ug/kg for TCDD TE.

Rocky Creek sediment volumes were not estimated due to low concentrations of contaminants and the identified lack of adverse impact to surface water. Rocky Creek sediments are not identified for remedial action. Table 3 summarizes average and maximum concentrations in creek sediments and includes data for other compounds evaluated.

Soils

Contaminants of concern for soils are pentachlorophenol, PAHs (anthracene, benzo(a)pyrene, fluoranthene and pyrene), and PCDDs/PCDFs (TCDD TE). Table 4 summarizes average and maximum concentrations in soils and includes data for other compounds evaluated.

The areal extent and volume of contaminated soil were determined by evaluation of analytical results for the contaminants of concern, visual observations made while conducting specific investigations and by computer modeling. The computer modeling evaluations were conducted in the treatment plant area and in the former roundhouse area. Volumes of contaminated soils were obtained by evaluating contaminant concentration data collected from test pit samples. The evaluation produced contour maps of contaminant concentrations at each zone or depth for which adequate discrete data was available. The estimated volume of contaminated soils in the treatment plant area is approximately 6594 cubic yards over an area of about 0.7 acres.

The RI determined that the majority of contaminated soils at the Site originate in the pole plant area and extend northward in close association with the oily wood treating fluid plume. Contamination of subsurface soils within the bounds of the oily wood treating fluid contamination area is due to smearing of oily wood treating fluid caused by the seasonally fluctuating water table. During high water table conditions, the oily wood treating fluid has reached ground surface in the pasture resulting in pools of oily wood treating fluid. The approximate boundary of soils containing the oily wood treating fluid is presented in Figure 5.

This area has been determined to be approximately 6.7 acres and was delineated primarily by visual observations during the field investigations. Given the potential for a 3-foot seasonal fluctuation of the static water level in this area, approximately 32,410 cubic yards of soil are potentially contaminated with the oily wood treating fluid. Additionally, 300 yd^3 of contaminated soils has been estimated in the former roundhouse area. The total estimated volume of contaminated soils is 39,304 cubic yards and 7.4 acres.

The oily wood treating fluid contains high concentrations of pentachlorophenol, B2 PAHs and PCDDs/PCDFs (TCDD TE). Oily wood treating fluid was sampled very infrequently but concentrations of 280 mg/kg, 283 mg/kg and 407ug/kg, respectively, for pentachlorophenol, B2 PAHs and TCDD TE, are representative of contaminant levels. Oily wood treating fluid is the principal source of contamination to soils, sediments and ground water.

Based on the results of an oily wood treating fluid plume investigation conducted as part of the remedial investigation, the average thickness of the oily wood treating fluid area has been determined to be approximately 0.5 feet. This value weighs free product pockets exceeding 1 foot in thickness in some areas and practically no product in others, and takes into account significant amounts of product suspended in the soils due to the smearing effect. Given the

oily wood treating fluid contamination area, a porosity of 0.3 and the average thickness of 0.5 foot, the estimated volume of oily wood treating fluid present is 327,000 gallons. This volume may be less due to ongoing product recovery efforts and conservative estimation methods.

Ground water

Contaminants of concern for ground water are pentachlorophenol, 2,4,6-trichlorophenol and PAHs (anthracene, benzo(a)pyrene, fluoranthene, fluorene, naphthalene and pyrene). Table 5 summarizes average concentrations of contaminants in ground water and includes data for other compounds evaluated.

The areal extent and volume of contaminated ground water associated with the dissolved plume has been determined using ground water modeling results presented in the RI. Figure 6 presents an illustration of the approximate dissolved plume boundary.

The dissolved plume containing pentachlorophenol at 1.0 ug/L or greater is approximately 61.4 acres. The average thickness of the contaminated ground water has been estimated at 35 feet, which includes the upper three aquifers. The average porosity value is 0.3. Based on these values, approximately 210 million gallons of ground water are contaminated with pentachlorophenol concentrations at or above 1.0 ug/L. Ground water above 1.0 ug/L was used for the volume estimate because 1.0 ug/L represents the promulgated Maximum Contaminant Level (MCL) for pentachlorophenol as established by the Safe Drinking Water Act. Ground water concentrations as high as 600 ug/L have been identified at the downgradient monitoring well furthest from the pole plant.

VI. SUMMARY OF SITE RISKS

The baseline risk assessment provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. It serves as the baseline for indicating what risks could exist if no action were taken at the Site. This section of the Record of Decision reports the results of the baseline risk assessment conducted for this Site.

As part of the remedial investigation and feasibility study, human health and ecological risk assessments, which together comprise the baseline risk assessment, were developed to help MDHES and EPA determine actions necessary to reduce actual and potential risks from hazardous substances at the Site. Risk assessments were conducted at the Site with the following objectives:

- provide an analysis of baseline risk (potential risk if no remedy occurs) and help determine the need for action;

- provide a basis for determining cleanup levels (concentrations) that are protective of public health and the environment;

- provide a basis to compare potential public health and ecological impacts of various cleanup alternatives; and

- provide a consistent process to evaluate and document potential public health and ecological threats at the Site.

The Baseline Risk Assessment indicates that the principal threats stem from subsurface soils, oily wood treating fluid, and to a lesser extent surface soils. The low level threats stem from ditch and creek sediments. This determination is based on concentrations and estimated volumes of contaminated media. The primary pathways are ingestion of and direct contact with contaminated ground water, ingestion of or direct contact with soils and inhalation of air entrained soils; secondary pathways are ingestion of and direct contact with surface water and ingestion of vegetation. Potentially affected receptors include human beings and terrestrial and aquatic biota.

Human Health Risks

The Baseline Risk Assessment indicates that there are excessive human health cancer risks and excessive non-cancer health hazards associated with hazardous substances at the Site: Remedial action is required in order to reduce these potential risks.

Selection of contaminants of concern

The selection of contaminants of concern was based upon the presence of contaminants in various media at the Site and the reference dose (RfD) or cancer slope factor (SF) associated with the contaminants.

This evaluation was completed for ditch and creek sediments, soils (including air entrained soil particles), ground and surface water and oily wood treating fluid. The contaminants of concern consist of semivolatile organic compounds. Volatiles and heavy metals were eliminated from consideration after an initial round of sampling and analysis indicated no significant concentrations. Table 6 summarizes contaminants of concern identified for use in the Baseline Risk Assessment.

Toxicity assessment summary

RfDs have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs are expressed in units of mg/kg-day. RfDs estimate (with uncertainty spanning an order of magnitude) daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects.

SFs have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of (mg/kg-day)[-1], are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess cancer risk.

SFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). Use of this approach makes underestimation of the actual cancer risk highly unlikely. Table 7 lists RfDs and SFs for the contaminants of concern.

Assumptions and exposure scenarios

Reasonable maximum exposure scenarios were developed for onsite and offsite receptors for current and future land use conditions. Two reasonable maximum exposure populations were developed for each condition. These were determined by consideration of continuing pole plant operations and a nearby residential neighborhood. The current onsite population was identified as pole plant workers and intruders. The current offsite receptor point was identified as the currently unoccupied residence in the contaminated ground water plume. This residence is located in the nearby residential neighborhood and could be reoccupied. The future reasonable maximum exposure onsite and offsite populations were defined by assuming that a trailer court will exist on the pole plant grounds and that the residence located in the ground water plume will be occupied. Table 8 summarizes the assumed reasonable maximum exposure populations.

TABLE 8
ASSUMED REASONABLE MAXIMUM EXPOSURE POPULATIONS

group	Onsite	Offsite
current	workers (adults) intruders (6-18 yrs)	adults children (612 yrs)
future	adults children (1-6 yrs)	adults children (612 yrs)

A principal difference between the onsite and offsite receptors was that only the offsite receptors were assumed to be exposed to contaminated ground water through use of domestic well water. This is a reasonable assumption since the pole plant facility is within the city limits and currently receives city water. The residence used for the offsite scenarios is outside of the city and has used ground water for domestic purposes.

Reasonable maximum exposure point concentrations were developed for each of the exposure populations identified in Table 8 for pentachlorophenol, PAHs (anthracene, benzo(a)pyrene, fluoranthene and pyrene), and TCDD TE. Reasonable maximum exposure point concentrations are summarized in the baseline risk assessment.

Risk characterization summary

Excess lifetime cancer risks are determined by multiplying the intake level of a contaminant with the SF. These risks are probabilities that are generally expressed in scientific notation (e.g., 1x10[-6] or 1E-06). An excess lifetime risk of 1 x 10[-6] indicates there is a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

where:

Risk = a unitless probability (e.g., 2 x 10[-5]) of an individual developing cancer; CDI = chronic daily intake averaged over 70 years (mg/kg-day); and SF = slope-factor, expressed as (mg/kg-day)[-1].

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose. By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where:

CDI = Chronic Daily Intake expressed as (mg/kg-day) and
RfD = reference dose expressed as (mg/kg-day).

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Because of elevated levels of contaminants, a major concern is use of ground water downgradient from the Site as a domestic water source. For example, arithmetic average concentrations of B2 PAHs relative to their respective, proposed maximum contaminant levels (MCL) standards result in excess cancer risk ranging from 2.6 x 10[-4] to 1.5 x 10[-2]. Although applicable to public water supplies, MCLs are relevant and appropriate to offsite residences not connected to city water. The intent of these standards is reduction, if possible, of lifetime risk of excess incidence of cancer to the one-in-one million (1 x 10[-6]) level.

Pursuant to the National Contingency Plan, the goal of the remedial action is to bring potential cancer risk to a range of between 1 in 10,000 (1 x 10[-4]) and 1 in 1,000,000 (1 x 10[-6]) additional cancers caused by site contamination. Potential noncancerous adverse health effects are evaluated against the health hazard index of 1.0. The baseline risk assessment identified potential cancer risks greater than 1 in 1,000 (1 x 10[-3]) and health hazard indices exceeding 1.0 indicating that remedial action is needed. Tables 9, 10, 11, and 12 summarize current and future human health risks estimated for the Site. The results of the baseline risk assessment indicate that existing conditions at the Site pose an excess lifetime cancer risk of as high as 1.8 x 10[-4]from exposure to contaminated soils and as high as 9.0 x 10[-3] from ingestion of contaminated ground water.

Cleanup Levels

The purpose of this response action is to control risks posed by direct contact, ingestion and inhalation of soils and ground water and to minimize migration of contaminants to ground and surface water and air. Concentrations of contaminants in sediments, soils and ground water remaining after Site cleanup will correspond to lifetime cancer risks within the acceptable range of 1 x 10[-4] to 1 x 10[-6]. The cleanup levels for compounds having noncarcinogenic effects will result in a collective health hazard index below 1.0.

Since no federal or state chemical specific applicable or relevant and appropriate requirements (ARARs) exist for soil or sediments, soil cleanup levels were determined through site specific risk analysis. Ground water cleanup levels were established at the final MCL for pentachlorophenol, benzo(a)pyrene and 2, 3, 7, 8 - TCDD (dioxin) and at proposed MCLs for other carcinogenic PAHs. Ground water will be treated to cleanup levels prior to reinjection into the aquifer or discharge to a publicly owned treatment works. For discharges to a publicly owned treatment works, pretreatment standards may require additional treatment. Treatment will be monitored to ensure that cleanup levels are achieved and maintained.

Cleanup which addresses potential cancer risks will also address potential non-cancer health hazards. The cleanup levels for the Site are presented in Table 13.

Ecological Risks

The Ecological Risk Assessment for the Site evaluated the potential for harm to terrestrial and aquatic populations and food chains following the ingestion of contaminants. Deer, river otter, beaver, waterfowl, skunk, songbirds and fishing birds reside within the area. Endangered species using the Site, but not living or nesting there, are bald eagles and peregrine falcons. Rainbow trout, brown trout, sculpin, whitefish and suckers are common in Rocky Creek. The Baseline Risk Assessment found that fish occupying various portions of Rocky Creek in the study area are more likely impacted by stream and riparian habitat than by Site contaminants. A steady influx of contaminants has not been identified.

Selection of contaminants of concern

Pentachlorophenol, benzo(a)pyrene and TCDD TE were selected as the contaminants of concern for use in the Ecological Risk Assessment for their identified toxic impacts to mammals, avian and fish species. Concentrations of contaminants of concern found at the Site used for the Ecological Risk Assessment are summarized in Table 14 for aquatic species and in Table 15 for terrestrial species.

Toxicity assessment summary

The Ecological Risk Assessment focused on the oral exposure route using toxicological data representative of species evaluated. Inhalation and direct contact were not evaluated due to a lack of RfDs or SFs. Table 16 summarizes toxicological endpoints used in the Ecological Risk Assessment.

Assumptions and exposure scenarios

Soils, vegetation, and surface oily wood treating fluid in the pasture and in sediments, and ground and surface water are potential exposure points to the indicator species. Three food chain scenarios were evaluated in the Ecological Risk Assessment: 1) Deer mouse/falcon, 2) cow/milk/child and 3) fish/fish fillet/child. The scenarios all represent current conditions in the pasture area or creeks. The subsequent child receptor was added to identify potential food chain impacts.

Effects on critical habitat and endangered species appear to be minimal. The surfacing of oily wood treating fluid in the pasture is the only obvious soil impact resulting in no vegetation. There is no indication that surface water habitat has been impacted. No endangered species have been identified on Site, although there may be some in the area that occasionally pass through the Site.

TABLE 14

AQUATIC DATA USED IN THE ECOLOGICAL RISK ASSESSMENT[a]

PART A. ROCKY CREEK DATA

Contaminants of Concern	Surface Water (ug/L)	Sediments(ug/kg)
PCP	(1U-50U)[b]	1,605+-1,195J
B(a)P	0.037	(190U-510U)
TCDD TE	No Analysis (NA)	NA

PART B. MPC SUBSTATION DITCH DATA

Contaminants of Concern	Surface Water	Sediments
PCP	88+-74J	10,667+-9,783
B(a)P	10U	410+-127J
TCD TE	NA	34.2

PART C. GROUNDWATER QUALITY FOR LIVESTOCK WATERING

Contaminants of Concern	Res - 10A	Downgradient Arithmetic Averages
PCP	(5.9U-25U)	3,799
B(a)P	(0.05U-0.23U)	74J
TCDD TE	NA	≤0.003

<Footnotes>

a Detailed discussions of sampling methodologies and consequent data interpretation for these media are found in Section 2.1 of the Baseline Risk Assessment, MSE, 1992.

b "U" data in parentheses indicates the range of undetects; "J" data are estimated.

</footnotes>

SOURCE: Ecological Risk Assessment, MSE, March 1992.

Risk characterization

In order to evaluate adverse impacts, an environmental harm quotient (EQ) was developed and used similarly to the HQ for human noncarcinogenic impacts. An EQ less than 1.0 represents no adverse impact while an EQ of 1.0 or greater represents adverse impact. SFs were also used to evaluate cancer risk to children at the end of the food chain. The Ecological Risk Assessment findings are summarized in Table 17. All of the EQs for the species evaluated are less than 1.0 indicating no adverse impact. Additionally, food chain carcinogenic impacts evaluated for the subsequent child receptor indicate no likely excess cancer risk. Population level effects on terrestrial and aquatic indicator species are not likely, at least through the oral route of exposure. However, adverse effects to particularly sensitive individuals cannot be ruled out.

VII. DESCRIPTION OF ALTERNATIVES

A brief description of the Site cleanup alternatives considered in the FS report follows. As discussed in section IV, Scope and Role of Response Action, three general types of contaminated media are found at the Site. Since soils and sediments provide sources of continuing contamination to ground water, and soils and sediments are closely associated with each other, one set of alternatives that addresses all soils and sediments was developed. Separate remedial cleanup alternatives were developed for ground water.

There are some elements common to all of the alternatives. Institutional controls would be used in conjunction with soil and ground water alternatives and may include restrictions on ground water use, residential well drilling and residential and commercial land use. Installation and maintenance of additional temporary residential water treatment systems may be necessary if private well monitoring results indicate a potential health risk or exceedance of cleanup levels.

The estimated cost of each alternative includes capital costs and annual operation and maintenance costs. The estimated costs for the soil and ground water alternatives represent a cleanup level protective for the current onsite and offsite scenarios as depicted in the Baseline Risk Assessment and briefly discussed in section VI, Site Risks. The estimated costs for the soil alternatives except Alternative 6 represent a cleanup level for residential land use that would reduce the excess cancer risks to less than 1 in 100,000 (1 x 10[-5]) and for industrial land use to less than 1 in 1,000,000 (1 x 10[-6]). Alternative 6, Soil Flushing/In Situ Biological Treatment in conjunction with other alternatives would reduce the excess cancer risk to 1 in 10,000 (1 x 10[-4]) for residential use and 1 in 100,000 (1 x 10[-5]) for industrial land use. Costs associated with the ground water alternatives represent a cleanup level for residential land use that would reduce the excess cancer risk to less than 5.5 in 100,000 (5.5 x 10[-5].

Soil Alternatives

Soil Alternative 2, Surface Capping, would only be considered for cleanup of the roundhouse area because the roundhouse area is not a source of ground water contamination and all of the identified direct contact risks posed by this area can be eliminated by surface capping. Contaminated soils, exceeding cleanup levels, found in other locations of the Site, contribute to ground water contamination and must undergo treatment to reduce soil and ground water exposure risks to an acceptable level. Therefore, capping was not considered for other areas. For purposes of cost comparison, however, the unit soil remediation costs of Alternatives 3, 4 and 5 have been calculated and have been used for comparison to the cost of Surface Capping (Alternative 2) in section VIII, Summary of Comparative Analysis of Alternatives.

Soil Alternatives 3 (Thermal Treatment), 4 (Biological Treatment) and 5 (Solvent Extraction) would require excavation of all of the contaminated soils on the Site exceeding remediation levels, including soils underneath I -90 and the IPC treating plant structures. The excavated soils would then be stockpiled and subsequently processed in the appropriate treatment unit. The costs of these alternatives are directly comparable because each of the alternatives remediate the same volume of contaminated soils.

Soil Alternative 6, In Situ Treatment Using Steam/Hot Water Flushing, would involve treating all of the contaminated soils at the Site, exceeding remediation levels, except the soils in the roundhouse area and in the drainage ditches. The contaminants in the soil in the roundhouse area are not as amenable to soil flushing techniques as soils in the other areas of the Site. The primary contaminants in the roundhouse soils are PAHs that are very difficult to separate from soil particles. The ditch sediments must be excavated for treatment, rather than being treated in situ, because of the long narrow area in which the contaminated sediments are located. Installation of a soil flushing system that would effectively reduce contaminant levels in the ditch sediments was determined to be not practicable. Alternative 6 does not require excavation of soils from under the IPC structures or from beneath I-90. The estimated costs for soils remediation by Alternatives 3, 4, 5, or 6 have been calculated and are contained in Section VIII. The unit costs for treating one cubic yard of soil to the Site remediation level may be calculated for Alternatives 3, 4, 5 and 6.

Alternative 1: No Action

Superfund law requires the consideration of a no action alternative. This alternative is used as a baseline against which to compare the other alternatives. As defined in the Idaho Pole RI/FS, no action means that a remedy would not be conducted, and that remediation goals would not be met. The quantity of untreated waste would remain at current levels and the degree of risk posed by such waste would remain constant.

No ARARs, risk-based levels, or to be considered standards (TBCs) would be met under this alternative.

Estimated cost: $0
Estimated time: 0 year

Alternative 2: Surface Capping

This alternative would involve covering contaminated areas with a clean, impermeable material such as asphalt pavement.

Contaminated material would be stored in a unit similar to a landfill. This alternative was only considered for the former roundhouse area. Under this alternative, neither the volume nor the toxicity of contaminated soil would be reduced, since no treatment would occur.

Surface capping was considered for remediation of only the roundhouse soils because the risk associated with the roundhouse soils is from direct contact. The roundhouse soils are not a source of ground water contamination and therefore would remain untreated under this alternative without impacting risks from ground water. Contaminated soils in the other areas of the IPC Site are contaminant sources for ground water and would require excavation and/or treatment to allow the remediation goals for ground water to be met.

The surface cap would require one construction season to install. This alternative could be implemented as a temporary measure in order to reduce health risks associated with direct contact or ingestion of PAH contaminated soils.

If this alternative were selected as a permanent remedy, construction of the cap would comply with RCRA performance standards. RCRA landfill regulations would apply to this alternative. The cap design and construction must withstand heavy equipment use at the IPC facility throughout future wood treating operations in the roundhouse area.

To protect the integrity of the cap, fencing, land use control, and deed restrictions would be required. Capping would reduce risks associated with direct contact and ingestion pathways and would potentially reduce the amount of infiltration that could impact ground water. However, this alternative is not regarded as a solution to ground water contamination.

Estimated cost: $1,329,577
Estimated time: 1 year

Alternative 3: Excavation And Treatment Using An Onsite or Offsite Thermal Process

Under this alternative all contaminated solid media would be excavated and incinerated including soils in the roundhouse area, under I-90 and in the IPC plant area. I-90 would be dismantled and demolition of the treating plant structures would be required.

There are three different thermal processes that have been evaluated under this alternative: 1) onsite incineration using a mobile incinerator on a rent or lease basis; 2) design and construction of a transportable or stationary large scale incinerator, with incineration being performed onsite; and 3) excavation and transport of contaminated materials to an offsite incinerator.

The three different processes evaluated all involve the use of a rotary kiln type incinerator. Rotary kiln incinerators are the most universally applicable incinerators for destruction of a wide variety of waste types and characteristics. A rotary kiln incinerator can process wastes having variable moisture content and variable clay content without a pretreatment step.

This alternative addresses all contaminated soils and sediments exceeding cleanup levels established for the Site. The alternative would involve incineration of approximately 42,000 yd[3] of contaminated material.

In a properly operated incinerator at least 99.99% of all pentachlorophenol (PCP) and PAHs and at least 99.9999% of polychlorinated dibenzo-pdioxins and polychlorinated-dibenzofurans (PCDDs and PCDFs) would be destroyed.

Process waste streams from an onsite incinerator including kiln ash, fly ash and purge water would be sampled and the substantive requirements for a hazardous waste delisting petition review would be met because the wastes being incinerated are RCRA listed hazardous waste (F032 and F034) and wastes streams from incinerating these listed hazardous wastes are also hazardous wastes. These waste streams are expected to meet standards for delisting RCRA waste and therefore would not require disposal as hazardous wastes. The ash materials would be landfilled onsite in a unit designed to meet RCRA Subtitle D standards for solid waste management. The amount of ash resulting from the incineration process would be approximately 75% of the original waste volume. Purge water would be discharged directly to a publicly owned treatment works (POTW) or to surface water.

Residual concentrations of PCDDs and PCDFs and other principal organic hazardous constituents of concern (POHC) in by-product scrubber blowdown water and kiln ash are typically found to be negligible (i.e., less than one part per trillion), while stack emissions typically do not pose an unacceptable health threat to surrounding communities. The methods used to measure the effectiveness of an incinerator and establish compliance are very comprehensive and well proven; consequently, the uncertainty level of this alternative is very low.

If an onsite incinerator is utilized, the substantive requirements for a RCRA permitted incinerator would be met. Offsite incineration requires compliance with both substantive and procedural RCRA requirements, including obtaining all necessary permits for the offsite incinerator. RCRA permit-by -rule requirements and Clean Water Act pretreatment requirements would apply to discharges to publicly owned treatment works if excess process water is to be disposed of offsite. Floodplain Management and Protection of Wetlands requirements would be followed to ensure that construction of treatment units or the excavation of contaminated soils does not encroach on the Rocky Creek and Mill Creek floodplains and wetlands. Construction of a waste storage pile to stage soils for incineration would require compliance with regulations for the safe operation of waste piles. For the offsite incineration option, standards established in 40 CFR 263 for transport of hazardous waste to the offsite incinerator would apply.

Treatability testing has not been conducted due to the proven capability of incineration; however, initial startup testing would be necessary to ensure proper functioning of the incinerator.

Figures 7 and 8 present conceptual process flow diagrams for a mobile rotary kiln incinerator, and an onsite, large scale rotary kiln incinerator, respectively. An offsite incinerator would be identical to the unit represented in Figure 8. The conceptual process flow diagrams also identify the waste streams associated with each process. Although the volume of process waste to be managed varies depending upon the amount of contaminated material that is incinerated, the waste streams are nearly identical.

Onsite Mobile Unit -

Feed Rate: 2 tons/hour
Estimated Cost: $63,000,000
Estimated Time: 5 years

Onsite Large Scale Unit -

Feed Rate: 9 tons/hour
Estimated Cost: $93,000,000
Estimated Time: 1.5 years

Offsite Large Scale -

Feed Rate: 7 tons/hour
Estimated Cost: $211,900,000
Estimated Time: 2 years

<u>Alternative 4: Excavation, Oily Wood Treating Fluid Recovery, and Solid-Phase (Surface Land) Biological Treatment Or Slurry-Phase Biological Treatment</u>

(Preferred Remedy for Accessible Soils only)

Under this alternative, all contaminated soils including the soil in the roundhouse area, under I-90 and in the IPC plant area and ditch sediments would be excavated. I-90 would be dismantled and the treating plant structures would be demolished.

Excavated soil would be stored in a waste pile constructed for staging prior to treatment. The soil would then be pretreated to remove the oilywood treating fluid. The recovered oily wood treating fluid would be recycled or disposed offsite. The soil would then be treated biologically in either a surface land treatment unit or a slurry-phase biological reactor to reduce the contaminant concentrations in the soil.

This alternative addresses all contaminated soils, sediments and oily wood treating fluid exceeding cleanup levels established for the Site. The alternative would biologically treat approximately 42,000 yd[3] of contaminated material.

Slurry-Phase Biological Treatment

The bioreactor would provide for treatment of soil contamination by providing contact between microorganisms growing on a fixed surface in the reactor and the slurry containing soil contaminants. The microorganisms use the contaminants as an energy source and degrade or destroy them to provide cell growth.

Excavated soils would undergo initial screening to remove debris by using stationary or moving screens. Oversize materials would be washed with high pressure hot water to remove contaminants. Materials passing through the screen would be washed and classified by size. The cleaned, relatively coarse materials would be stockpiled while the more contaminated silt/clay fraction would be slurried to a multistage, submerged fixed-film bioreactor.

The treated soils would be remixed with the clean coarse materials and used to backfill the excavated area if they meet remediation goals. If remediation goals are not fully achieved in the bioreactor system, a small RCRA Subtitle C land treatment unit would have to be constructed to provide additional contaminant reduction.

Effluent from the slurry units would be biologically treated in another treatment unit and discharged to a POTW.

Slurry-phase treatment should reduce contaminant levels by 90% for PCP, 85% for B2 PAHs, 90% for D PAHs and 70% for PCDDs and PCDFs.

Solid-Phase Biological Treatment (Land Treatment)

The Solid-Phase Biological Treatment option consists of an engineered land treatment unit (LTU) for treatment of the soils from contaminated areas. If significantly different waste types are excavated, an additional LTU would be considered because of the variable contamination. This could happen if contamination from one area consists primarily of PAH's and contamination from the other areas is primarily PCP. The LTU for the site soils would cover approximately 4 acres.

A perimeter berm or dike would be constructed around the outer edge of each unit and, if determined necessary during the engineering design phase, a bottom liner and leachate collection system would be installed. Excavated soil would be placed in the unit in layers up to one foot deep and would be routinely plowed and irrigated. Areas where soil is excavated would be backfilled with clean soil to eliminate any potential hazard associated with the open excavations.

Treatment takes place in the unit by enhancing the conditions in which naturally occurring microorganisms live and reproduce. Plowing adds oxygen to the soil and irrigation and nutrient addition (nitrogen and phosphorus) serves to promote biodegradation. As with the slurry option, the microorganisms use contaminants in the soil as an energy source and degrade or destroy them.

Before additional layers of soil would be added to the LTU, soil remediation levels would have to be achieved. When all of the contaminated soil has been applied to the LTU and treatment is complete, the unit will be closed by capping.

The solid-phase process should reduce contaminant levels by 90% for PCP, 85% for B2 PAHs, 85% for D PAHs and 40% for PCDDs and PCDFs. Land treatment would require compliance with RCRA requirements. Land disposal restrictions would apply if treatment standards for F032 and F034 listed wastes are finalized prior to the Record of Decision.

RCRA permit-by-rule requirements and Clean Water Act pretreatment requirements would apply to discharges of treated slurry unit effluent to publicly owned treatment works. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requirements would apply to reuse/recycling of recovered oily wood treating fluid. If the oily wood treating fluid did not meet substantive FIFRA standards, the oily wood treating fluid would be transported to an offsite RCRA Subtitle C disposal facility and disposed of in accordance with RCRA. RCRA Subtitle C regulations for operation of waste piles would be followed.

There are different implementation requirements and time frames for each method. Solid phase treatment will require a minimum of 10 years to reach remedial goals mainly due to the restricted area available at the Site to place a land treatment unit. The slurry phase biological treatment could be effected in 2 years.

Institutional controls required for this alternative include deed restrictions and land use controls to prevent new well construction and to prevent interference with the treatment units. Fencing would also be necessary to prevent access to LTUs.

Figures 9 and 10 provide conceptual process flow diagrams for the soil slurry reactor phase and solid phase treatments respectively.

Slurry-Phase -

Estimated Cost: $12,816,185
Estimated Time: 2 years

Solid-Phase -

Estimated Cost: $8,164,357
Estimated Time: 10 years

Alternative 5: Excavation, Oily Wood Treating Fluid Recovery, and Critical Fluid Solvent Extraction

Contaminated soil, including soil in the roundhouse area, under I90, and in the IPC plant area and ditch sediments would be excavated and stored in a waste pile constructed in accordance with RCRA Subtitle C requirements. I-90 would be dismantled and the treating plant structures would be demolished.

Oily wood treating fluid would be recovered and recycled, treated or disposed offsite in accordance with RCRA Subtitle C requirements. Hazardous substances would be extracted from the soil using liquified propane in a series of tanks. After treatment, the soil would be returned to the excavated area or a repository and recovered hazardous substances would be recycled or disposed offsite in accordance with RCRA Subtitle C requirements.

This alternative addresses all contaminated soils and sediments exceeding cleanup levels established for the Site, approximately 42,000 yd[3]. The process could treat as much as 200 tons/day with a 97% reduction in contaminant concentration.

The specific process evaluated under this alternative is the CF Systems Organics Extraction Process. In this process, a series of reactors are designed to achieve the specified cleanup levels. Within the extractor vessel of the reactor, at or near the solvent's critical pressure and temperature, the hazardous organic substances in the contaminated media waste dissolve into the solvent. Extracted organics are then removed with the solvent, while clean soils and water are removed through an underflow. The extracted organics and solvent then go to a second decanter vessel, where the pressure and temperature are decreased, causing the hazardous substances to separate from the solvent. The gaseous solvent is sent to a recovery column where it is liquified by addition of heat and pressure and then recycled back to the extractor vessel. Addition of heat may be required to maintain reactor temperatures above 60 F.

Treated soils would be used to backfill the excavated area if treatment levels are met. If treatment levels were not achieved during the extraction process, additional treatment in an LTU might be required. Recovered organics would be recycled if they meet FIFRA standards; otherwise they would be disposed of offsite in accordance with RCRA Subtitle C requirements, in a RCRA Subtitle C disposal facility.

Any land treatment occurring under this alternative would require compliance with RCRA Subtitle C requirements. Land disposal restrictions would apply if treatment standards for F032 and F034 wastes are finalized prior to the Record of Decision.

Risks would be reduced to the 1 x 10[-6] level for industrial use. Treatability testing has not been conducted and the effectiveness of the extraction process has not been determined. Process design testing would be required before full scale implementation.

RCRA permit-by-rule requirements and Clean Water Act pretreatment requirements would apply to discharges from the extraction process dewatering system to a POTW. FIFRA requirements would apply to reuse/recycling of recovered oily woodtreating fluid. FIFRA requires that a material used as a pesticide (wood treating fluid is classified as a pesticide by FIFRA), meet the formulation requirements. Recovered wood treating fluid would be analyzed and that analysis would be compared to the requirements to determine if the recovered fluid could be reused. If it could not be reused, RCRA Subtitle C requirements would apply to the offsite disposal of the oily wood treating fluid.

If an LTU is deemed necessary, deed restrictions would be required in order to prevent development and well drilling in and around the land treatment unit. Fencing would be required around the treating units to prevent unauthorized entry.

Figure 11 presents a simplified process flow diagram for CF System's Critical Fluid Solvent Extraction process and specifies the waste streams associated with the process.

Estimated cost: $82,232,520
Estimated time: 1-1/2 years

Alternative 6: Soil Flushing/In Situ Biological Treatment

(Preferred remedy for Soils Beneath the Treatment Plant and I-90)

As analyzed in the FS, this alternative addresses all contaminated soils at the IPC Site with the exception of soils in the roundhouse area and sediments in the drainage ditches. Soils in the treating plant area and underneath I-90 would not be excavated under this alternative. Structures on the Site would not be demolished and I-90 would not be temporarily removed. Ditch sediments and former roundhouse soils would be addressed by one of the other soil alternatives. This alternative treats approximately 39,000 yd[3] of contaminated soil.

The contaminants in the soil in the roundhouse area are not as amenable to soil flushing techniques as soils in the other areas of the Site. The primary contaminants in the roundhouse soils are PAHs that are very difficult to separate from soil particles. The ditch sediments must be excavated for treatment, rather than being treated in situ, because of the long narrow area in which the contaminated soils are located. Installation of a soil flushing system that would effectively reduce contaminant levels in the ditch sediments was determined to be not practicable.

Under this alternative, soil contaminated with oily wood treating fluid would be left in place and flushed with hot water or steam and, if initial test or pilot runs indicated the need, a nonhazardous surfactant which would cause the oily wood treating fluid to wash out would be added. The nonhazardous surfactant would not have an adverse impact on domestic ground water use. The flushed water, associated contaminants and flushed oily wood treating fluid would be collected in a series of trenches on both sides of I-90. The oily wood treating fluid would be skimmed from the water for recycling or treatment and disposal and the water would be treated in a separate system along with ground water. An oxygen source such as hydrogen peroxide and possibly nutrients would be added to the system to enhance biological degradation of soil contaminants.

The soil flushing system would be designed to flood the soil pores in the soil above the water table. Flushing solution would be distributed by an infiltration gallery designed to provide maximum contact between the flushing solution and the course grained soils associated with the pole plant area. Application of flushing solution would continue at a steady-state condition until desired residual concentrations were reached.

Oily wood treating fluid would be recycled or disposed of offsite. FIFRA requirements would apply to reuse/recycling of recovered oily wood treating fluid. FIFRA requires that a material used as a pesticide (wood treating fluid is classified as a pesticide by FIFRA), meet the formulation requirements. Recovered wood treating fluid would be analyzed and that analysis would be compared to the requirements to determine if the recovered fluid could be reused. If it could not be reused, RCRA Subtitle C requirements would apply to the offsite disposal of the oily wood treating fluid.

With the exception of soil removed for the installation of operating components, all contaminated soils would be left in place. Soils removed for the installation of process components, and the ditch sediments and former roundhouse soils will be addressed under another soil alternative.

Water used to recover contaminants during the soil flushing process could be treated in a fixed film biological reactor to remove contaminants. A portion of the water would then be reinjected within the contaminated zone to assist in the flushing process. The remaining volume of treated water would be discharged to a POTW or to surface water in compliance with Clean Water Act requirements.

About 40-80% of the oily wood treating fluid would be removed by flushing and approximately 70% of the contaminants that adhere to the soils would be removed. Recovery efficiencies would largely be dependent on how much oily wood treating fluid is currently present as free product versus the amount tied up as residual concentrations within the soils. Mathematical modeling has been conducted to refine this estimation and is summarized in the FS. However, testing would be necessary to provide site-specific information with sufficient accuracy to design and implement this process.

It has been estimated that the active in situ flushing and contaminant recovery activities would take one year to complete and follow-up in situ biological treatment of soils would take up to 10 years.

Safe Drinking Water Act requirements would apply to Class IV injection wells needed to inject hot water or steam into the subsurface.

Figure 12 presents a conceptual process flow diagram for the soil flushing, steam/hot water enhanced recovery process and specifies the waste streams associated with the process.

Estimated cost: $10,841,429
Estimated time: 10 years

Ground Water Alternatives

Costs for conducting the ground water alternatives were calculated in a manner similar to the soil alternatives cost calculations. This was done so that costs of the ground water alternatives could be compared. The cost for each ground water alternative involving extraction and treatment (Alternatives 2 and 3) was calculated assuming that each system would treat 200 gallons of water per minute for approximately 10 years or a total volume of 1 billion gallons. The cost of the in situ ground water alternative (Alternative 4) was based on treating a total volume of 210 million gallons.

<u>Alternative 1: No Action</u>

Superfund law requires the consideration of a no action alternative. This alternative is used as a baseline against which to compare the other alternatives. As defined in the Idaho Pole RI/FS, no action means that a remedy would not be conducted. The quantity of untreated waste would remain at current levels and the degree of risk posed by such waste would remain constant.

The only activity that would occur under this alternative is routine ground water monitoring. ARARs, risk based levels and TBCs would not be met.

Estimated cost: $45,000
Estimated time: annually

<u>Alternative 2: Pump and Treat Using Activated Carbon Adsorption</u>

This alternative involves the design of a ground water extraction system to capture the dissolved contaminant plume. Conventional activated carbon adsorption units would be used to remove contaminants from the ground water. Pretreatment of the extracted ground water to remove suspended solids and oily liquid would be required to prevent the activated carbon units from becoming overloaded.

Solid materials removed during the pretreatment process would be addressed through the selected soils alternative and oily fluids would be either reused in the wood treating process if FIFRA requirements were met, or disposed of offsite in accordance with RCRA Subtitle C requirements at a RCRA Subtitle C facility.

Treatability data collected at the Site indicate that excessive carbon loading and plugging due to dissolved organic and inorganic constituents will not significantly impact the operational life of the activated carbon.

Spent carbon would be reactivated using thermal or biological methods onsite or be sent offsite to a commercial carbon reactivation process. Reactivation of carbon by either thermal or biological methods destroys the contaminants adsorbed to the carbon. Transport of spent activated carbon to an offsite reactivation facility would require compliance with RCRA requirements because the carbon would contain the contaminants removed from the ground water and would be classified as a hazardous waste.

Treated ground water would be reinjected through a series of wells or trenches depending on which process is determined to be the more effective during design phase evaluations. Excess water would be discharged to a POTW in compliance with Clean Water Act pretreatment requirements. Injection wells used to return treated water to the aquifer are classified as Class IV Wells and would have to meet Safe Drinking Water Act requirements.

The design of the extraction system would focus on the volume of ground water having high contaminant concentrations. The alternative was evaluated with a conceptual extraction and reinjection plan; however, specific criteria would be developed during remedial design. Ideally, the treated extracted water would be reinjected. Pumping rates would remain low in order to prevent draw down of the water table causing subsequent vertical enlargement of the contaminated zone. The extraction and reinjection system would be designed to stimulate flushing of contaminants and to limit migration of contaminants. Figure 13 illustrates the carbon adsorption treatment process. Estimated cost: $4,413,555 Estimated time: 10 years

Alternative 3: Pump and Treat Using A Fixed Film Biological Reactor

(Preferred Remedy to be Used in Conjunction with Ground Water Alternative 4)

Contaminated ground water would be extracted by wells located along the axis or centerline of the contaminated plume and would be sent for pretreatment in an onsite oil/water separator-clarifier/filtration plant. Suspended solids would be removed from the water in the clarifier/filtration plant. Solids removed during this phase of the ground water treatment process would be addressed through the selected soils alternative and oily wood treatment fluid removed by the oil/water separator would be recycled if FIFRA requirements were met or disposed of offsite in accordance with RCRA Subtitle C requirements at a RCRA Subtitle C facility.

After the pretreatment steps described above, the water would enter a mix tank where the pH and temperature would be adjusted and microbes that have been acclimated to the contaminants would be added. Water then would pass into the submerged fixed film bioreactor. The water would remain in the reactor long enough for the contaminants to be degraded to a level that would allow for reinjection or discharge to a POTW or to surface water. The design of the extraction system would focus on the volume of ground water having high contaminant concentrations. The alternative was evaluated with a conceptual extraction and reinjection plan; however, specific criteria would be developed during remedial design. Ideally, all of the treated extracted water would be reinjected. Pumping rates would remain low in order to prevent a draw down of the water table and subsequent vertical enlargement of the contaminated zone. The extraction and reinjection system would be designed tostimulate flushing of contaminants and to limit migration of contaminants. Injection wells would comply with Safe Drinking Water Act requirements for Class IV injection wells. Discharge to a POTW or to surface water would be in compliance with the Clean Water Act. Figure 14 illustrates the biological treatment process.

Estimated cost: $2,519,235
Estimated time: 15 years

Alternative 4: In Situ Biological Treatment

(Preferred Remedy to be Used in Conjunction with Ground Water Alternative 3)

The principal objective of this alternative is to enhance the treatment of ground water and soil beneath the water table in the pasture area north of I -90 by adding oxygen and nutrients to the subsurface environment. The oxygen and nutrients would be carried to the subsurface in water that has been extracted from the aquifer and treated under one of the other remedial ground water alternatives.

The injection of this oxygen and nutrient rich solution into the contaminated ground water plume would enhance oxidation and biodegradation of contaminants by native bacteria. The bacteria utilize the contaminants in the ground water and in the saturated soil below the ground water table as an energy source, destroying contaminants by converting them to other nonhazardous forms. Injection wells used to transfer solution to the aquifer would comply with Safe Drinking Water Act requirements for Class IV injection wells.

Treatability information indicates that the addition of nutrients and an oxygen source will enhance biological degradation of the contaminants in the ground water.

The extraction well locations and pumping rates would be determined during remedial design by modeling. Modeling results may indicate the need for limited hydrologic plume management to prevent spread of the plume boundaries. Field-scale process treatability testing will be necessary to determine actual effectiveness of this technology. Figure 15 portrays the in situ biological treatment process.

Estimated cost: $1,878,447
Estimated time: 10 years

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 300.430(e)(9) of the NCP requires that the agencies evaluate and compare the remedial cleanup alternatives based on the nine criteria listed below. The first two criteria are threshold criteria and must be met. The selected remedy must represent the best balance of the selection criteria.

Evaluation and Comparison Criteria

1. Overall protection of human health and environment addresses whether or not a remedy provides adequate protection and describes how potential risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

2. Compliance with applicable or relevant and appropriate requirements addresses whether or not a remedy will comply with federal and state environmental laws and/or provide grounds for invoking a waiver.

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

4. Reduction of toxicity, mobility and volume through treatment refers to the degree that the remedy reduces toxicity, mobility and volume of the contamination.

5. Short-term effectiveness addresses the period of time needed to complete the remedy, and any adverse impact on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to carry out a particular option.

7. Cost evaluates the estimated capital costs, operation and maintenance costs and present worth costs of each alternative.

8. State agency acceptance indicates whether, based on its review of the information, the state (MDHES) concurs with, opposes or has no comment on the preferred alternative. However, for the Site, the state (MDHES) is the lead management agency and EPA is the support agency. As such, the State has identified the selected remedy and EPA has agreed with that identification.

9. Community acceptance is based on whether community concerns are addressed by the selected remedy and whether or not the community has preference for a remedy. Although public comment is an important part of the final decision, MDHES and EPA are compelled by law to balance community concerns with all of the other criteria. A complete record of the responses to specific categories of comments is summarized in the Responsiveness Summary.

The following summary of the evaluation and comparison of alternatives is presented in greater detail in the FS. The initial discussion covers the soil alternatives, followed by a discussion of the ground water alternatives. The alternatives are discussed in order of relative rank, with alternatives ranking the highest discussed first and alternatives ranking the lowest, discussed last.

Soil Alternatives

<u>Overall Protection of Human Health and the Environment:</u>

This criterion evaluates how the alternatives provide human health and environmental protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

All of the soil alternatives, except No Action, Surface Capping and Soil Flushing/In Situ Biological Treatment, are expected to provide overall protection of human health and the environment by eliminating, reducing or controlling risks associated with contaminated soils at the Site. However, Surface Capping and Soil Flushing/In Situ Biological Treatment, could provide adequate protection within limited areas of the Site. Each of the soil alternatives with the exception of Surface Capping and No Action would use treatment to eliminate or reduce risks. Institutional controls would be used to supplement each alternative's ability to provide further protection.

Alternative 3: Excavation and Thermal Treatment, would be the most protective alternative because the high temperature thermal process would destroy all (more than 99%) of the site contaminants in a single step, either onsite or offsite. Remaining risks for residential land use would be less than 1 x 10[-6] related to remaining untreated contaminants.

Alternative 5: Excavation and Critical Fluid Solvent Extraction, is slightly less effective than incineration. This alternative has a 97% contaminant removal efficiency. Oversize materials must be pretreated prior to introduction into the extraction process to assure complete contaminant reduction. Remaining risks for residential land use would be less than 1 x 10[-5] resulting from untreated material and treatment residuals.

Alternative 4: Excavation and Biological Treatment, would biologically remove or reduce contaminant concentrations in the soil to protective remediation levels as has been demonstrated at a number of wood treating sites currently undergoing remediation. Slurry phase and solid phase processes are the two options under this alternative and result in nearly identical ranking. Slurry phase treatment is somewhat better than solid phase treatment at contaminant removal. Removal efficiencies for slurry phase for pentachlorophenol, B2 PAHs, D PAHs and PCDDs/PCDFs are 90%, 85%, 90% and 70%, respectively, and for solid phase, 90%, 85%, 85%, and 40%, respectively. Remaining risks for residential land use would be less than 1 x 10[-5] for both options.

Alternative 6: Soil Flushing/In situ Biological Treatment, is ranked lower than the previous alternatives because of lesser expected contaminant removal. The range of removal is estimated to be from 40% to 80%. This alternative has been considered in order to avoid the need to demolish and excavate the IPC facility and the highway. This alternative does not directly address surface soils or ditch sediments. Since this alternative requires minimal excavation during installation of system components any surface soil and sediments would be treated along with the excavated material under another alternative. As a stand-alone alternative, this alternative may not meet 1 x 10[-4] risk level but in conjunction with other soil and ground water alternatives remaining risks would be reduced to less than 1 x 10[-4] for residential use. The areas where this alternative would be implemented are sources of ground water contamination that must be remediated to reach site cleanup levels.

Alternative 2: Surface Capping, would only provide protection where direct contact is the primary risk to human health. Areas of ground water contamination would not be protected by this alternative; therefore, Surface Capping is ranked lower than the other alternatives except for Alternative 1, No Action. This alternative would not be as protective as Alternatives 3, 5, 4 or 6 because it would not treat contaminants and would rely on the continuing integrity of the cap to prevent exposure. Remaining risks relating to untreated materials would be less than 1 x 10[-5]. Alternative 1: No Action, would not provide protection to human health and the environment from site contaminants. All soil pathways would remain and no treatment would occur. Without treatment, site contamination will persist indefinitely and will continue to affect residential water supply wells. Risks would remain constant.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable requirements are those cleanup standards, and other substantive requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, or location, at a CERCLA site. Relevant and appropriate requirements are similar requirements that, will not applicable clearly address problems or situations sufficiently similar to those encountered at a CERCLA site such that their use is well suited to the particular site. An evaluation of Federal and State ARARs for the selected remedy is provided in Appendix A. Remedial action Alternatives 3, 4, and 5 would comply with the ARARs. Alternative 2 would only meet ARARs that are related to direct contact and inhalation exposures; ground water ARARs would not be met; therefore surface capping will only be discussed for application in the roundhouse area. Alternative 6 would not meet ARARs as a stand-alone alternative. It will be discussed for use in conjunction with another alternative. Since the No Action alternative does not meet the two threshold criteria, it will no longer be discussed in the comparative analysis.

Long Term Effectiveness and Permanence

Long term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time. This criterion includes the consideration of residual risk and the adequacy and reliability of institutional controls. Although institutional controls, consisting of land use restrictions and prohibitions on aquifer use, would be implemented in conjunction with the remedy, the effectiveness and reliability of institutional controls is considered to be less than that of engineered controls.

Because the soil cleanup levels established in this ROD for some areas of the Site are health based standards for industrial use, and not unlimited use with unrestricted exposure, and because the contaminants will remain onsite, the remedial action alternative selected requires five year reviews under Section 121(c) of CERCLA, and Section 300.430(f)(4)(ii) of the NCP, to assure the long term effectiveness of the remedy.

Alternatives 3: Excavation and Thermal Treatment, reduces the risks associated with site contaminants by permanently destroying contaminants and achieves a higher destruction efficiency than the other treatment alternatives. This alternative has been proven reliable and would be adequate to address contaminants of concern. Treatment residuals would be clean of hazardous substances resulting in minimal risks.

Alternative 5: Excavation and Critical Fluid Solvent Extraction, has good reliability, but since residuals may have slightly greater contaminant levels than Alternative 3, this alternative is ranked below Alternative 3. Long term management of residuals would be necessary. There are also some uncertainties concerning the fate of extracted hazardous substances, because contaminants of concern are concentrated in the extract but are not destroyed and may pose residual risk.

Alternative 4: Excavation and Biological Treatment, provides for long term effectiveness through destruction of contaminants of concern, although it would be necessary to evaluate the operational processes on a site specific basis to estimate efficiency. Long term management of both solid phase and slurry phase treatment residuals would be necessary. Uncertainties are greater with solid phase than slurry because of the time required to meet cleanup levels and the area necessary to complete the treatment process. Slurry phase would rank ahead of solid phase due to slightly better reduction of concentration levels. This alternative ranks below Alternatives 5 and 3 because residual contamination would be higher.

Alternative 2: Surface Capping, would not provide permanent risk reduction even in a limited area. Capping could meet performance specifications but the need for long term maintenance and management is great. It is likely that replacement and repair of the cap would be necessary to maintain protectiveness. The degree of long term effectiveness of the capping alternative would depend on maintenance of the cap and on the effectiveness of institutional controls protecting the cap. This alternative only ranks ahead of Alternative 6.

Alternative 6: Soil Flushing/In situ Biological Treatment, would require the implementation of an additional ground water remedy to increase contaminant destruction for long term effectiveness. If this alternative were used as a stand-alone alternative, remaining risks could be greater than 1 x 10[-4], which is higher than remaining risks for other alternatives. This alternative is ranked lower than other alternatives. Long term management would be required to evaluate the effectiveness of Alternative 6. There would be considerable design testing necessary to optimize this alternative. Contaminants would be degraded to a lesser extent under this alternative than Alternatives 3, 4 or 5, although this alternative has the capability of reaching soils other alternatives might not, especially soils underneath structures.

Reduction of Toxicity, Mobility and Volume

Congress has expressed a preference under CERCLA for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of hazardous substances as their principal element.

Alternative 3: Excavation and Thermal Treatment, would reduce the toxicity, mobility and volume of soil contaminants at the Site better than other alternatives. This alternative addresses all excavated material with an irreversible treatment process. Any treatment residuals would have minimal risks and would meet treatment goals. This alternative satisfies the preference for treatment.

Alternative 4: Excavation and Biological Treatment, would reduce the toxicity, mobility and volume of soil contaminants on the Site. Slurry phase treatment would provide more complete destruction than solid phase but the two options are ranked together after Alternative 3. Alternative 4 would convert contaminants to nontoxic compounds. The treatment process would be irreversible. The preference for treatment would be satisfied.

Alternative 5: Excavation and Critical Fluid Solvent Extraction, would reduce the mobility and volume of soil contaminants at the Site better than Alternatives 2 and 6 but not as well as Alternatives 3 and 4. Hazardous substances are not destroyed in this process but are extracted in the form of a concentrate that would require additional treatment or recycling. The preference for treatment is satisfied.

Alternative 6: Soil Flushing/In situ Biological Treatment, would address the principal threat by removing contaminants of concern from the environment and also by breaking them down thus reducing toxicity, mobility and volume. However, this alternative does not provide as great a percent of reduction as the previous alternatives do. Additionally there are special requirements necessary for this alternative, such as a suitable soil matrix to flush oily wood treating fluid and hazardous substances as well as hydrological controls to control the flushing solution and the in situ bioremediation. This alternative meets the preference for treatment.

Alternative 2: Surface Capping, would reduce the mobility of soil contaminants by covering them and by minimizing or eliminating surface water infiltration and air entrainment, but would not reduce the toxicity or volume of contaminants. The alternative does not employ an irreversible treatment or destruction process and it does not meet the preference for treatment as a principal element of the remedy. Therefore, this alternative is ranked the lowest.

Short Term Effectiveness

Short term effectiveness refers to the period of time needed to complete the remedy and any adverse impacts on human health and the environment that may be posed during the construction and implementation of the remedy.

Alternative 2: Surface Capping, would rank the highest under this criterion, primarily because it involves the least amount of work, can be completed in the shortest time and results in minimal risks to workers and the community. It could be conducted in one construction season and would present little risk to workers (less than 1 x 10[-5]) constructing the cap and little risk to the community (less than 1 x 10[-6]) during construction. Environmental impacts would be expected to be little, with some increased chance for surface water runoff that previously infiltrated the soils.

Alternative 4: Excavation and Biological Treatment, would take longer to conduct remedial action than Alternative 2. Slurry phase ranks higher than solid phase treatment but both rank relatively close to one another. Slurry phase presents minimal risk to workers (1 x 10[-5]) and the community (1 x 10[-6]).

Solid phase treatment would result in low worker risks (1 x 10[-5] and community risks (1 x 10[-6]) but requires a much longer time frame, from 5 to 10 years to achieve remediation levels. The size of the land treatment unit used for solid phase treatment would determine the length of the soils treatment period. A larger land treatment unit would require fewer layers of soil and treatment would be completed in less time.

Exposure to dust from excavation of soils would be of concern for Alternatives 3, 4 and 5 but could be addressed through dust suppression techniques.

Alternative 6: Soil Flushing/In situ Biological Treatment, would take a longer time than other alternatives to achieve remediation levels. Alternative 6 would not pose any significant risks to workers or others during implementation other than potential ground water impacts that would require monitoring. This alternative results in a lower ranking than Alternatives 2 or 4 but ahead of Alternatives 3 and 5 because of limited worker risks.

Alternative 3: Excavation and Thermal Treatment, would present the highest opportunity for impacts to site workers and the environment from air emissions. There is also the potential for adverse impacts to offsite populations from air emissions resulting from emission control system malfunctions. There would also be potentially significant risks associated with the offsite incineration option since large quantities of hazardous substances would be transported over public roads. The time required to complete this remedy, however, is relatively short: 1.5 years for an onsite large scale unit to 5 years for an onsite mobile unit.

Alternative 5: Excavation and Critical Fluid Solvent Extraction, would only take approximately 1.5 years to decontaminate site soils. However, it would pose a threat to onsite workers if not properly designed or operated from air emissions and the use of pressurized solvent. Community risks would be minimal as long as the system is operated within specifications. Workers may also encounter risks from concentrated extract and from treatment residuals. Environmental impacts would be limited if correct design and operation were followed. This alternative ranks lowest primarily due to worker risks.

Implementability

Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the remedy. This criterion also includes coordination of Federal, State and local governments to clean up the Site.

Alternative 2: Surface Capping, is considered to be a standard construction practice and could be accomplished in a short period of time. Design methods are well understood and materials are readily available. Additional action to improve the cap would be available. No excavation of soils or sediments would be necessary. These factors all result in this alternative being the most implementable.

Alternative 4: Excavation and Biological Treatment, is somewhat less implementable than Alternative 2, but more so than the remaining alternatives. A solid phase surface land treatment unit would require no special equipment or treatment units. The land treatment unit would be operated like an agricultural farm field and would be constructed in a short time using standard earth moving equipment. The slurry reactor option of Alternative 4 would not be required to withstand high temperatures and pressures as equipment under Alternatives 3 and 5, so it would be easier to construct. Alternative 4 would require some planning with local government especially for the slurry option if discharges to a POTW were found to be necessary. This alternative ranks as the second most easily implemented alternative.

Alternative 6: Soil Flushing/In situ Biological Treatment, would require equipment and services that are readily available. The drilling techniques required to introduce hot water/steam into the area under I-90 would be challenging, but not insurmountable. This makes this alternative less implementable than 2 and 4 but more so than Alternatives 3 and 5.

Alternative 3: Excavation and Thermal Treatment, would likely be the most difficult to implement other than Alternative 5, both administratively and technically. There is not currently an offsite commercial incinerator that is permitted to burn dioxin containing wastes. There are a limited number of mobile incinerators available for onsite use. Construction of an onsite incinerator is feasible and many vendors offer design, construction and training services for operation and maintenance of full scale units, however, thermal treatment has a history of opposition by the public and local governments. This alternative would entail considerable planning with local government. The offsite option would require coordination with the Department of Transportation.

Alternative 5: Excavation and Critical Fluid Solvent Extraction, requires a specially designed and constructed unit that would be used to contain the waste material during the treatment process. This alternative would be the most difficult to implement. There is a vendor available, but there may be delays in optimizing the process. This alternative would require extensive system monitoring. Additional remedial action could be undertaken in the form of additional excavation but capital investment in solvent extraction would make use of another technology difficult. This alternative would require planning with the local government.

Cost

This criterion evaluates the estimated costs for each remedial alternative. For comparison, capital and annual operation and maintenance costs are used to calculate a present worth cost for each alternative.

The alternatives' approximate present worth costs for site wide implementation are shown below:

Alternative 1, No Action

- $0

Alternative 2, Surface Capping,

- $18,000,000 (cost for entire Site based on unit cost developed for former roundhouse area soils)

Alternative 3, Excavation and Thermal Treatment,

- $63,000,000 Mobile Onsite
  $93,000,000 Large Scale Onsite
  $212,000,000 Offsite

Alternative 4, Excavation and Biological Treatment,

- $13,000,000 Slurry Phase
  $8,000,000 Solid Phase (Land treatment unit)

Alternative 5, Excavation and Critical Fluid Solvent Extraction,

- $82,000,000

Alternative 6, Soil Flushing/In situ Biological Treatment,

- $11,000,000.

The alternatives, in order of increasing costs, are as follows: Alternative 1, No Action; Alternative 4, Solid Phase Biological Treatment; Alternative 4 Slurry Phase Biological Treatment; Alternative 6, Soil Flushing In Situ; Alternative 2, Surface Capping; Alternative 3, Thermal Treatment (onsite mobile) and Alternative 5, Solvent Extraction.

In order to evaluate the costs of the alternatives for implementation in only the roundhouse area the following estimated costs have been prepared. The estimated costs in the FS for Alternative 2 were only for the roundhouse area. The estimated costs for the other alternatives were not in the FS comparative analysis and do not result in the same unit costs as the costs described above because those costs do not include demolition or I-90 disruption.

Alternative 1, No Action

- $0

Alternative 2, Surface Capping,

- $1,300,000

Alternative 3, Excavation and Thermal Treatment,

. $7,800,000 Mobile Onsite

Alternative 4, Excavation and Biological Treatment,

. $960,000 Slurry Phase
$600,000 Solid Phase (Land treatment unit)

Alternative 5, Excavation and Critical Fluid Solvent Extraction,

. $55,000,000

Alternative 6, Soil Flushing/In situ Biological Treatment,

. $1,100,000.

The Alternatives, in order of increasing costs, for the roundhouse area, are as follows: Alternative 1, No Action; Alternative 4, Solid Phase; Alternative 4, Slurry Phase; Alternative 6, Soil Flushing In Situ; Alternative 2, Surface Capping; Alternative 3, Thermal (onsite mobile) and Alternative 5, Solvent Extraction. Since the ranking of alternatives based on cost estimates is the same over the Site and over the roundhouse area, the alternatives retain their relative ranking regardless of area of implementation.

<u>State Acceptance</u>

The State of Montana has been the lead agency for the development of this Record of Decision and has selected the remedy contained herein. EPA has participated in the remedial process as the support agency and has concurred with the remedy selection.

<u>Community Acceptance</u>

Public comment on the Remedial Investigation, Feasibility Study and Proposed Plan was solicited during formal public comment periods extending from April 1, 1992 until June 16, 1992. Comments received from the community indicate no opposition to the preferred remedy with the exception of a late comment expressing opposition to the remedy and support for the remedy proposed by IPC. Additionally, at least one person and the local government requested that the cleanup be expedited if possible. The City of Bozeman expressed concern about possible discharges to the publicly owned treatment works. Response to the community comments are found in the Responsiveness Summary.

During the public comment period, MDHES and EPA received extensive comments from two Potentially Responsible Parties (PRPs) that have been identified for the Site. The PRP comments object to the RI procedures, the Baseline Risk Assessment development and the FS as well as the preferred remedy. As part of the written comments, the Idaho Pole Company submitted their proposed remedy consisting primarily of in situ biological treatment of soils. PRP comments with MDHES and EPA responses are also found in the Responsiveness Summary.

Ground Water Alternatives

Ground water beneath the Site has become contaminated with oily wood treating fluid that has been spilled, dripped or discharged onto the ground surface. The oily wood treating fluid has migrated downward, contaminating the soil that it passed through, and has entered the ground water. Some of the oily wood treating fluid is found at the surface of the ground water, and some of the fluid is attached to soil particles above and below the water table. A portion of the fluid has dissolved in the ground water and will have to be removed to reach site remediation goals.

In order to assure long term protection of the ground water, the soil, acting as a source of oily treating fluid contamination, must be cleaned up to a level that no longer contributes contaminants to the ground water. If the source areas are not remediated, none of the ground water alternatives would be considered permanent remedies. The effectiveness of implementation of the ground water alternatives is dependent upon effective soil remediation. Institutional controls preventing the construction of new water supply wells during site remediation and installation of on-tap treatment devices at residences with contaminated wells would provide additional protection.

<u>Overall Protection of Human Health and the Environment</u>

Alternative 2: Carbon Treatment, would be expected to provide protection of human health and the environment by eliminating or reducing the risks posed by contaminated ground water better than the other alternatives.

Remaining risks would be less than 5 x 10[-6].

Alternative 3: Fixed Film Bioreactor, would also be expected to provide protection of human health and the environment by eliminating or reducing the risks posed by contaminated ground water although this alternative would not be as protective as Alternative 2. Remaining risks would be less than 5.5 x 10[-5].

Alternative 4: In Situ Bioreclamation, would be expected to provide protection of human health and the environment by eliminating or reducing the risks posed by contaminated ground water only if it were used in conjunction with alternative 2 or 3. Alternative 4 would not meet protective cleanup levels alone. However, Alternative 4 would enhance Alternatives 2 or 3 by reaching ground water that they can't reach. If Alternative 4 were used with Alternative 3, for example, remaining risks would be less than 5.5 x 10[-5].

Alternative 1: No Action, would not provide protection of human health since the untreated ground water would continue to pose risks. Risk levels would remain constant. The only activity identified under this alternative would be ground water monitoring.

Compliance with Applicable or Relevant and Appropriate Requirements(ARARs)

Applicable requirements are those cleanup standards, and other substantive requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, or location, at a CERCLA site. Relevant and appropriate requirements are similar requirements that, while not applicable, clearly address problems or situations sufficiently similar to those encountered at a CERCLA site such that their use is well suited to the particular site. An evaluation of Federal and State ARARs for the selected remedy is provided in Appendix A. Alternatives 2 and 3 would meet ARARs for all ground water that is pumped to the surface for treatment. Nevertheless, pump and treat systems have been shown to not be completely able to reach cleanup levels in the ground water without additional in situ treatment. Alternative 4 would meet ARARs only if used in conjunction with other ground water alternatives. Since the No Action alternative does not meet the two threshold criteria, it will no longer be discussed in the comparative analysis.

Long Term Effectiveness and Permanence

Alternative 2: Carbon Treatment, would offer a high degree of permanence in the reduction of risk associated with ground water if combined with a soil alternative that effectively removes the potential for recontamination. This alternative would be expected to attain MCLs and proposed MCLs in treated ground water, resulting in minimal risk from contaminant residuals in ground water. Because of the length of time for remediation, remedial action conducted under this alternative would require five year reviews and periodic monitoring to assure the long term effectiveness of this remedy. In addition, there would be need for long term maintenance of the treatment units and the need to treat or dispose of the spent carbon that contains the contaminants would be required. This alternative would offer the best long term effectiveness of any of the alternatives.

Alternative 3: Fixed Film Bioreactor, would offer a good degree of permanence in the reduction of risk associated with the ground water if combined with a soil alternative that effectively removes the potential for recontamination. This alternative would be expected to attain MCLs or proposed MCLs in treated ground water, but not as quickly as Alternative 2 because the biologic system is not as efficient at removing contaminants as the carbon treatment system. Operational monitoring would be required. Because of the length of time for remediation, remedial action conducted under this alternative would require five year reviews and periodic monitoring to assure the long term effectiveness of these remedies.

Alternative 4: In Situ Bioreclamation, would offer a lesser degree of permanence in the reduction of risk associated with the ground water. The technology has been implemented at other Sites but there would be uncertainties related to design and degree of contaminant reduction. Because of the length of time for remediation, remedial actions conducted under this alternative would require five year reviews and periodic monitoring to assure the long term effectiveness of these remedies. An advantage that this alternative would offer is the ability to treat residual ground water contaminants that could not be pumped to the surface for treatment under alternatives 2 or 3.

Reduction of Toxicity, Mobility and Volume

Alternative 3: Fixed Film Bioreactor, would provide a reduction in toxicity, mobility and volume of contaminants in ground water through treatment. This alternative degrades ground water contaminants that are extracted by approximately 95%. This alternative is ranked higher than Alternative 2 even though it has a slightly lower per cent reduction in concentrations, because this technology offers direct destruction of contaminants while Alternative 2 only transfers contaminants from one medium (ground water) to another (carbon). The contaminant breakdown under Alternative 3 is irreversible and treatment residuals would be land disposed onsite. This alternative meets the preference for treatment.

Alternative 2: Carbon Treatment, would transfer contaminants from the ground water to activated carbon which must be regenerated at regular intervals either onsite or offsite. This alternative would meet the preference for treatment, with approximately 99% contaminant removal. The initial carbon treatment process is not irreversible, but the subsequent carbon regeneration would be. This alternative ranks ahead of Alternative 4.

Alternative 4: In Situ Bioreclamation, would provide for treatment of contaminated ground water to remove residual contamination in the aquifer. This alternative may not adequately degrade contaminants by itself to remediation levels. An advantage of this alternative is that no treatment residuals would be generated. This alternative results in irreversible degradation and meets the preference for treatment.

Short Term Effectiveness

Alternative 4: In Situ Bioreclamation, would take about 10 years to reach remediation levels in the ground water. Construction workers health risks associated with this alternative would be minimal, less than 1 x 10[-5]. The principal hazard might be working with concentrated hydrogen peroxide, if that compound is selected to provide the oxygen enrichment source. Community risks would be very low during implementation of this alternative. Any potential risks presented by construction activities could be controlled or eliminated by proper construction and health and safety practices. Due to the length of treatment time and minimal risks this alternative ranks highest in short term effectiveness.

Alternative 3: Fixed Film Bioreactor, would take about 10 to 15 years to reach remediation levels in the ground water. Construction workers health risks would be less than 1 x 10[-5], with risks related to well installation, bioreactor operation and treatment residual disposal. Any potential risks presented by construction activities could be controlled or eliminated by proper construction and health and safety practices. This alternative ranks ahead of Alternative 2.

Alternative 2: Carbon Treatment, would take about 10 to 15 years to reach remediation levels in the ground water. Construction workers health risks associated with this alternative would be less than 1 x 10[-5.] However, there would be additional risks incurred during regeneration of carbon, relating to either transportation or thermal regeneration. Any potential risks presented by construction activities could be controlled or eliminated by proper construction and health and safety practices.

Implementability

Alternative 2: Carbon Treatment, would require preconstructed units that could be installed very quickly. Since Carbon Treatment is well established and proven, it would be easy to implement and operate this type of system. Monitoring the effectiveness of the system would be easily accomplished. Possible delays related to biofouling and to discharges to the POTW or to surface water could occur under this alternative. Equipment for this technology is readily available. There would be a need to coordinate with the local government for discharges to POTW. This alternative would be the most easily implemented.

Alternative 3: Fixed Film Bioreactor, would require pilot testing; however, modular treatment units are commercially available for full scale use. This alternative would require specifically designed units that could be developed locally. Since Alternative 3 is relatively well proven, it would be easy to implement and operate. Possible delays would relate to operational testing and the ability of the system design to handle the volume of ground water for treatment. Other delays might relate to discharges to the POTW or to surface water. There would be a need to coordinate with the local government for discharges to a POTW. This alternative is more implementable than Alternative 4.

Alternative 4: In Situ Bioreclamation, would require no special equipment for implementation although the design of the system may require pilot testing. There have been successful demonstrations of the in situ system, and this alternative has been implemented in the state. System design would need to accommodate hydrogen peroxide if that compound is selected for the oxygen enrichment source. Another operational delay might be the ability of introducing oxygen and nutrient enrichment compounds to ground water zones of contamination. Additional remedial action would be easily accomplished either by expanding the network or by initiating a pump a treat technology. Monitoring effectiveness would be relatively easy. This alternative may require out of state assistance in proper startup and operation. No coordination with local government would be required.

Cost

The total 30 year present worth cost for each ground water alternative is estimated below:

Alternative 1, No Action

- $45,000 (annually)

Alternative 2, Carbon Treatment

- $4,400,000

Alternative 3, Fixed Film Bioreactor

- $2,500,000

Alternative 4, In Situ Bioreclamation

- $1,800,000

State Acceptance

The State of Montana has been the lead agency for the development of this ROD and has selected the remedy contained herein. EPA has participated in the remedial process as the support agency and has concurred with the remedy selection.

Community Acceptance

Public comment on the Remedial Investigation, Feasibility Study and Proposed Plan was solicited during formal public comment periods extending from April 1, 1992 until June 16, 1992. Comments received from the community indicate no opposition to the preferred remedy with the exception of a late comment expressing opposition to the remedy and support for the remedy proposed by IPC. Additionally, at least one person and the local government requested that the cleanup be expedited if possible. The City of Bozeman expressed concern about possible discharges to the publicly owned treatment works. Response to the community comments are found in the Responsiveness Summary.

During the public comment period, MDHES and EPA received extensive comments from two potentially responsible parties that have been identified for the Site. The PRP comments object to the RI procedures, the Baseline Risk Assessment development and the FS as well as the preferred remedy. As part of the written comments, the Idaho Pole Company submitted their proposed remedy consisting primarily of in situ biological treatment of soils and ground water. Potentially Responsible Party comments with MDHES and EPA responses are also found in the Responsiveness Summary.

IX. SELECTED REMEDY

Based upon consideration of CERCLA requirements, the detailed analysis of alternatives, and public comments, MDHES and EPA have determined that a combination of Soil Alternatives 4 (Excavation and Biological Treatment) and 6 (Soil Flushing and In Situ Biological Treatment) and Ground Water Alternatives 3 (Pump and Biological Treatment) and 4 (In Situ Biological Treatment) is the most appropriate remedy for the Site. No single soil or ground water alternative will provide complete remediation of soils or ground water over the entire Site. It is necessary to combine several alternatives to achieve site wide cleanup.

Remedy for Soils and Sediments

Two soil alternatives have been selected to address the physical features of the Site. In recognition of cost and the fact that the IPC pole plant is currently operating, MDHES and EPA believe that Soil Flushing and In Situ Soil Biological Treatment (Alternative 6), under treating plant structures and under I-90 is appropriate. Excavation and Biological Treatment (Alternative 4) has been selected as the remedy for soils that are accessible and will afford a greater opportunity to achieve cleanup levels. The solid phase biological treatment option in Alternative 4 has been selected over slurry phase bioremediation because of more proven implementation at hazardous waste sites.

Alternative 6 is the only soil alternative evaluated that can be implemented in the active plant area without requiring demolition of the existing structures and excavation of contaminated soils and that provides a reduction in toxicity and mobility through treatment. Although Alternative 6 is not as effective as a stand-alone remedy at meeting some of the selection criteria as some of the other remedies, it will allow continued operation of the plant and will reduce exposure risks to within the acceptable range. Surface Capping, Alternative 2, does not provide reduction in toxicity or volume and was eliminated from consideration for application in the plant area. Remediation of soils under I-90 without replacement of the highway can only be accomplished by Alternative 6, Soil Flushing and In Situ Biological Treatment. MDHES and EPA have determined that replacement of I-90 is not practicable for this remedial action, therefore soil treatment must take place without excavation.

Alternative 4, Excavation and Solid Phase Biological Treatment, will be implemented to remediate all other areas. This alternative has been selected because it best meets the selection criteria. Solid phase biological treatment is a proven remediation technology that has met community acceptance at other sites, and is relatively inexpensive. In addition, biological treatment in a surface land treatment unit is readily implementable and converts contaminants to non-toxic compounds.

As discussed above, each of the soil alternatives will be implemented in separate areas of the Site, generally determined by accessibility to contaminated soils or sediments. The following summarizes the alternatives and implementation areas:

- Soils Alternative 4 (Excavation and Solid Phase Biological Treatment) will be implemented in the pole plant soils between Cedar Street and I-90, round house area soils, the pasture north of I-90 and ditch sediments (or bottom soils) from the Cedar Street and substation ditches.

- Soil Alternative 6 (Soil Flushing and In Situ Biological Treatment) will be implemented under and around the pole plant treatment facility south of Cedar Street and under I-90.

- Institutional controls will be implemented to protect closed land treatment units.

Contaminated soil will be excavated and will be stored in a waste pile constructed in accordance with RCRA Subtitle C requirements. The soil will then be pretreated with an oil/solids separator to remove the oily wood treating fluid. The recovered oily wood treating fluid and material removed by the oil/water separator will be recycled if substantive FIFRA requirements are met or disposed of offsite in accordance with RCRA and other applicable requirements. The soil will then be treated biologically in a surface land treatment unit to reduce the concentrations of the contaminants of concern in the soil.

The LTU for the soils will cover approximately four acres. Excavated soil will be placed in the unit in layers up to one foot deep and will be routinely plowed and irrigated. Areas where soil is excavated will be back-filled with clean soil to eliminate any potential hazard associated with the open excavations.

Before additional layers of soil are added to the LTU, soil remediation levels will have to be achieved. When all of the contaminated soil has been applied to the LTU and treatment is complete, the unit will be closed by capping in accordance with RCRA Subtitle C requirements.

Soil in inaccessible locations such as under buildings and I-90 contaminated with oily wood treating fluid will be left in place and flushed with hot water or steam. The flushed water, associated contaminants and flushed oily wood treating fluid will be collected in a series of trenches on both sides of I-90. The oily wood treating fluid will be skimmed from the water and will be recycled if substantive FIFRA requirements are met or disposed of offsite in accordance with RCRA and other applicable requirements. The water will be treated with ground water under Ground Water Alternative 3. In situ biological degradation of soil contaminants will then be enhanced by addition of oxygen and nutrient sources to the soils.

Remedy for Ground Water

Two ground water alternatives have been selected in order to conduct a complementary cleanup. In order to provide the most effective ground water cleanup, in situ bioremediation was selected to complement the pump and treatment process. Biological pump and treat was selected over carbon adsorption because it costs much less to implement and it more fully satisfies the preference for treatment and reduction in mobility, toxicity and volume, since contaminants are degraded rather than transferred to another medium.

The ground water alternatives will be conducted in concert with each other generally in and around the oily wood treating fluid plume.

- Ground Water Alternative 3 (Pump and Biological Treatment) will be implemented within the boundaries of the oily wood treating fluid plume.

- Ground Water Alternative 4 (In Situ Biological Treatment) will be implemented along the boundaries of the oily wood treating fluid plume and downgradient within the ground water plume.

- Institutional controls will be implemented to prevent access to contaminated ground water.

Contaminated ground water will be extracted by wells located along the axis or centerline of the contaminated plume and will be sent to an oil/water separator-clarifier/filtration plant. Suspended solids will be removed from the water in the clarifier/filtration plant. Solids removed during this phase of the ground water treatment process will be treated in the LTU developed under Soil Alternative 4. Extracted ground water will then be treated in the fixed film bioreactor described in Ground Water Alternative 3. The extraction and reinjection system will be designed to stimulate flushing of contaminants and to limit migration of contaminants.

In situ biological degradation of ground water will enhance the treatment of ground water and soil beneath the water table in the pasture area north of I -90 by adding oxygen and nutrients to the subsurface environment. The oxygen will be delivered to the subsurface in a manner determined during remedial design. Nutrients will be carried to the subsurface in water that has been extracted from the aquifer and treated in a bioreactor on the surface to remove contaminants.

If design and implementation of the ground water treatment prove to require a discharge of water other than reinjection, then additional treatment such as carbon polishing may be necessary to meet pretreatment standards prior to discharging to a publicly owned treatment works or to meet surface water quality standards and nondegradation standards prior to discharge to surface water.

Sludge composed of exhausted microbes from the bioreactor will be captured in a bag filter and applied to the LTU developed under Soil Alternative 4 for treatment.

Additionally, throughout the cleanup of the Site, ground water monitoring will be conducted to evaluate cleanup efficiency and potential contaminant release. As part of the monitoring program, residential wells in the potentially impacted neighborhood will be sampled not less than quarterly for contaminants of concern. Residential wells exhibiting concentrations exceeding MCLs or risk based cleanup levels shall have an in-home carbon/reverse osmosis treatment system installed, operated and maintained until cleanup levels in ground water are achieved.

Estimated Costs of the Remedy

The estimated cost summary for this combination of alternatives is presented in Table 18. Costs for Soil Alternatives 4 and 6, and Ground Water Alternatives 3 and 6 are less than those presented in Sections VII and VIII of this document, because these alternatives will address smaller areas and volumes than was assumed in Sections VII and VIII. Soil Alternative 4, Excavation and Biological Treatment will address 19,000 cubic yards and Soil Alternative 6, Soil Flushing/In Situ Biological Treatment will address 23,000 cubic yards. Ground Water Alternative 3 will address up to 1.0 billion gallons and Ground Water Alternative 4 will address up to 210 million gallons. The selected remedy cleanup areas are depicted in Figure 16.

The selected remedy may change as a result of engineering processes during remedial design. Furthermore, specific design and startup testing will be necessary to fully evaluate the selected remedy.

Performance Standards for Soils and Sediments

For soils and sediments, the remedial goal is treatment so that the contaminant concentration levels pose no unacceptable risk to human health or the environment. Since no federal or state chemical specific ARARs exist for these media, cleanup levels were determined for contaminants of concern through a site specific risk assessment and through development of preliminary remediation goals.

The specific performance standards which will be used to insure attainment of the remediation levels for these contaminated media are:

- Excavation of all soil and sediments at the Site with contaminant levels exceeding concentrations identified in Table 13; the exception being those inaccessible soils under the pole plant structures and I-90;

- Recovery of oily wood treating fluid from excavated soils or from flushed soils to a level that is technically practicable as determined by MDHES and EPA, and recycling to active pole plant operations, or offsite disposal in accordance with RCRA and other applicable requirements if the oily wood treating fluid does not meet substantive FIFRA requirements;

- Treatment of all excavated soils and sediments in land treatment units onsite to cleanup levels identified in Table 13;

- Placement of clean fill in all excavated areas;

- Closure of the land treatment units in accordance with RCRA Subtitle C requirements;

- Implementation of engineering and institutional controls to prevent access, to limit the spread of contamination and to protect the integrity of the treatment units;

- Flushing of the inaccessible soils under the pole plant structures and I-90 for a minimum period of one year or until oily wood treating fluid is no longer recovered and contaminant levels have plateaued; and

- Attainment of all other ARARs identified in Appendix A for the remediation of soils.

Sampling will be performed during the response action to verify that all media contaminated above the cleanup levels are treated. Additional contaminated media will be moved to the treatment areas prior to the completion of land treatment, as necessary, until attainment of soils cleanup levels and protectiveness are ensured. The sampling program shall be developed during remedial design.

Performance Standards for Ground Water

Remediation goals for ground water include the restoration of contaminated ground water to its potential future uses, protection of uncontaminated ground water by minimizing migration of contaminants with the ground water, and ensuring that the level of contaminants remaining in the ground water poses no unacceptable risk to human health or the environment. Since the current and future use of the ground water aquifer is for domestic use, cleanup levels for ground water are either promulgated or proposed MCLs established by the Safe Drinking Water Act. Attainment of these cleanup levels will be protective of human health and the environment and will restore the ground water to potential beneficial uses.

The specific performance standards which will be used to ensure attainment of the remediation goals for ground water are:

- Reduction of contaminant levels in ground water within the attainment area to cleanup levels identified in Table 13; the attainment area is the contaminated ground water aquifer bounded by Rocky Creek, Bozeman Creek and I-90;

- Extraction of ground water at the Site with contaminant concentrations exceeding the cleanup levels in Table 13;

- Treatment of extracted ground water to cleanup levels in Table 13;

- Reinjection of treated and nutrient enhanced ground water to the contaminated ground water aquifer to stimulate in situ biological degradation of contaminants to the cleanup levels in Table 13; and, if necessary, discharge to the publicly owned treatment works or to surface water, in accordance with the applicable discharge requirements;

- Evaluation of monitoring well 17 abandonment procedures and, if necessary, reabandonment;

- Attainment of all other ARARs identified in Appendix A for ground water remediation;

- Monitoring of residential wells within or proximate to the contaminated ground water plume for contaminants of concern for ground water; residential wells will be monitored not less than every three months until attainment of ground water cleanup levels in the aquifer and in the wells has been achieved;

- Implementation of institutional controls to prevent access to contaminated ground water and to prevent spreading of the plume; and

- Installation, operation and maintenance of carbon/reverse osmosis treatment system for all residential wells that have ground water contaminant concentrations exceeding cleanup levels in Table 13.

Ground water sampling will be performed during the response action to verify that contaminated ground water above the cleanup levels is treated. Ground water will be extracted, treated and reinjected until cleanup levels are attained. If, during operation of the ground water remediation system, contaminant levels cease to decline and remain constant at concentrations higher that the cleanup levels, the remedy will be reevaluated.

TABLE 18
ESTIMATED COSTS FOR THE SELECTED REMEDY

Soils/Sediments

Alternative 4, Excavation and Biological Treatment (Roundhouse area)	
Capital cost	$107,562
Present worth, Pre-closure (1 year at 10%)	13,550
Present worth, Closure (1 years at 10%)	13,685
Present worth, Operation & Maintenance (30 years at 10%)	68,439
TOTAL PRESENT WORTH COST	193,236
Alternative 4, Excavation and Biological Treatment (Treatment plant and pasture)	
Capital cost	$798,036
Present worth, Pre-closure (2 years at 10%)	20,210
Present worth, Closure (2 years at 10%)	24,454
Present worth, Operation & Maintenance (30 years at 10%)	58,070
TOTAL PRESENT WORTH COST	900,770
Alternative 6, Soil Flushing and In Situ Biological Treatment	
Capital cost	$483,950
Present worth, Pre-closure Operation & Maintenance (10 years at 10%)	435,364
Present worth, Closure (single payment in 10 years at 10%)	6,636
Present worth, Operation & Maintenance (30 years at 10%)	58,070
TOTAL PRESENT WORTH COST	5,984,020

Ground water

Alternative 3, Pump & Biological Treatment	
Capital Cost	1,169,025
Present Worth, Operation & Maintenance (2 years at 10%)	398,304
TOTAL PRESENT WORTH COST	1,567,329
Alternative 4, In Situ Biological Treatment	
Capital Cost	83,700
Operation & Maintenance (10 years at 10%)	345,907
TOTAL PRESENT WORTH COST	429,607
TOTAL ESTIMATED COSTS	$ 9,074,962

Compliance Sampling Program

A sampling program for monitoring the remedial action and determining compliance with the performance standards shall be implemented during the remedial action. In addition, to ensure that ground water performance standards are maintained, it is expected that ground water will be monitored at least twice annually during the ground water seasonal high and low for a period of at least three years following discontinuation of ground water remediation. These monitoring programs will be developed during remedial design and shall include, at a minimum, the following: analytical parameters (focusing on the contaminants of concern, but analyzing other contaminants, if any, that are not contaminants of concern and are determined to be occurring at levels exceeding MCLs or proposed MCLs), sampling points, sampling frequency and duration, and statistical methods for evaluating data. Specific performance monitoring points shall be specified and approved by EPA and MDHES during remedial design.

Because the soils cleanup levels established in this Record of Decision are health based standards for industrial use of the Site, that do not provide for unlimited use with unrestricted exposure, and because residual hazardous substances may be left onsite and the cleanup is expected to take 10-15 years, the selected remedy will require five year reviews under Section 121(c) of CERCLA, Section 300.430(f)(4)(ii) of the NCP, and applicable guidance, to assure the long-term effectiveness of the remedy.

Continued monitoring of the treated materials remaining in the land treatment units will be necessary until cleanup levels are attained.

Points of Compliance

Compliance with remediation levels for excavated soils and sediments must be achieved at any point on the Site with the exception of under the plant and under I-90. Soils under the plant facility and under I-90 must meet the performance standards. For ground water, compliance with remediation levels must be achieved throughout the contaminated ground water plume, located downgradient of I-90, extending to Rocky Creek. Additionally, runoff that may be the result of ground water recharge, precipitation or snow melt, or release of noncontact cooling water from the pole plant will meet the surface water standards as identified in Appendix A, ARARs, where the release enters the surface waters. Surface water not meeting those standards will be treated with ground water under Ground Water Alternative 3.

Engineering and Institutional Controls

These controls are required to maintain the protectiveness of the remedy. Since cleanup for all media are not likely to be met in less than 10 years, measures must be instituted to ensure that risks do not reach unacceptable levels. Fencing and posting of areas where active remediation is occurring will be required to prevent unauthorized access to contaminated media or to remedial action areas. Institutional controls will include the prevention of domestic or commercial water well drilling in the contaminated ground water plume area to prevent additional receptors of contaminated ground water or an expansion of the plume. Land use and deed restrictions for the closed land treatment units will also be implemented to preserve the integrity of the closed land treatment units.

Ground Water Uncertainty and Restoring Ground Water to Beneficial Uses

The goal of this remedial action is to restore the ground water to its beneficial use, which is as an actual drinking water source. Based on information obtained during the RI and upon careful analysis of all remedial alternatives, MDHES and EPA believe the remedy will achieve this goal. It may become apparent, during implementation or operation of the ground water extraction and in situ bioremediation system, that contamination levels have ceased to decline and are remaining constant at levels higher than the remediation goals over some portion of the contaminated plume. In such a case, the remedy may need to be reevaluated.

The selected remedy will include ground water extraction and in situ bioremediation for an estimated period of 10-15 years, during which the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

- At individual wells where cleanup goals have been attained, pumping may be discontinued;
- Alternating pumping at wells to eliminate stagnation points;
- Pulse pumping to allow aquifer equilibration and to allow adsorbed contaminants to partition into ground water; and

- Installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

Finally, if active IPC pole treating operations cease at the Site, MDHES and EPA may reevaluate the remedy concerning soils located under treatment facility structures.

X. STATUTORY DETERMINATIONS

Under CERCLA section 121, MDHES and EPA must select a remedy that is protective of human health and the environment, complies with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), is cost-effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment through a combination of soil and ground water alternatives. Soil alternatives include excavation and biological treatment of contaminated soil and soil flushing with in situ biological treatment under pole plant structures and I -90. Excavated areas will include portions of the pole plant, the pasture and two ditches. Contaminated soils and sediments will be replaced by clean fill prior to completion of the cleanup. Soil flushing with in situ biological treatment will be used in those areas where excavation is not practicable or not cost effective in order to capture as much of the mobile contamination as possible and to reduce concentrations of contaminants in those areas to levels that will be more susceptible to biological treatment.

Implementation of the soil flushing alternative in the active plant area around existing structures and under I-90 will eliminate the need for demolition of structures and relocation/excavation of the interstate highway and will reduce the exposure risk in those areas to within the acceptable range. The other soils alternatives evaluated were not implementable in the plant area and under I-90 without removing structures and the roadbed.

Biological treatment of the contaminated soil will eliminate the threat of exposure through direct contact with or ingestion of contaminated soil. The current cancer risks associated with these exposure pathways are as high as 1.8 x 10[-4]. By excavating the contaminated soils and treating them, the cancer risks from exposure will be reduced to less than 1 x 10[-6] industrial use (1 x 10[-5] residential use) which is within the EPA's acceptable risk range of 1 x 10[-4] to 1 x 10[-6] as specified by the NCP. By closing the land treatment unit according to RCRA standards, the risks of exposure through direct contact will be further reduced. There are no short term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

Pumping the ground water and treating it biologically will reduce the threat of exposure to contaminated ground water. Further reduction in risk will occur through in situ biological treatment of ground water. The current risks associated with ground water are as high as 9.0 x 10[-3] depending upon the exposure pathway and contaminant. By treating the ground water and using it for in situ reinjection or discharging it to a publicly owned treatment works or to surface water, the cancer risks from exposure will be reduced to less than 5.5 x 10[-5] for residential use, which is within the EPA acceptable risk range. There are no short term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross media impacts are expected from the remedy.

A variety of engineering and institutional controls will be implemented with the remedy to ensure protectiveness while the remedy is being implemented. Residential wells in the area will be sampled on a routine basis for contaminants. Any residences with levels exceeding MCLs in drinking water will have individual treatment at the tap. Institutional controls will be implemented to prohibit additional placement of wells in the affected area in order to prevent additional receptors of contaminated ground water and to prevent an expansion of the plume. Fencing and posting during remediation will be used to prevent unauthorized access to contaminated media, and land use and deed restrictions will be used to preserve the long term integrity of the closed land treatment units.

Compliance with Applicable or Relevant and Appropriate Requirements

The final determination of ARARs by MDHES and EPA is set forth in Appendix A attached to this Record of Decision. The selected remedy will comply with all applicable or relevant and appropriate requirements (ARARs). No waiver of ARARs is expected to be necessary.

Contaminant-specific ARARs

Contaminant-specific ARARs typically set levels or concentrations of chemicals that may be found in or discharged to the environment. The primary contaminant-specific ARARs for this remedy are the maximum contaminant levels (MCLs) for ground water under the Safe Drinking Water Act. While there are no currently effective MCLs for the contaminants of concern at the Site, an MCL has been promulgated for pentachlorophenol and will become effective January 1, 1993. Similarly, MCLs for benzo(a)pyrene and 2, 3, 7, 8 - TCDD (dioxin) have been promulgated and will become effective January 17, 1994. The selected remedy will remediate existing ground water contamination to achieve these relevant and appropriate MCLs. The selected remedy will also reduce levels of certain other contaminants of concern to MCLs which have been proposed but not yet adopted. The proposed MCLs have been identified as TBCs by EPA and MDHES.

Since no treatment standards have been set for the RCRA listed wastes on site (F032 and F034 wastes) as of the date of this Record of Decision, RCRA Land Disposal Restrictions will not apply to the remedy.

Location-specific ARARs

Location-specific ARARs establish requirements or limitations based on the physical or geographic setting of the Site or the existence of protected resources on the Site. The area in which the treatment is to be implemented is not located within a 100-year floodplain, and no planned waste storage or treatment area is located within 200 feet of a fault. Thus the selected remedy will comply with all requirements based on physical or geographic setting.

Regulations concerning the protection of wetlands, including those relating to the Fish and Wildlife Coordination Act and Executive Orders 11,988 and 11,990, will apply to the implementation of this remedy. The protected resource which has the potential to be adversely affected by the selected remedy is a small wetland area. Consultation with the U.S. Fish and Wildlife Service during the design and implementation phase will be required to establish appropriate mitigative measures, such as reestablishing these wetlands as part of the reclamation of excavated areas. Also in connection with EPA's consultation with the U.S. Fish and Wildlife Service regarding the Endangered Species Act, the U.S. Fish and Wildlife Service has requested that additional biological assessments regarding certain endangered species (peregrine falcons, and bald eagles) be conducted in conjunction with remedial design.

Action-specific ARARs

Action-specific ARARs generally provide guidelines for the manner in which specific activities must be implemented. Thus, compliance with many action-specific requirements must be ensured through appropriate design of the remedy.

The remedy will meet all action-specific ARARs, including the following RCRA requirements: monitoring for releases from waste management units, closure and post-closure standards, requirements for management of waste piles and land treatment units, recycling requirements, and transportation requirements, if any hazardous waste is ultimately shipped offsite for treatment or disposal, as well as all requirements for reclamation of excavated areas

The remedy will also satisfy regulations under the Federal Insecticide Fungicide and Rodenticide Act which establish allowable limits of certain constituents in pentachlorophenol products used in wood treating operations. Product which exceeds these limits must be appropriately disposed of by a method other than recycling. For any discharge to a POTW the remedy will comply with requirements, including the pretreatment requirements under the Clean Water Act and the permit-by-rule requirements under RCRA. Compliance with the standards for discharges to POTWs would require fulfilling the administrative, as well as the substantive portions of those requirements, since any such discharge would occur offsite.

In addition, the remedy, as designed, will meet other action specific standards, including Clean Air Act regulations for particulate matter, dust control practices that achieve ambient air quality standards, Clean Water Act regulations requiring run-on and run-off controls that prevent any discharge of contaminants from remedial actions that would violate surface water standards, sufficient treatment before reinjection of ground water to ensure compliance with ground water nondegradation standards, the requirements of the Underground Injection Control program under the Safe Drinking Water Act and RCRA regulations associated with the treatment, storage and transportation of hazardous waste.

The FS Report provides further support for the determination that the selected remedy complies with ARARs.

Cost-Effectiveness

MDHES and EPA have determined that the selected remedy is cost effective in mitigating the principal risks posed by the soils, sediments and contaminated ground water. Section 300.430(f)(ii)(D) of the NCP requires evaluation of cost-effectiveness. Cost-effectiveness is determined by the following three balancing criteria to determine overall effectiveness: longterm effectiveness and permanence; reduction of toxicity or volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective. A remedy is cost effective if its costs are proportional to its overall effectiveness. The selected remedy meets the criteria and provides for overall effectiveness in proportion to its cost. The estimated cost for the selected remedy is approximately $9,074,962

The selected remedy for the soils provides the best overall effectiveness of all alternatives considered proportional to its cost. The selected remedy will greatly reduce the toxicity, mobility, and volume of contaminated soils. Also the implementation of this remedy will result in long-term effectiveness by reducing residual carcinogenic risks to within the acceptable risk range through permanent treatment. Although in situ bioremediation, if implemented by itself, is less expensive than the combination of soil alternatives comprising the selected remedy, it does not provide as great a degree of long-term effectiveness or reduction in toxicity, mobility or volume through treatment and therefore is only appropriate for use in specific areas of the Site.

Alternative 6, soil flushing and in situ bioremediation is the only soil remedy identified that will not require demolition of existing structures at the IPC plant and will not require excavation of I-90. Thus, the costs of Alternative 6 for these parts of the Site are much less than other alternatives, while still maintaining effectiveness.

The selected remedy for ground water provides the best overall effectiveness of all alternatives considered proportional to its cost. The combination of Alternatives 3, Pump and Biological Treatment, and 4, In Situ Biological Treatment, will reduce the toxicity, mobility or volume of affected ground water and will be permanent solutions. The combination of Alternative 2 and Alternative 4 might achieve cleanup levels more quickly, but the additional cost of Alternative 2 compared to Alternative 3 is not warranted. The combination of Alternatives 3 and 4 is believed necessary in order to reach MCLs because pump and treat methods without an in situ component require longer remediation times.

The selected remedy assures a high degree of certainty that the remedy will be effective in the long-term because of the significant reduction of the toxicity and mobility of the wastes achieved through biological treatment of the soil. The ground water component of the remedy ensures a high degree of certainty of effectiveness because the technology employed is known to be effective for organic contaminated wastewaters and will enhance the degradation of contaminants remaining in situ.

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

MDHES and EPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, MDHES and EPA have determined that this selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, shortterm effectiveness, implementability and cost, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance. The detailed evaluation of the balance of these criteria among the alternatives considered is set forth in the FS Report and is summarized in section VII, Description of Alternatives, of this record of decision.

The selected remedy includes treatment of contaminated media which will permanently and significantly reduce the principal threats posed by the soils and ground water. The other alternatives considered which could achieve similar or more substantial reductions, including incineration, solvent extraction or offsite disposal, were significantly more expensive. Other alternatives considered, including in situ biological treatment over the entire Site, did not offer similar prospects for effectiveness in treatment.

Preference for Treatment as a Principal Element

By biologically treating the contaminated ground water and the contaminated soils, the selected remedy addresses the principal threats posed by the Site through the use of treatment technologies. By utilizing treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Site was released for public comment April 16, 1992. The plan identified a combination of Soil Alternatives (4, Excavation and Biological Treatment and 6, Soil Flushing/In Situ Biological Treatment) and Ground Water Alternatives (3, Extraction and Biological Treatment and 4, In situ Biological Treatment) as the preferred remedy for the Site.

MDHES and EPA have reviewed all written and oral comments submitted during the public comment period. Upon review of the public comments, MDHES and EPA have determined that two changes to the Proposed Plan are warranted.

First, MDHES and EPA are considering the possibility of discharging treated wastewater from the Site into surface water if reinjection into the aquifer or discharge to a POTW are not feasible. This change is the result of strong objections by the City of Bozeman to any discharge of treated wastewater to the POTW.

Second, the roundhouse area soils have been identified as a significantly contaminated and have been included for remedial action. However, due to recent regulatory changes this conclusion may be subject to change. The rationale for this is that since preparation of the Proposed Plan, the cancer slope factor for benzo(a)pyrene, upon which the B2 PAH cleanup level of 7.5 mg/kg is based, has been reduced from 11.5 to 5.79 (mg/kg/day)[-1]. Therefore, an adjusted cleanup level of 15 mg/kg B2 PAHs has been identified by MDHES as representative of the 1 x 10[-6] risk level for industrial use. The currently determined highest concentrations of B2 PAHs at test pit 3B (25 mg/kg) and at test pit 7A (32 mg/kg) are much closer to the adjusted cleanup level than they were to the initial cleanup level. Also, the revised cleanup level reduced the number of data points above the cleanup level.

Consequently, the amount of contaminated soil in the roundhouse area that is subject to excavation and treatment may be significantly less than the earlier estimate of 4600 yd[3].

XII. REFERENCES

Freeman, Harry M., 1989. Standard Handbook of Hazardous Waste Treatment and Disposal, McGraw Hill, New York, N.Y.

MSE, Inc., Remedial Investigation Report for Idaho Pole Site, Bozeman, MT, March 1992.

MSE, Inc., Remedial Investigation Report for Idaho Pole Site, Bozeman, MT, March 1992.

MSE, Inc., Feasibility Study for Idaho Pole Site, Bozeman, MT, April 1992.

MSE, Inc., Technical Memorandum 3 (Baseline Risk Assessment) for Idaho Pole Site, Bozeman MT, March 1992.

MSE, Inc., Technical Memorandum 3 (Ecological Risk Assessment) for Idaho Pole Site, Bozeman, MT, March 1992.

U.S. EPA, Guidance on Preparing Superfund Decision Documents, Office of Emergency and Remedial Response, Interim Final, EPA/540/G, July 1989.

Woodward-Clyde, November 1988. Feasibility Study for Site Remediation, Libby, MT.

APPENDIX A

FINAL DETERMINATION AND DESCRIPTION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

IDAHO POLE NPL SITE
BOZEMAN, MONTANA

TABLE OF CONTENTS

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency of Toxic Substances and Disease Registry
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BPCTCA	Best Practicable Control Technology Currently Available
BPJ	Best Professional Judgment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
DNRC	Department of Natural Resources and Conservation (Montana)
DSL	Department of State Lands (Montana)
EPA	U.S. Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
HWM	Hazardous Waste Management
IPC	Idaho Pole Company
LNAPL	Light Non-aqueous Phase Liquid
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDHES	Montana Department of Health and Environmental Sciences
MGWPCS	Montana Groundwater Pollution Control System
MPDES	Montana Pollutant Discharge Elimination System
NCP	National Contingency Plan
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NPL	National Priorities List
NPDES	National Pollutant Discharge Elimination System
PAH	Polynuclear Aromatic Hydrocarbon
PCP	Pentachlorophenol
POHC	Principal Organic Hazardous Constituents
POTW	Public Owned Treatment Works
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SHPO	State Historic Preservation Officer (Montana)
SIP	State Implementation Plan
TBC	To Be CONSIDERED
TU	Turbidity Unit
UIC	Underground Injection Control

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

ARARS FOR REMEDIAL ACTIONS

Section 121(d)(2) of CERCLA, 42 U.S.C. %4F 9621(d)(2), requires that cleanup actions conducted under CERCLA achieve a level or standard of control which at least attains "any standard, requirement, criteria or limitation under any Federal environmental law ... or any [more stringent] promulgated standard, requirement, criteria or limitation under a State environmental or facility siting law ... [which] is legally applicable to the hazardous substance concerned or is relevant and appropriate under the circumstances of the release of such hazardous substance or pollutant, or contaminant ..." The standards, requirements, criteria or limitations identified pursuant to this section are commonly referred to as "applicable or relevant and appropriate requirements," or ARARs.

The cleanup of the Idaho Pole NPL site must comply with or attain all ARARs unless specific ARAR waivers are invoked. See CERCLA %4F 121(d)(4), 42 U.S.C. %4F 9621(d)(4), and the NCP, 40 CFR 300.430(f)(1)(ii)(C). ARARs must be met both during the conduct of on site cleanup activities and at the conclusion of the cleanup activity, unless specifically exempted.**[1]**

DETERMINATION OF ARARS

ARARs may be either "applicable" requirements or "relevant and appropriate" requirements. Compliance with both is equally mandatory under CERCLA.**[2]**

---

[1] 40 CFR 300.435(b)(2); Preamble to the Proposed NCP, 53 Fed. Reg. 51440 (December 21, 1988); Preamble to the Final NCP, 55 Fed. Reg. 8755-8757 (March 8, 1990).

[2] See CERCLA 121(d)(2)(A), 42 U.S.C. 9621(d)(2)(A).

Applicable requirements are those standards, requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site.

Relevant and appropriate requirements are those standards, requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to hazardous substances, pollutants, contaminants, remedial actions, locations, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Factors which may be considered in making this determination, when the factors are pertinent, are presented in 40 C.F.R. 300.400(g)(2). They include, among other considerations, examination of: the purpose of the requirement and the purpose of the CERCLA action; the medium and substances regulated by the requirement and the medium and substances at the CERCLA site; the actions or activities regulated by the requirement and the remedial action contemplated at the site; and the potential use of resources affected by the requirement and the use or potential use of the affected resource at the CERCLA site.

ARARs are divided into contaminant-specific, location-specific and action-specific requirements. Contaminant-specific requirements govern the release to the environment of materials possessing certain chemical or physical characteristics or containing specific chemical compounds. Contaminant-specific ARARs generally set human or environmental risk-based criteria and protocols which, when applied to site-specific conditions, result in the establishment of numerical action values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.

Location-specific ARARs, relate to the geographic or physical position of the site, rather than to the nature of site contaminants. These ARARs place restrictions on the concentration of hazardous substances or the conduct of cleanup activities due to their location in the environment.

Action-specific ARARs are usually technology- or activity-based requirements, or are limitations on actions taken with respect to hazardous substances. A particular remedial activity will trigger an action-specific ARAR. Unlike chemical-specific and location-specific ARARs, action-specific ARARs do not, in themselves, determine the remedial alternative. Rather, action specific ARARs indicate how the selected remedy must be achieved.

On-site actions are required to comply with ARARs, but need comply only with the substantive provisions of a requirement.**[3]** Off-site actions need comply only with legally applicable requirements, but must comply fully with both the substantive and administrative portions of such requirements. See EPA OSWER Dir. 9234.2-02FS. Administrative requirements are those which involve consultation, issuance of permits, documentation, reporting, record keeping, and enforcement. The CERCLA program has its own set of administrative procedures which assure proper implementation of CERCLA. The application of additional or conflicting administrative requirements could result in delay or confusion.**[4]** Provisions of statutes or regulations which contain general goals that merely express legislative intent about desired outcomes or conditions but are non-binding are not ARARs.**[5]**

Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be applicable or relevant and appropriate. To be an ARAR, a state standard must be "promulgated," which means that the standards are of general applicability and are legally enforceable.**[6]**

Additional documents may be identified as To Be CONSIDERED (TBCs). The TBC category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies. These may be considered as appropriate in selecting and developing cleanup actions.**[7]**

---

[3]40 CFR 300.5 (Definitions of "Applicable requirements" and "Relevant and appropriate requirements.") See also Preamble to the Final NCP, 55 Fed. Reg. 8756-8757 (March 8, 1990).

[4] Preamble to the Final NCP, 55 Fed. reg. 8756-8757 (March 8, 1990); Compliance with Other Laws Manual, Vol. I, pp. 1-11 through 1-12.

[5] Preamble to the Final NCP, 55 Fed. Reg. 8746 (March 8, 1990).

[6]40 C.F.R. 300.400(g)(4).

[7]40 C.F.R. 300.400(g)(3); 40 C.F.R. 300.415(i); Preamble to the Final NCP, 55 Fed. Reg. 8744-8746 (March 8, 1990).

Laws which are not environmental laws or state facility siting laws are not ARARS, but, if applicable, must be observed and complied with in any action at the site. CERCLA 121 exempts any action conducted entirely on-site from any local, state or federal permit requirement, including any permit requirements of these other laws. However, all other applicable requirements of these other laws, including the administrative as well as the substantive requirements, apply to actions conducted at the site.

ARARS FOR THE IDAHO POLE NPL SITE

This document constitutes MDHES' and EPA's final determination and detailed descriptions of federal and state ARARs for remedial action at the Idaho Pole NPL site. The descriptions are provided to allow the user a reasonable understanding of the requirements without having to refer constantly back to the statute or regulation itself. However, in the event of any inconsistency between the law itself and the summaries provided in this document, the applicable or relevant and appropriate requirement is ultimately the requirement as set out in the law, rather than any paraphrase of the law provided here.

The ARARs analysis is based on section 121(d) of CERCLA, 42 U.S.C.9621(d); "CERCLA Compliance with Other Laws Manual, Volume I," OSWER Dir. 9234.1-01 (August 8, 1988); "CERCLA Compliance with Other Laws Manual, Volume II," OSWER Dir. 9234.1-02 (August, 1989); the Compendium of CERCLA ARARs Fact Sheets and Directives, OSWER Dir. 9347.3-15 (October 1991); the Preamble to the Proposed National Contingency Plan, 53 Fed. Reg. 51394, et. seq. (December 21, 1988); the Preamble to the Final National Contingency Plan, 55 Fed. Reg. 86668813 (March 8, 1990); and the Final National Contingency Plan, 40 C.F.R. Part 300 (55 Fed. Reg. 8813-8865, March 8, 1990) (hereinafter referred to as the NCP). All references to 40 C.F.R. Part 300 contained in this document refer to the final NCP, unless noted.

FEDERAL ARARS

FEDERAL CONTAMINANT-SPECIFIC ARARS

Safe Drinking Water Act (Relevant and Appropriate)**[8]**

The National Primary and Secondary Drinking Water Standards (40 CFR Parts 141, 143), better known as "maximum contaminant levels" (MCLs), are not applicable to remedial activities at the site because the aquifer underlying the site does not serve a public water supply system. These drinking water standards are, however, relevant and appropriate to all groundwater alternatives because groundwater in the area is a domestic water source for off-site residences not connected to city water.

Ten residences located downgradient and within ½ mile of the site use groundwater for domestic, irrigation, and stock watering purposes. These wells are typically between 30 and 60 feet deep and are completed within transmissive sand and gravel seams. Pentachlorophenol, a contaminant of concern at the site, has been repeatedly identified in one of these wells. There are approximately 400 other wells within a 2-mile radius of the site.

---

[8] EPA has granted to the State of Montana primacy in enforcement of the Safe Drinking Water Act. Thus the law commonly enforced in Montana is the state law, rather than the federal law. The state regulations under the state Public Water Supply Act, 75-6-101 et seq., MCA, substantially parallel the federal law. The MCLs are currently identical, see ARM 16.20.203, and will remain so until certain federal rule changes become effective on July 1, 1992, and January 1, 1993. The state requirements are not separately identified, since they are not more stringent. This note is provided only to clarify the primacy issue, i.e., which law is commonly enforced in Montana.

The determination that the drinking water standards are relevant and appropriate at the site is fully supported by EPA regulations. The Preamble to the National Contingency Plan (NCP) clearly states MCLs are relevant and appropriate for groundwater that is a current or potential source of drinking water, 55 Fed. Reg. 8750 (March 8, 1990), and this determination is further supported by requirements in the RI/FS section of the NCP, 40 CFR 300.430(e)(2)(i)(B). In addition to the MCLs, non-zero maximum contaminant level goals (MCLGs)**[9]** for any contaminants at the site would be relevant and appropriate for remedial actions that will be considered for this site. See 55 Fed. Reg. 8750-8752 (March 8, 1990). None of the contaminants for which MCLs and MCLGs are currently in effect have been identified as contaminants of concern at the Idaho Pole site. Relevant proposed MCLs are discussed in the federal standards "To Be CONSIDERED" (TBCs), Section 3.4, below. An EPA rule making establishing an MCL for pentachlorophenol at 0.001 mg/l has been promulgated. The new MCL will be effective January 1, 1993. See 56 Fed. Reg. 30280 (July 1, 1991), to be codified at 40 CFR 141.61. This MCL should be considered a relevant and appropriate requirement for this action. When a regulation with a delayed effective date is known at the time of issuance of a record of decision, and the remedy will not be performed until after the effective date of the regulation, EPA will consider the standard to be an ARAR.**[10]**

Similarly, the newly promulgated MCL's of 3 X 10[-8] mg/l for 2,3,7,8-TCDD (Dioxin) and 0.0002 mg/l for Benzo(a)pyrene, 57 Fed. Reg. 31778 (July 17, 1992), are relevant and appropriate requirements for this action.

FEDERAL LOCATION-SPECIFIC ARARS

Fish and Wildlife Coordination Act (Applicable)

This standard (16 U.S.C. 1531-1566, 40 CFR 6.302(g)) requires that federal agencies or federally-funded projects ensure that any modification of any stream or other water body affected by any action authorized or funded by the federal agency provides for adequate protection of fish and wildlife resources. Compliance with this ARAR requires consultation with the U.S. Fish and Wildlife Service and the Wildlife Resources Agency of the affected State to ascertain the means and measures necessary to mitigate, prevent and compensate for project-related losses of wildlife resources and to enhance the resources. Consultation will occur during the remedial design and implementation phase and specific mitigative measures may be identified in consultation with the appropriate agencies, if remedial action, as designed, will affect a stream or creek.

Floodplain Management Order (Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,988) mandates that federally-funded or authorized actions within the 100 year floodplain avoid, to the maximum extent possible, adverse impacts associated with development of a floodplain. Compliance with this requirement is detailed in EPA's August 6, 1985 "Policy of Floodplains and Wetlands Assessments for CERCLA Actions." Specific measures to minimize adverse impacts will be identified and incorporated into the remedial design following consultation with the appropriate agencies.

Protection of Wetlands Order (Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,990) mandates that federal agencies and PRPs avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. The wetlands inventory for the site identified the following wetlands: drainage ditches along Cedar Street and I-90; lowland areas along Mill Ditch; a 6-acre willow/sedge grove situated immediately west of the MPC Substation and located on pasture land owned by the IPC; and the Rocky Creek floodplain. Alternatives for soil and sediments and ground water cleanup could impact these areas, so this requirement would be applicable.

---

[9] Effective January 1, 1993, pentachlorophenol will be included in the group of highly toxic chemicals for which the MCLG is zero. See 56 Fed. Reg. 30280 (July 1 1991), to be codified at 40 CFR 141.50(a). The zero MCLGs are not generally considered "appropriate" requirements for CERCLA cleanups, primarily for reasons of practicability. See 40 CFR 300.430(e)(2)(i)(C); See also Preamble to the Final NCP, 55 Fed Reg. 8750-8753 (March 8, 1990).

[10] The new MCL does not have to be currently in effect to be considered relevant and appropriate. But for the delayed effective date, the new MCL would clearly constitute a relevant and appropriate requirement. The considerations specified in 40 CFR 300.400(g)(2) for evaluating whether a requirement is relevant and appropriate all weigh in favor of observing this requirement as an ARAR.

Compliance with this ARAR requires consultation with the U.S. Fish and Wildlife Service (USFWS) to determine the extent of impact on wetlands and to ascertain the means and measures necessary to mitigate, prevent and compensate for project-related losses of wetlands. EPA consulted the USFWS during the RI/FS. The USFWS has submitted suggestions for developing a wetlands mitigation plan. This plan will be prepared in conjunction with the design phase of the remedy.

Resource Conservation and Recovery Act (Applicable)

The requirements set forth at 40 CFR 264.18(a) and (b)**[11]** provide that (a) any hazardous waste facility must not be located within 61 meters (200 feet) of a fault (see Appendix VI of Part 264), and (b) any hazardous waste facility within the 100 year floodplain must be designed, constructed, operated and maintained to avoid washout. Although the site is not located within 61 meters of a fault, a portion of the site lies within the 100 year floodplain. Any discrete disposal or storage facilities which remain on-site as part of remedial activities will be located outside the 100 year floodplain.

Endangered Species Act (Pending)

This statute and implementing regulations (16 USC 1531-1543, 50 CFR 402, 40 CFR 6.302(h)) require that any federal activity or federally-authorized activity may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify critical habitat.

Compliance with this requirement involves consultation with the U.S. Fish and Wildlife Service to determine whether there are listed or proposed species or critical habitats present on the site, and, if so, whether any proposed activities will impact such wildlife or habitat. To date the U.S. Fish and Wildlife Service has not identified any threatened or endangered species or critical habitats on the site. However, a final determination will be made during the design phase of the remedial action. The U.S. Fish and Wildlife Service has recommended that certain biological assessments be conducted in conjunction with remedial design to determine the exact extent of any impact on endangered species.

Archaeological and Historical Preservation Act (Applicable)

This statute and implementing regulations, 16 U.S.C. 469, 40 CFR 6.301(c), establish requirements for the evaluation and preservation of historical and archaeological data, which may be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program. This requires a survey of the site for covered scientific, prehistorical or archaeological artifacts. Such a survey was conducted by GCM Services, Inc., of Butte, Montana, on April 25 and 26, 1990, and revealed no prehistoric sites at the facility. See Final Cultural Resource Inventory of the Idaho Pole Site, MSE, Inc., September 1990. Preservation of appropriate data concerning any artifacts actually discovered would be required, however, during the implementation of this remedial action.

FEDERAL ACTION-SPECIFIC ARARS

Clean Water Act (Applicable)

Under the Clean Water Act, all discharges by nondomestic users into POTWs must meet pretreatment standards. Under 40 CFR Part 403, standards are set to control pollutants which contact publicly-owned treatment works (POTWs) or which may contaminate sewage sludge. 40 CFR Part 421 limits discharges to POTWs. If groundwater that is pumped and treated is discharged to a POTW, these requirements will be applicable. Because the POTW is off-site, both administrative and substantive permit requirements specified in these regulations must be met.

There are three categories of limitations for discharges into a POTW. The first is the general standard that applies to all discharges into a POTW. Second, POTWs may issue discharge permits to industrial users to enforce specific limits for a particular facility. Third, EPA has established pretreatment standards for specific industrial subcategories. All three of these standards may be applicable to a particular wastewater stream. Generally, discharges into a POTW cannot cause pass through or interference with a POTW. "Pass through" means a discharge which exits the POTW causing a violation of the POTW's National Pollutant Discharge Elimination System ("NPDES") permit. "Interference" is a discharge which inhibits or disrupts a POTW's treatment process or operation, causing a violation of the POTW's NPDES permit.

---

[11] These requirements are applicable through their incorporation by reference in Montana's regulations for its authorized RCRA program. ARM 16.44.702.

Safe Drinking Water Act (Applicable)

The underground injection control (UIC) program requirements found at 40 CFR Part 144 would be applicable for alternatives that involve reinjection of pumped and treated groundwater. The program divides wells into classes for permitting purposes. Class IV wells are used to dispose of hazardous waste into or above a formation which contains, within one-quarter mile of the well, an underground source of drinking water. These wells are generally prohibited, except for reinjection of treated groundwater into the same formation from which it was withdrawn, as part of a CERCLA cleanup or RCRA corrective action.

The aquifer underlying the site would be considered an underground source of drinking water, so any well injecting above the aquifer would be a Class IV well. Generally, the construction, operation, and maintenance of a Class IV well is prohibited by 40 CFR 144.13. However, wells used to inject contaminated ground water that has been treated and is being reinjected into the same formation from which it was withdrawn are not prohibited if such injection is approved by EPA pursuant to provisions for cleanup of releases under CERCLA, or pursuant to requirements and provisions under RCRA. 40 CFR 144.23 requires that Class IV wells be plugged or otherwise closed in a manner acceptable to the EPA Regional Administrator.

Clean Air Act (Applicable)

Section 109 of the Clean Air Act, 42 USC 7409, and implementing regulations found at 40 CFR Part 50 set national primary and secondary ambient air quality standards. National primary ambient air quality standards define levels of air quality which are necessary, with an adequate margin of safety, to protect the public health. National secondary ambient air quality standards define levels of air quality which are necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. The standards for particulate matter at 40 CFR 50.6 are applicable for all alternatives involving the excavation, land treatment, incineration and transportation of soils. These standards must be met during both the design and implementation phases of the remedial action.

Particulate Matter

The ambient air quality standard for particulate matter of less than or equal to 10 micrometers in diameter (PM-10) is 150 micrograms per cubic meter, 24 hour average concentration; 50 micrograms per cubic meter, annual arithmetic mean for particulate matter of less than or equal to 10 micrometers in diameter.**[12]**

In addition, state law provides an ambient air quality standard for settled particulate matter. Particulate matter concentrations in the ambient air shall not exceed the following 30-day average: 10 grams per square meter. ARM 16.8.818 (Applicable).

Resource Conservation and Recovery Act (Applicable)

As noted above, EPA has listed new RCRA hazardous wastes consisting of waste waters, process residuals, preservative drippage, and spent formulations of wood preserving processes generated at plants using chlorophenolic and creosote formulations for wood preserving waste nos. F032 and F034. 55 Fed. Reg. 50,450, 50,482, to be codified at 40 CFR 261.31(a). Because the site is a wood treating site that uses pentachlorophenol (PCP) and has used creosote, these newly-listed wastes are found in various locations throughout the site, and RCRA regulations concerning the treatment, storage and disposal of hazardous wastes apply to activities involving these materials.

Standards Applicable to Transporters of Hazardous Waste (Applicable)

The regulations at 40 CFR Part 263 establish standards that apply to persons that transport hazardous waste within the United States. If hazardous waste is transported on a rail-line or public highway on-site, or if transportation occurs off-site, these regulations will be applicable.

Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (Applicable)

---

[12] The state air quality regulations provide an equivalent standard, see ARM 16.8.821, which is enforceable in Montana as part of the State Implementation Plan.

A. Releases from Solid Waste Management Units

The regulations at 40 CFR 264, Subpart F,**[13]** establish requirements for groundwater protection for RCRA-regulated solid waste management units (i.e., waste piles, surface impoundments, land treatment units, and landfills). These requirements will apply to the land treatment units containing the PCP contaminated wastes and media at the site. Subpart F provides for three general types of groundwater monitoring: detection monitoring (40 CFR 264.98); compliance monitoring (40 CFR 264.99); and corrective action monitoring (40 CFR 264.100). Monitoring wells must be cased according to 264.97(c).

Monitoring is required during the active life of a hazardous waste management unit. At closure, if all hazardous waste, waste residue, and contaminated subsoil is removed, no monitoring is required. If hazardous waste remains, the monitoring requirements continue during the 40 CFR 264.117 closure period.

B. Closure and Post-Closure

40 CFR Part 264, Subpart G,**[14]** establishes that hazardous waste management facilities, including land treatment units treating hazardous wastes, must be closed in such a manner as to (a) minimize the need for further maintenance and (b) control, minimize or eliminate, to the extent necessary to protect public health and the environment, post-closure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.

Facilities requiring post-closure care must undertake appropriate monitoring and maintenance actions, control public access, and control postclosure use of the property to ensure that the integrity of the final cover, liner, or containment system is not disturbed. 40 CFR 264.117. In addition, all contaminated equipment, structures and soil must be properly disposed of or decontaminated unless exempt. 40 CFR %4F 264.114. A survey plat should be submitted to the local zoning authority and to the EPA Regional Administrator indicating the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. 40 CFR 264.116. 40 CFR 264.228(a) requires that at closure, free liquids must be removed or solidified, the wastes stabilized, and the waste management unit covered.

C. Waste Piles (Applicable)

40 CFR Part 264, Subpart L, applies to owners and operators of facilities that store or treat hazardous waste in piles.**[15]** Implementation of the remedy may include placement of hazardous waste contaminated soils and sediments in piles as part of pretreatment (separation of rocks, etc.) prior to the placement of the soils in the land treatment unit. The regulations require the use of run-on and run-off control systems and collection and holding systems to prevent the release of contaminants from waste piles.

D. Land Treatment (Applicable)

The requirements of 40 CFR Part 264, Subpart M,**[16]** regulate the management of "land treatment units"**[17]** that treat or dispose of hazardous wastes; these requirements are applicable for any land treatment units established at the site.

The owner or operator of a land treatment unit must design treatment so that hazardous constituents placed in the treatment zone are degraded, transformed, or immobilized within the treatment zone. "Hazardous constituents" are those identified in Appendix VIII of 40 CFR Part 261 that are reasonably expected to be in, or derived from, waste placed in or on the treatment zone. Design measures and operating practices must be set up to maximize the success of degradation, transformation, and immobilization processes. The treatment zone is the portion of the unsaturated zone below and including the land surface in which the owner or operator intends to maintain the conditions necessary for effective degradation, transformation, or immobilization of hazardous constituents. The maximum depth of the treatment zone must be no more than 1.5 meters (five feet) from the initial soil surface; and more than one meter (three feet) above the seasonal high water table.

---

[13] These regulations are incorporated by reference and are implemented by DHES as part of Montana's authorized RCRA program. See ARM 16.44.702.

[14] These regulations are incorporated by reference and are implemented by DHES as part of Montana's authorized RCRA program. See ARM 16.44.702.

[15] "Pile"means any non-containerized accumulation of solid, nonflowing hazardous waste that is used for treatment or storage. 40 CFR 260.10.

[16] These regulations are incorporated by reference and are implemented by DHES as part of Montana's authorized RCRA program. See ARM 16.44.702.

[17] Land treatment occurs when hazardous waste is applied onto or incorporated into the soil surface.

Subpart M also requires the construction and maintenance of control features that prevent the run-off of hazardous constituents and the run-on of water to the treatment unit. The unit must also be inspected weekly and after storms for deterioration, malfunctions, improper operation of run-on and runoff control systems, and improper functioning of wind dispersal control measures.

An unsaturated zone monitoring program must be established to monitor soil and soil-pore liquid to determine whether hazardous constituents migrate out of the treatment zone. Specifications related to the monitoring program are contained in section 264.278.

E. Incineration (Applicable)

The regulations at 40 CFR 264.340 - 351 and 40 CFR Part 265, Subpart O,**[18]** will be ARARs for any remedial action involving incineration of hazardous waste. The standards require an owner or operator of a hazardous waste incinerator to conduct a waste analysis in conjunction with obtaining a treatment, disposal, and storage permit for the incinerator. A permit designates one or more Principal Organic Hazardous Constituents (POHCs) from those constituents listed in 40 CFR Part 261, Appendix VIII. A POHC designation is based on the degree of difficulty of incineration of the organic constituents in the waste feed from trial burns. Organic constituents that represent the greatest degree of difficulty are most likely to be designated a POHC. Incineration of POHCs designated in the permit must achieve a 99.99% destruction and removal efficiency. Incineration of dioxins must achieve a destruction and removal efficiency of 99.9999% (40CFR 264.343(a)).

An incinerator burning hazardous waste and producing stack emissions of more than 1.8 kilograms per hour (4 pounds per hour) of hydrogen chloride (Hcl) must control Hcl emissions such that the rate of emission is no greater than the larger of either 1.8 kilograms per hour or 1% of the HCl in the stack gas prior to entering any pollution control equipment (40 CFR 264.343(b)). A permitted incinerator must not emit particulate matter in excess of 180 milligrams per dry standard cubic meter (40 CFR 264.343(c)). The owner or operator must monitor combustion temperature, waste feed rate, CO emissions, and combustion gas velocity. The incinerator must be visually inspected daily, and the emergency waste feed cutoff system and associated alarms must be tested weekly. At closure, all hazardous waste residues must be removed from the incinerator site.

Discharge to POTWs (Applicable)

All discharges of RCRA hazardous wastes to POTWs must comply with the RCRA permit-by-rule requirements at 40 CFR 270.60. The regulations require that the waste meet all federal, state, and local pretreatment requirements which would be applicable to the waste if it were being discharged into the POTW through a sewer, pipe, or similar conveyance.

Requirements for Recyclable Materials (Applicable)

Hazardous wastes that are recycled are subject to the requirements for generators, transporters, and storage facilities set forth in 40 CFR 261.6(b) and (c), unless the wastes are excluded from regulation in 40 CFR 261.6(a).

40 CFR 261.6(b) subjects generators and transporters of recyclable materials to the applicable requirements of 40 CFR Part 262, under which generators must comply with specified accumulation times and methods for storing hazardous waste on-site. Both time and storage method vary depending upon the quantity of hazardous waste generated.

Owners or operators of facilities that store recyclable materials before they are recycled must comply with 40 CFR Part 270. Part 270 establishes EPA's Hazardous Waste Permit Program, and sets forth basic permitting requirements, standard permit conditions, and monitoring and reporting requirements. While a permit is not required for on-site remediation, the substantive portions of the permitting requirements must be followed.

Hazardous Materials Transportation Act (Applicable)

The Hazardous Materials Transportation Act (49 USC 1801-1813), as implemented by the Hazardous Materials Transportation Regulations (49 CFR Parts 10, 171-177), regulates the transportation of hazardous materials. The regulations apply to any alternatives involving the transport of hazardous waste offsite, on public highways on-site, or by rail line.

---

[18] These regulations are incorporated by reference and are implemented by DHES as part of Montana's authorized RCRA program. See ARM 16.44.702 and 16.44.609 (Interim status).

Federal Insecticide, Fungicide, and Rodenticide Act (Applicable)

This statute (7 U.S.C. 136 et seq.) regulates the sale, distribution and use of all pesticide products in the United States, and is applicable to any alternative involving the recycling and reuse of recovered wood treating fluid, since the fluid contains the pesticide pentachlorophenol. Under FIFRA, use of a registered pesticide product in a manner inconsistent with its labeling is a violation of the Act (7 U.S.C. 136j). Recovered pesticides may be reused provided they meet new product labeling specifications, which include concentration limits for pesticides in solution.

FEDERAL STANDARDS TO BE CONSIDERED (TBC's)

Safe Drinking Water Act

Proposed MCLs

Proposed Maximum Contaminant Levels are unpromulgated versions of the MCLs discussed in the ARARs section. MCLs apply to public water systems. However, they may be relevant and appropriate to surface or groundwater if those waters are used as drinking water. Because the aquifer underlying the site is a drinking water source, and current or adopted MCL's are ARARs, the proposed MCLs are TBCs. The contaminant levels identified below have been proposed as MCLs. See 54 Fed. Reg. 22062, 22155-57 (May 22, 1989) and 55 Fed Reg. 30370, 30445 (July 25, 1990), (to be codified at 40 CFR 141.61).

	Compound	Proposed MCL (mg/l)
PAHs:	Benz(a)anthracene	0.0001
	Benzo(b)fluoranthene	0.0002
	Benzo(k)fluoranthene	0.0002
	Chrysene	0.0002
	Dibenz(a,h)anthracene	0.0003
	Indeno(1,2,3-CD)pyrene	0.0004

STATE OF MONTANA ARARS

MONTANA CONTAMINANT-SPECIFIC ARARS

Water Quality

Surface water quality standards, including the requirement that any discharge to surface waters such as Rocky or Mill Creek must meet Gold Book levels, are specified in the action-specific ARARs below.

MONTANA LOCATION-SPECIFIC ARARS

Floodplain and Floodway Management

The 100 year floodways and floodplains of Rocky and Mill Creeks are near the site. The areas proposed for excavation and for placement of the land treatment units are located outside these floodplains. Compliance with these floodway and floodplain ARARs can be attained by avoiding conducting any of the remedial activities within the floodplain boundaries.

Floodplain and Floodway Management Act (Applicable)

Section 76-5-401, MCA, (Applicable) specifies the uses permissible in a floodway and generally prohibits permanent structures, fill, or permanent storage of materials or equipment. Section 76-5-402, MCA, (Applicable) specifies uses allowed in the floodplain, excluding the floodway, and allows structures meeting certain minimum standards.

Section 76-5-403, MCA, (Applicable) lists certain uses which are prohibited in a designated floodway, including:

1. any building for living purposes or place of assembly or permanent use by human beings,

2. any structure or excavation that will cause water to be diverted from the established floodway, cause erosion, obstruct the natural flow of water, or reduce the carrying capacity of the floodway, or

3. the construction or permanent storage of an object subject to flotation or movement during flood level periods.

Floodplain Management Regulations (Applicable)

ARM 36.15.216 (Applicable) specifies factors to consider in determining whether a permit should be issued to establish or alter an artificial obstruction or nonconforming use in the floodplain or floodway. While permit requirements are not directly applicable to activities conducted entirely on site, the criteria used to determine whether to approve establishment or alteration of an artificial obstruction or nonconforming use should be applied by the decision-makers in evaluating proposed remedial alternatives which involve artificial obstructions or nonconforming uses in the floodway or floodplain. Thus the following criteria are relevant and appropriate considerations in evaluating any such obstructions or uses:

1. the danger to life and property from backwater or diverted flow caused by the obstruction;

2. the danger that the obstruction will be swept downstream to the injury of others;

3. the availability of alternative locations;

4. the construction or alteration of the obstruction in such a manner as to lessen the danger;

5. the permanence of the obstruction;

6. the anticipated development in the foreseeable future of the area which may be affected by the obstruction.

ARM 36.15.604 (Applicable) precludes new construction or alteration of an artificial obstruction that will significantly increase the upstream elevation of the flood of 100-year frequency (½ foot or as otherwise determined by the permit issuing authority) or significantly increase flood velocities.

ARM 36.15.605 (Applicable) enumerate artificial obstructions and nonconforming uses that are prohibited within the designated floodway except as allowed by permit and includes "a structure or excavation that will cause water to be diverted from the established floodway, cause erosion, obstruct the natural flow of water, or reduce the carrying capacity of the floodway ... ." Solid and hazardous waste disposal and storage of toxic, flammable, hazardous, or explosive materials are also prohibited.

ARM 36.15.703 (Applicable) is applicable in flood fringe areas (i.e., areas in the floodplain but outside of the designated floodway) of the site and prohibits, with limited exceptions, solid and hazardous waste disposal and storage of toxic, flammable, hazardous, or explosive materials.

MONTANA ACTION-SPECIFIC ARARS

In the following action-specific ARARs, the nature of the action triggering applicability of the requirement is stated in parenthesis as part of the heading for each requirement.

Water Quality

Surface Water Quality Standards (Applicable) (Discharge to surface water)

Under the state Water Quality Act, 75-5-101 et seq., MCA, the state has promulgated regulations to preserve and protect the quality of surface waters in the state. These regulations classify state waters according to quality, place restrictions on the discharge of pollutants to state waters, and prohibit the degradation of state waters. The requirements listed below would be applicable to any discharge **[19]** to surface waters in connection with the remedial action. Compliance with these requirements may be achieved by avoiding any such discharge.

---

[19] "Discharge" is defined in the state Surface Water Quality Standards as "the injection, deposit, dumping, spilling, leaking, placing, or failing to remove any pollutant so that it or any constituent thereof may enter into state waters, including ground water." ARM 16.20.603(6).

ARM 16.20.607(1) provides that specified waters in the Missouri River drainage, including Rocky Creek and Mill Creek, are classified "B-1" for water use. The standards for "B-1" classification waters are contained in ARM 16.20.618 (Applicable) of the Montana water quality regulations. These standards place limits on fecal coliform content, dissolved oxygen concentration, Ph balance, turbidity, water temperature, sediments, solids, oils, and color.**[20]** Concentrations of toxic or deleterious substances which would remain in the water after conventional treatment cannot exceed MCLs, and concentrations of toxic or deleterious substances cannot exceed Gold Book levels or the levels.**[21]**

Additional restrictions on any discharge to surface waters are included in:

ARM 16.20.631 (Applicable), which requires that industrial waste **[22]** must receive, as a minimum, treatment equivalent to the best practicable control technology currently available (BPCTCA) as defined in 40 CFR Subchapter N and subsequent amendments. This section also requires that in designing a disposal system, stream flow dilution requirements must be based on the minimum consecutive 7-day average flow which may be expected to occur on the average of once in 10 years.

ARM 16.20.633 (Applicable), which prohibits discharges containing substances that will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions which create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; (e) create conditions which produce undesirable aquatic life.

ARM 16.20.925 (Applicable), which adopts and incorporates the provisions of 40 C.F.R. Part 125 for criteria and standards for the imposition of technology-based treatment requirements in MPDES permits. Although the permit requirement would not apply to on-site discharges, the substantive requirements of Part 125 are applicable, i.e., for toxic and nonconventional pollutants treatment must apply the best available technology economically achievable (BAT); for conventional pollutants, application of the best conventional pollutant control technology (BCT) is required. Where effluent limitations are not specified for the particular industry or industrial category at issue, BCT/BAT technology-based treatment requirements are determined on a case by case basis using best professional judgment (BPJ). See CERCLA Compliance with Other Laws Manual, Vol. I, August 1988, pp. 3-4 and 3-7.

---

[20] The B-1 classification standards in ARM 16.20.618 include the following limitations:

1. During periods when the daily maximum water temperature is greater than 60 F, the geometric mean number of organisms in the fecal coliform group must not exceed 200 per 100 milliliters (ml), nor are 10% of the total samples during any 30-day period to exceed 400 fecal coliforms per 100 ml.

2. Dissolved oxygen concentration must not be reduced below 7.0 milligrams (mg) per liter (l).

3. Induced variation of hydrogen ion concentration (Ph) within the range of 6.5 to 8.5 must be less than 0.5 Ph unit. Natural pH outside this range may not be altered and natural pH above 7.0 must be maintained above 7.0.

4. Temperature variations are specifically limited, depending upon the temperature range of the receiving water. See ARM 16.20.618(2)(e).

5. No increase in naturally occurring concentrations of sediment, settleable solids, oils, or floating solids is allowed which will or is likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife.

6. True color must not be increased more than five units above naturally occurring color.

[21] ARM 16.20.603(10) defines Gold Book levels as "the freshwater acute or chronic levels for water and fish ingestion that are listed in Update Number Two (5/1/87) of Quality Criteria for Water 1986 (EPA 440/5-86-001)."

[22] Section 75-5-103, MCA, defines "Industrial waste" as "any waste substance from the process of business or industry or from the development of any natural resource, together with any sewage that may be present."

The Water Quality Act and regulations also include nondegradation provisions which require that waters which are of higher quality than the applicable classification be maintained at that high quality, and discharges which would degrade that water are prohibited. Montana's standard for nondegradation of water quality is applicable for all constituents for which pertinent portions of Rocky Creek and Mill Creek are of higher quality than the B-1 classification. This standard will also be applicable if any remedial action constitutes a new source of pollution or an increased source of pollution to high quality waters to require the degree of waste treatment necessary to maintain that existing water quality.

ARM 16.20.701 (Applicable) defines "degradation" and provides that "nonpoint source pollutants [e.g., runoff] from lands where all reasonable land, soil and water managements or conservation practices have been applied are not considered degradation."

ARM 16.20.702 (Applicable) applies nondegradation requirements to any activity which would cause a new or increased source of pollution to state waters. This section states when exceptions to nondegradation requirements apply, except that in no event may such degradation affect public health, recreation, safety, welfare, livestock, wild birds, fish and other wildlife or other beneficial uses.

ARM 16.20.703 (Applicable) establishes the substantive nondegradation standard (quality of receiving waters whose quality is higher than established water quality standards is not to be degraded by the discharge of pollutants), and requires that water quality permits incorporate nondegradation standards. In accordance with CERCLA 121(e), if the discharge occurs entirely onsite, only the substantive nondegradation standard, and not the permit requirement, would apply. However, if the discharge occurs off-site, the permit and administrative requirements would also be applicable. This rule also provides that determination of degradation is to ensure that baseline quality of the receiving waters will not be degraded at any flow greater than the 7-day, 10year low flow of the receiving waters.

Montana Groundwater Pollution Control System (Applicable)(Discharge to groundwater)

ARM 16.20.1002 (Applicable) classifies groundwater into Classes I through IV based on the present and future most beneficial uses of the groundwater, and states that groundwater is to be classified according to actual quality or actual use, whichever places the groundwater in a higher class. Class I is the highest class; class IV is the lowest. Based upon its specific conductance, the bulk of the groundwater at the site should be considered Class I groundwater.**[23]**

ARM 16.20.1003 (Applicable) establishes the groundwater quality standards applicable with respect to each groundwater classification. Concentrations of dissolved substances in Class I or II groundwater or any groundwater which is used for drinking water supplies may not exceed Montana MCL values for drinking water. However, no Montana MCL's have been established for the contaminants of concern at the Idaho Pole site. Thus for the Idaho Pole site, concentrations of dissolved or suspended substances must not exceed levels that render the waters harmful, detrimental or injurious to public health. Maximum allowable concentration of these substances also must not exceed acute or chronic problem levels that would adversely affect existing or designated beneficial uses of groundwater of that classification.

ARM 16.20.1011 (Applicable), the nondegradation requirement, provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless the Board of Health is satisfied that a change is justifiable for economic or social development and will not preclude present or anticipated use of such waters. Thus any groundwater which is to be reinjected as part of the remedy must be treated sufficiently to prevent additional degradation of the aquifer, i.e., the reinjected groundwater cannot be of lower quality than the receiving groundwater for any constituent.

Groundwater Act (Applicable) (Construction and maintenance of groundwater wells)

Section 85-2-505, MCA, (Applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained so as to prevent waste, contamination, or pollution of groundwater.

---

[23] ARM 16.20.1002 provides that Class I groundwaters have a specific conductance of less than 1000 micromhos/cm at 25 C; Class II groundwaters: 1000 to 2500; Class III groundwaters: 2500 to 15,000; and Class IV groundwaters: over 15,000. The groundwater at the Idaho Pole site ranges from 586 to 1370 micromhos/cm, with the majority of the wells testing at below 1000. See Final Draft Remedial Investigation Report, Vol. II, Appendix E, MSE, Inc., March 1992.

Air Quality **[24]**

Air Quality Regulations (Applicable) (Excavation/earth-moving; transportation; incineration; storage of petroleum distillates)

Dust suppression and control of certain substances likely to be released into the air as a result of earth moving, transportation and similar actions may be necessary to meet air quality requirements. The ambient air standards for specific contaminants and for particulates are set forth in the federal contaminant-specific section above. Additional air quality regulations under the state Clean Air Act, 75-2-101 et seq., MCA, are discussed below.

ARM 16.8.1404 (Applicable) states that "no person may cause or authorize emissions to be discharged in the outdoor atmosphere ... that exhibit an opacity of twenty percent (20%) or greater averaged over six consecutive minutes."

---

[24] The air quality ARARs included in this analysis are identified on the assumption that no remedial action at the site will constitute a "major stationary source," or "major modification," as defined in ARM 16.8.921. Should any part of a remedy constitute such a source, some additional requirements would be applicable, including the ambient air increments of ARM 16.8.925 et seq.

Similarly, if any part of a remedy should constitute a new or altered source of air pollution which has the potential to emit more than 25 tons per year of any pollutant addressed by the Clean Air Act regulations, the owner or operator must install the maximum air pollution control capability which is technically practicable and economically feasible, as provided by ARM 16.8.1103 (best available control technology shall be utilized).