U.S. EPA REGION VIII

MONTANA OPERATIONS OFFICE

RECORD OF DECISION

BURLINGTON NORTHERN (SOMERS PLANT) SUPERFUND SITE

FLATHEAD COUNTY, MONTANA

SEPTEMBER 1989

RECORD OF DECISION

DECLARATION

SITE NAME AND LOCATION

Burlington Northern (Somers Plant)
Flathead County
Somers, Montana

STATEMENT OF BASIS AND PURPOSE

This decision document represents the U. S. Environmental Protection Agency's selected and contingency remedial actions for the Burlington Northern (Somers Plant) Superfund Site ("the Site"), in Somers, Montana. This document is developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. Section 9601, et seq. (Superfund) and the National Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is based on the administrative record file for the Site.

By signature below, the State of Montana concurs in this Record of Decision. All determinations reached in the Record of Decision were made in consultation with the State of Montana, which has participated fully in the development of this Record of Decision.

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 REMEDY

This response action is anticipated to be the final action for the Site. Other actions at the Site included the 1985 Superfund emergency removal in the swamp pond area (see Figure 3 in the Record of Decision Summary for locations of areas of the Site), after it was determined to constitute an imminent and substantial hazard to Flathead Lake, and the closure in 1988 of two wastewater impoundments at the Site under State Resource Conservation and Recovery Act (RCRA) authority.

This response action addresses the remaining contamination by remediating soils, sediments and ground water, all of which have been determined to pose a potential threat to human health and the environment. The selected remedy addresses the principal threats by removing the potential for direct contact with soils, by reducing the impact of the soils and sediments on ground water and surface water, and by treating the ground water.

Soils and Sediments

The major aspects of the selected "source control" or soil component of the remedy include:

- Excavation of approximately 11,700 cubic yards of contaminated soils and sediments. Volumes to be excavated include soils above the water table from the CERCLA lagoon, drip track, drainage ditch and beneath the retort building as well as sediments from the slough.

- On-site biological treatment of excavated soils.

- Restoration and/or replacement of wetlands lost during remedial action and those lost during the 1985 emergency action. The restoration/replacement will be conducted in consultation with the U.S. Department of the Interior.

Ground Water

The major aspects of the "migration control" or ground water component of the selected remedy include:

- Installation and operation of an innovative hot water flushing and water treatment system to remove and treat available free creosote contamination from the water table aquifer in the CERCLA lagoon and swamp pond areas.

- In-situ biological treatment to degrade both contaminants adsorbed onto the aquifer matrix and residual contaminants dissolved in the ground water.

Ground Water Restrictions

Currently, there are no drinking water supply wells in the affected portions of the water table aquifer. However, institutional controls designed to prohibit the construction of new wells downgradient from the CERCLA lagoon and in the swamp pond area will be implemented and maintained until ground water quality returns to acceptable levels.

Monitoring

The ground water component of the selected remedy will require monitoring to assure that treatment is effective and that treatment proceeds until risk-based cleanup levels have been achieved and maintained. In addition, monitoring of the town's proposed new municipal wells in the bedrock aquifer will be instituted if testing indicates that drawdown in these wells could cause the contaminated water table aquifer to affect the municipal supply. The municipal wells are expected to be installed and tested in the fall of 1989.

Contingency Remedies

The selected ground water component of the remedy involves two innovative technologies: hot water flushing and in-situ biological treatment. These technologies are expected to be successful at the Site. However, because of their unproven nature under the Somers hydrogeologic conditions, these technologies will require pilot testing to determine their effectiveness prior to full-scale implementation.

Contingency Remedy A. If EPA determines, based on pilot testing, that ground water remediation is not practicable, soils will be excavated to a depth of approximately 20 feet in the swamp area and to approximately 30 feet in the CERCLA lagoon area, and downgradient. This excavation will remove the source of ground water contamination both above and below the water table, in addition to the excavation areas outlined in the selected remedy. In this case, institutional controls designed to prevent the construction of drinking water wells downgradient from the CERCLA lagoon will be implemented and maintained until natural degradation returns the aquifer to a usable condition. Under this contingency, the excavated soils will be incinerated on-site.

Contingency Remedy B. If, based on pilot testing, EPA determines that ground water remediation would only be practicable in the area of the CERCLA lagoon but not in the swamp area, most likely due to lower permeability aquifer materials, the swamp area soils will be excavated to a depth of approximately 20 feet, in addition to the excavation areas outlined in the selected remedy. The ground water component of the selected remedy will then be implemented in the CERCLA lagoon area only. Under this contingency remedy the soils will also be incinerated on-site.

DECLARATION

The selected remedy and all the contingency remedies are protective of human health and the environment, attain and comply with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and are cost-effective. The selected remedy satisfies the statutory preference for remedies which employ treatment that reduces toxicity, mobility or volume as a principal element and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Although Contingency Remedy A also involves treatment of soils, this remedy would not satisfy the statutory preference for treatment as a principal element of the ground water component of the remedy to the extent that ground water contamination downgradient from the CERCLA lagoon would not be treated.

Because the remedy will take longer than five years to reach health-based cleanup levels and because contaminated beach sediments will be left in place, a review will be conducted five years after commencement of the remedial action. The review is to ensure that the remedy continues to provide adequate protection of human health and the environment.

Signature

James J. Scherer
Regional Administrator
U.S. EPA Region VIII

9-27-89
Date

In Concurrence

for William J. Opitz
Donald E. Pizzini, Director
Department of Health and Environmental Sciences
State of Montana

Sept. 21, 1989
Date

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RECORD OF DECISION SUMMARY

RECORD OF DECISION SUMMARY

I. Site Description

The Burlington Northern (Somers Plant) Superfund Site (also commonly referred to as the Burlington Northern Somers Tie Plant or the Glacier Park Company - Somers Tie Treatment Plant, hereinafter referred to as "the Site") is located in northwestern Montana in the unincorporated town of Somers, Flathead County (Figures 1 and 2). Fewer than 1,000 residents live in the community. The Site occupies approximately 80 acres within the community. Residential areas abut the Site on three sides. Areas known to be affected by contamination from the tie plant extend from the plant to the shoreline of Flathead Lake, a distance of approximately 1,200 feet. In addition, beach sediments contaminated by plant discharges extend approximately 150 feet into Flathead Lake. The Site is located partially in the floodplain of Flathead Lake. Flathead River enters Flathead Lake approximately five miles east of Somers. Portions of the Site along Flathead Lake and in a slough area adjacent to the plant are wetlands. Ground water flows from the tie plant toward the lake and slough.

The Somers community is located in the Flathead Valley surrounded by the Rocky Mountains of western Montana. Flathead Lake and Glacier National Park (located approximately 30 miles to the north) are important recreational areas. The Flathead Valley economy depends primarily on lumber, farming and tourism. Flathead Lake covers an area of 300 square miles and is used for hydroelectric power generation at Kerr Dam in Polson, Montana. The lake is also used for recreational fishing and boating. The local beach area, which is part of the Site, was formerly used as a swimming beach, although it was closed to public access in 1985 by the property owners because of liability concerns. Most of the southern half of the lake area and shoreline is contained within the Flathead Indian reservation. A Federal Waterfowl Production Area occupies much of the north shore of Flathead Lake east of Somers. Waterfowl also breed in the slough area adjacent to the tie plant.

Flathead Lake is currently the source of the Somers municipal drinking water supply. The Somers Water District has indicated its intention to convert to a bedrock aquifer drinking water source in 1989. A bedrock well at the local school located approximately 1/4 mile north of the tie plant currently is the only well in Somers which is used as a source of drinking water. Six residences in Somers have private wells used for purposes other than drinking water. One of the six wells is completed in bedrock, the other five are completed in the shallow water table aquifer. None of these wells has thus far been shown to be affected by contamination from the site.

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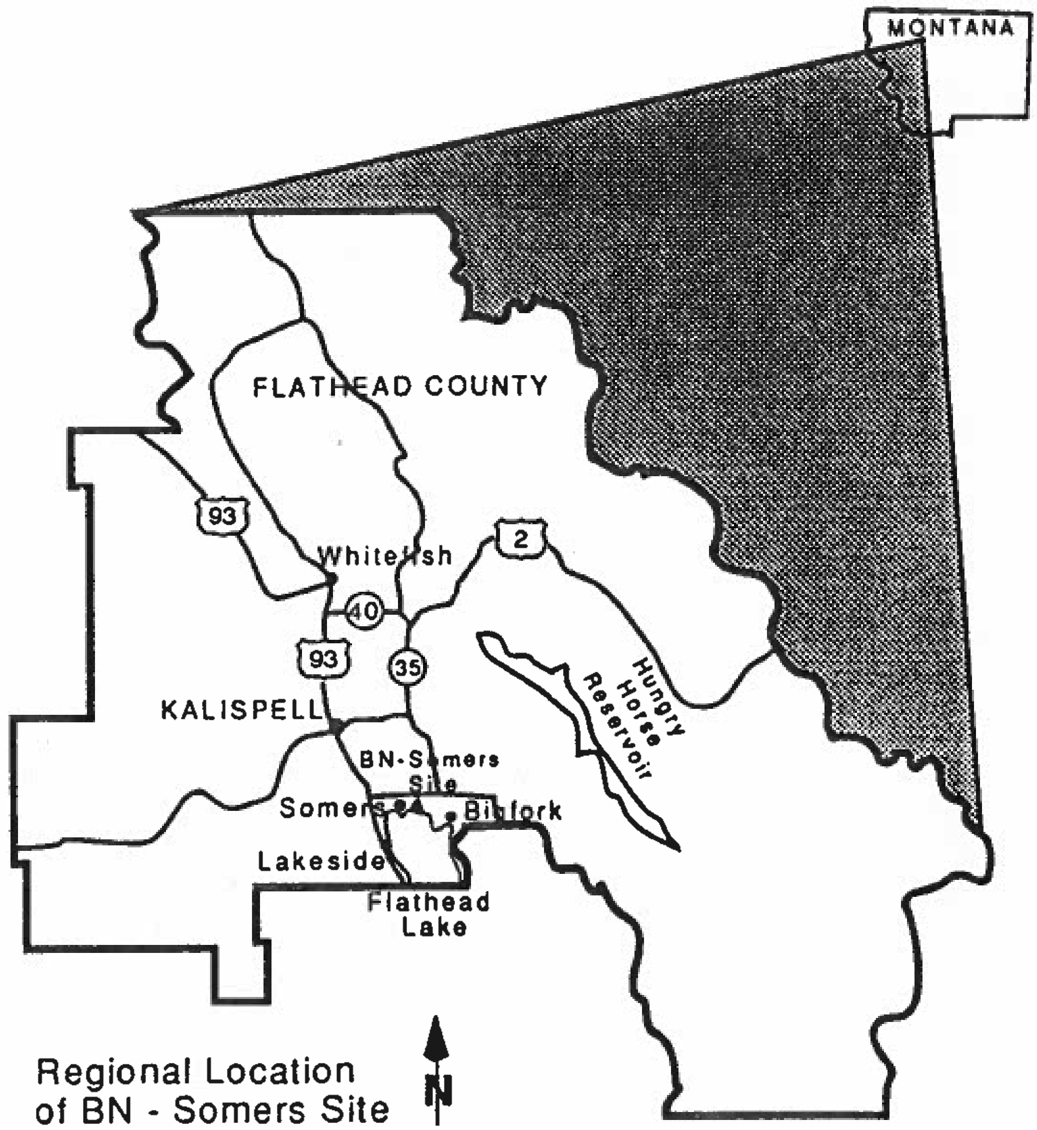
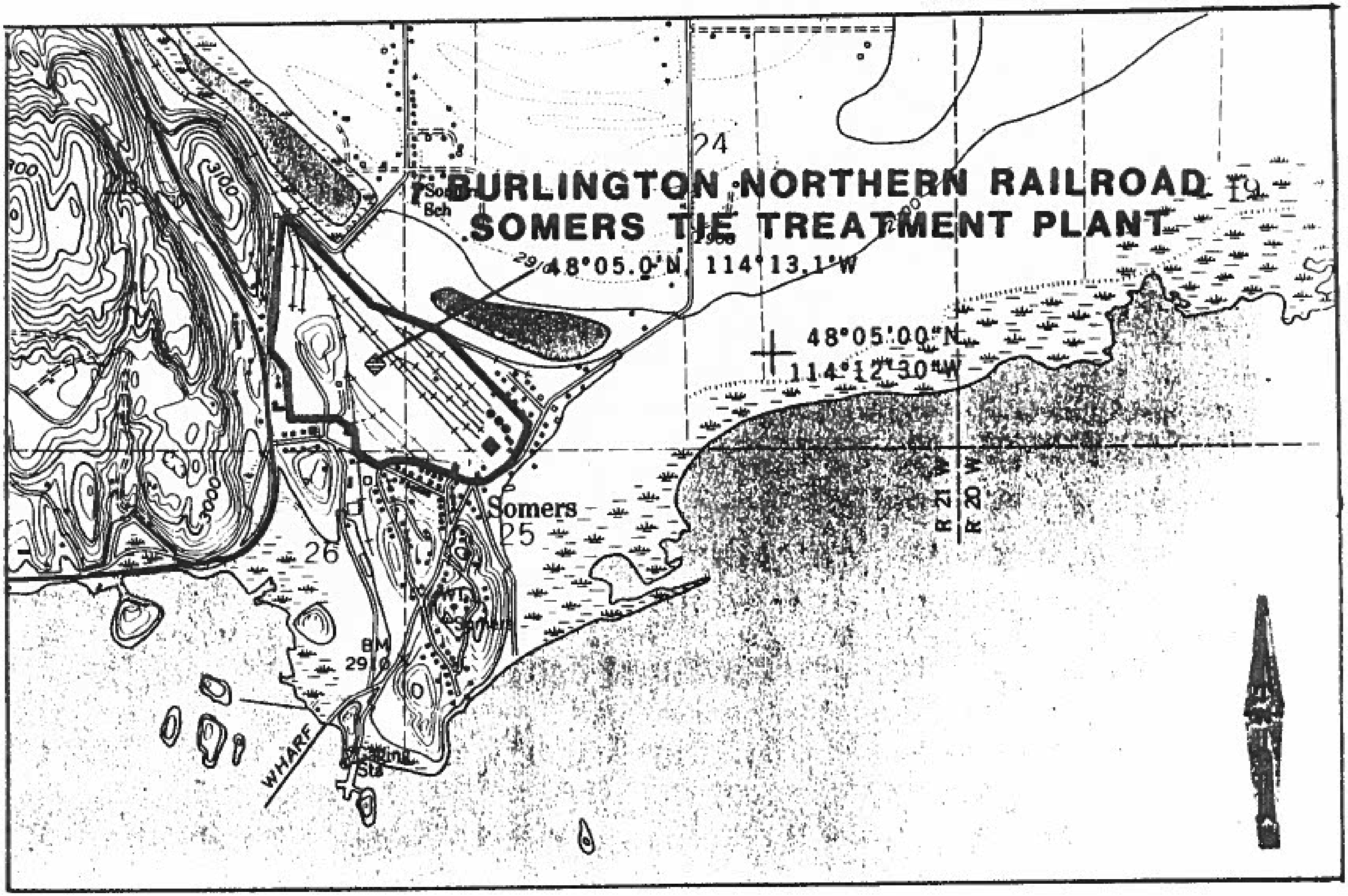
FIGURE 1



Regional Location
of BN - Somers Site

FIGURE 2



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The main structures on the tie plant property include an office building, a retort building (which housed the wood treating equipment), a boiler house, three large insulated creosote product storage tanks and miscellaneous support buildings. Three wastewater impoundments and one sanitary lagoon were or are also located on site. The wastewater impoundments are discussed in the following section.

II. Site History and Enforcement Activities

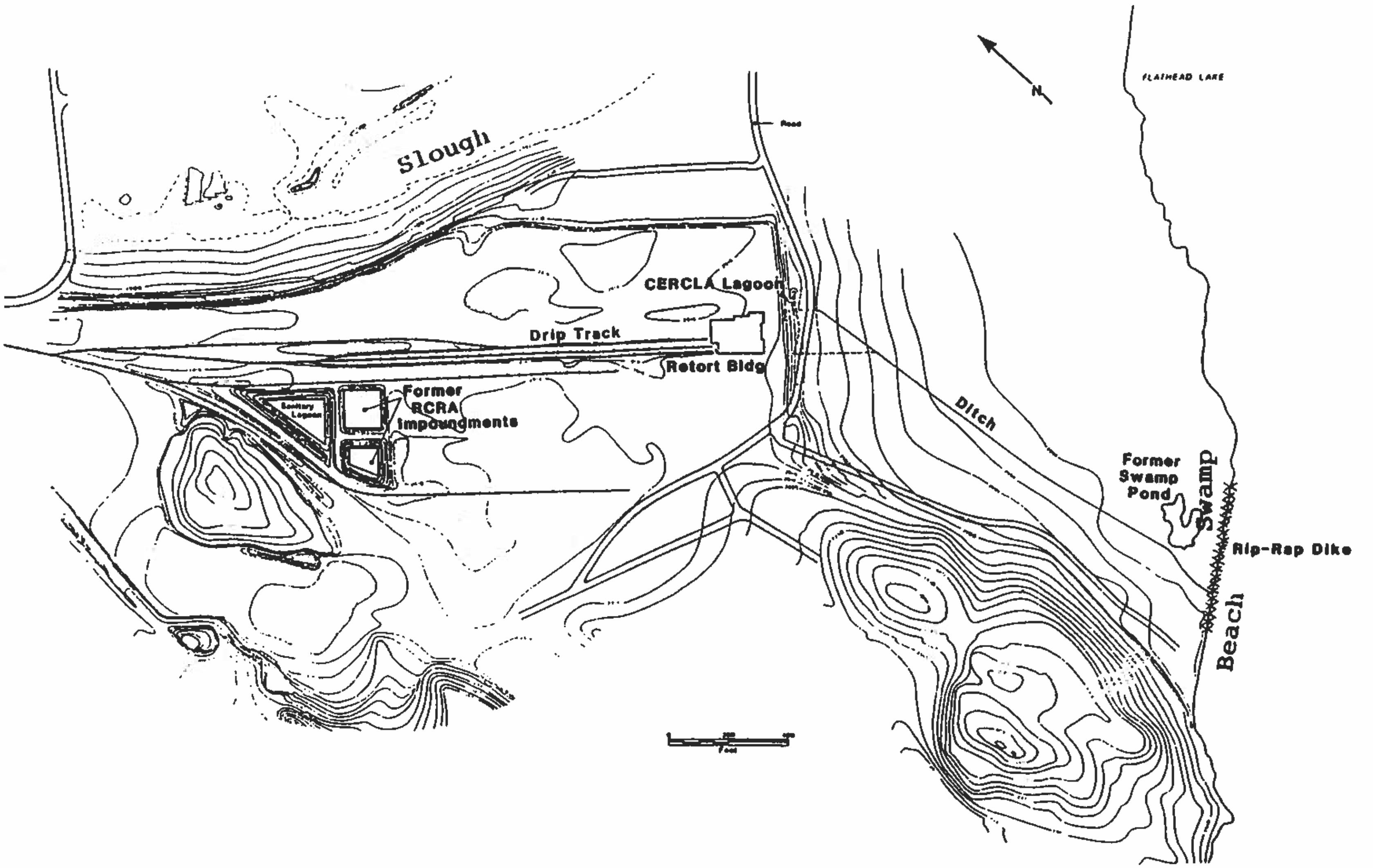
The Somers tie plant was operated by Burlington Northern between 1901 and 1986. The plant treated railroad ties and other miscellaneous lumber products to protect the materials from weathering and insects. Treatment fluids used by BN included zinc chloride, chromated zinc chloride and creosote/petroleum preservative mixtures. The treatment process generated wastewater primarily consisting of steam condensate containing zinc chloride or creosote. Other sources of process generated wastewater were floor and shop washings, drippage from ties pulled out of the retort and drippage from treated ties in storage. An average of 350 gallons of wastewater were discharged per day. Approximately 1,000 pounds of sludge from the retort was generated every one and a half to two years (ReTec 1989). Prior to 1971, BN discharged wastewater to a lagoon located immediately south of the retort building (the "CERCLA lagoon"). Overflow from this lagoon discharged through an open ditch into Flathead Lake. Sometime prior to 1946, a pond formed in the swamp area (the "swamp pond") adjacent to Flathead Lake and waste material discharged through the open ditch accumulated here. The final disposition of retort sludge is uncertain. Some was reported to have been used to patch holes in local roads. The locations of the major, presently known disposal areas at the Site are shown in Figure 3.

BN abandoned the CERCLA lagoon and ditch in 1971 when the company constructed two new wastewater holding impoundments (the "RCRA impoundments"). In 1984 BN implemented a recycling system and stopped all wastewater discharges.

In February, 1984, the Montana Department of Health and Environmental Sciences (MDHES) sampled the Site soils. Based on the results of this investigation, the Site was proposed for inclusion on the Superfund National Priorities List in October 1984 (49 FR 40320, October 15, 1984). The proposed listing cited potential negative effects on Flathead Lake and the water supply for the town of Somers which is drawn from the lake.

In May, 1985, EPA, BN and Sliters (a corporation which owns a portion of the site) signed an Administrative Order on Consent (Docket No. CERCLA-VIII-85-02) providing for an Emergency Removal action in the area of the swamp pond adjacent to Flathead Lake.

FIGURE 3



Location of Disposal Areas at the Somers Tie Plant

Source: Remediation Technologies (1989), Volume 1.

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The area was determined to pose an imminent and substantial hazard to Flathead Lake because of the presence of heavy creosote contamination in water and soil located within 20 feet of the shoreline. Pursuant to the 1985 Administrative Order, BN removed approximately 3,000 cubic yards of the most heavily contaminated soils and over 100,000 gallons of contaminated water from the swamp pond area and from a portion of the drainage ditch. The excavated areas were backfilled with clean soil and rip rap was installed along the lakeshore. The excavated materials were placed in the RCRA impoundments, which had been cleared and double-lined for this purpose. The contaminated water was processed at the plant to recover any usable materials and the soils were transferred to the BN RCRA-regulated facility in Paradise, Montana to await treatment.

In October, 1985, the EPA, BN and Sliters signed an Administrative Order on Consent (Docket No. CERCLA-VIII-85-07) for a Remedial Investigation and Feasibility Study (RI/FS). The purpose of the Remedial Investigation and Feasibility Study was to determine the nature and extent of contamination at the Site, to evaluate the impacts of contamination on public health and the environment and to formulate alternatives for remedial action. BN began conducting the work under EPA supervision in the fall of 1985 and completed its field investigations in the fall of 1988. Sliters provided access to their property for site investigations. A Remedial Investigation/Feasibility Study report, consisting of final Site Investigation and Exposure and Endangerment reports and a public review draft Feasibility Study, was submitted to EPA in the spring of 1989 (Remediation Technologies, 1989). Correspondence between the EPA and BN regarding the Remedial Investigation/Feasibility Study is contained in the Administrative Record file.

The RCRA impoundments were filled in and covered with pavement by BN in 1988 pursuant to a closure plan approved by the MDHES. Subsequent to the closure of the RCRA impoundments, a ground water monitoring well located adjacent to the impoundments indicated that ground water was contaminated; therefore ground water corrective action was required. BN submitted a proposal for corrective action to the MDHES in February, 1989. In order to ensure coordination of the RCRA and CERCLA facets of site activities, the EPA has consulted with the MDHES and kept the agency involved in all CERCLA activities.

In June 1988, the EPA published a notice of intent to remove the Site from the proposed National Priorities List, because of its status as a RCRA-regulated facility. The MDHES and various community groups have made requests to the EPA that the Site be retained on the proposed National Priorities List. As of the date of this Record of Decision, the Site has not been removed from the proposed list.

III. Highlights of Community Participation

Section 113 (k)(2)(B)(i-v) of CERCLA, 42 U.S.C. Part 9601, sets forth the minimum requirements for public participation in the CERCLA remedial action process. The EPA and MDHES have maintained an active community relations program at the Site. Fact sheets and periodic updates were prepared and public meetings were conducted to keep Somers residents and other interested parties informed about site activities. An information repository was established at the Somers Central School Library. In May of 1988, the EPA and MDHES conducted interviews of local and State officials and other interested parties to determine the effectiveness of community relations efforts and revised the Community Relations Plan.

Some of the concerns expressed by interested persons during the Remedial Investigation/Feasibility Study related to possible health effects caused by living near the Site, future availability of the beach area for recreational use, and the future availability of the tie plant property for development. The Somers Water District expressed concerns about replacing water mains which run across the tie plant property, and about the possible effects of the Site on the municipal water supply.

The availability of Technical Assistance Grants for citizen's groups was publicly noticed in several Montana newspapers in the spring of 1988. In the fall of 1988, the EPA received an application for a Technical Assistance Grant from the Flathead Lake Protection Association. The EPA approved a Technical Assistance Grant for this group in January, 1989. The Association has participated in reviewing and interpreting of Site technical reports and other documents.

The Remedial Investigation and Exposure and Endangerment Assessment reports were released to the public for review in April, 1989. On April 26, 1989, a notice of availability of these reports was mailed to all persons on the Site mailing list. An announcement of the availability of these documents was also published in the Kalispell Daily Interlake newspaper on April 28, 1989.

The draft Feasibility Study and the Proposed Plan for the Site were released to the public in May, 1989. A notice of availability of the draft Feasibility Study and the Proposed Plan was published in the Kalispell Daily Interlake on May 17 and May 21, 1989. A copy of the Proposed Plan was also mailed to all persons on the Site mailing list.

The technical documents and plans, as well as other information on the site, were made available to the public in the administrative record file and information repository maintained at the EPA Region VIII Montana Office Docket Room and at the

Somers Central School Library. Both locations are open during normal business hours.

A 30 day public comment period on the Remedial Investigation/Feasibility Study reports and the Proposed Plan began on May 18, 1989. Based on a request from the Flathead Lake Protection Association, EPA extended the close of the comment period to July 15, 1989. An announcement of the extension to the comment period was mailed to all persons on the Site mailing list and was published in the Kalispell Daily Interlake.

A public meeting was held on June 6, 1989, at the Somers Central School. At this meeting, representatives from EPA presented the proposed plan and EPA and MDHES representatives answered questions about the problems being addressed at the Site and the remedial alternatives under consideration. BN representatives were also available to answer questions. A transcript of the meeting was produced and is contained in the Administrative Record file. A second community meeting was conducted on June 21, 1989, in Paradise, Montana, at the request of local residents.

The EPA and the State of Montana received substantial public comment in opposition to the EPA proposal for soil remediation which involved transportation of contaminated soils from Somers to the BN facility in Paradise, Montana for treatment. In a letter of July 5, 1989, the MDHES requested that the EPA reconsider its preference for this alternative. On July 14, 1989, the EPA extended the close of the comment period to August 3, 1989. An announcement of this extension was issued in the form of a press release, was published in the Kalispell Daily Interlake and was also mailed to all persons on the Site mailing list. The announcement indicated that EPA had been asked to reconsider its proposed plan and was extending the comment period to allow further consideration of on-site biological soils treatment. A second Somers public meeting was announced in the same notice. The meeting was held on July 27, 1989.

A response to the comments received during the comment period is included in the Responsiveness Summary, which is a part of this Record of Decision (Attachment B).

IV. Scope and Role of Response Action Within Site Strategy

The problems at Somers have been addressed in stages under different authorities. The first stage consisted of an emergency cleanup of the swamp pond area conducted in 1985 by BN under the oversight of the Superfund removal program. Although not a Superfund activity, the second stage involved the closure and capping of the two RCRA impoundments pursuant to State RCRA authority. Stage two will also include corrective action for ground water contamination from these units.

The remedial actions described in this Record of Decision constitute a third stage of cleanup activities addressing the remaining contaminants in soils, sediments and ground water, all of which have been determined to pose a threat or potential threat to human health and the environment as described in Section VI of this Record of Decision. The response objectives of remedial action are to control and remediate contaminated soil through excavation and treatment; to minimize, eliminate and prevent current or future exposure of humans and other receptors to contaminated soils; to reduce contaminant migration to ground water; and to clean up contaminated ground water and prevent adverse impacts on surface water. The remedy selection process in this Record of Decision treats both soil/sediment and ground water components as a single response action. This action is anticipated to be the final response action for this site.

V. Site Characteristics

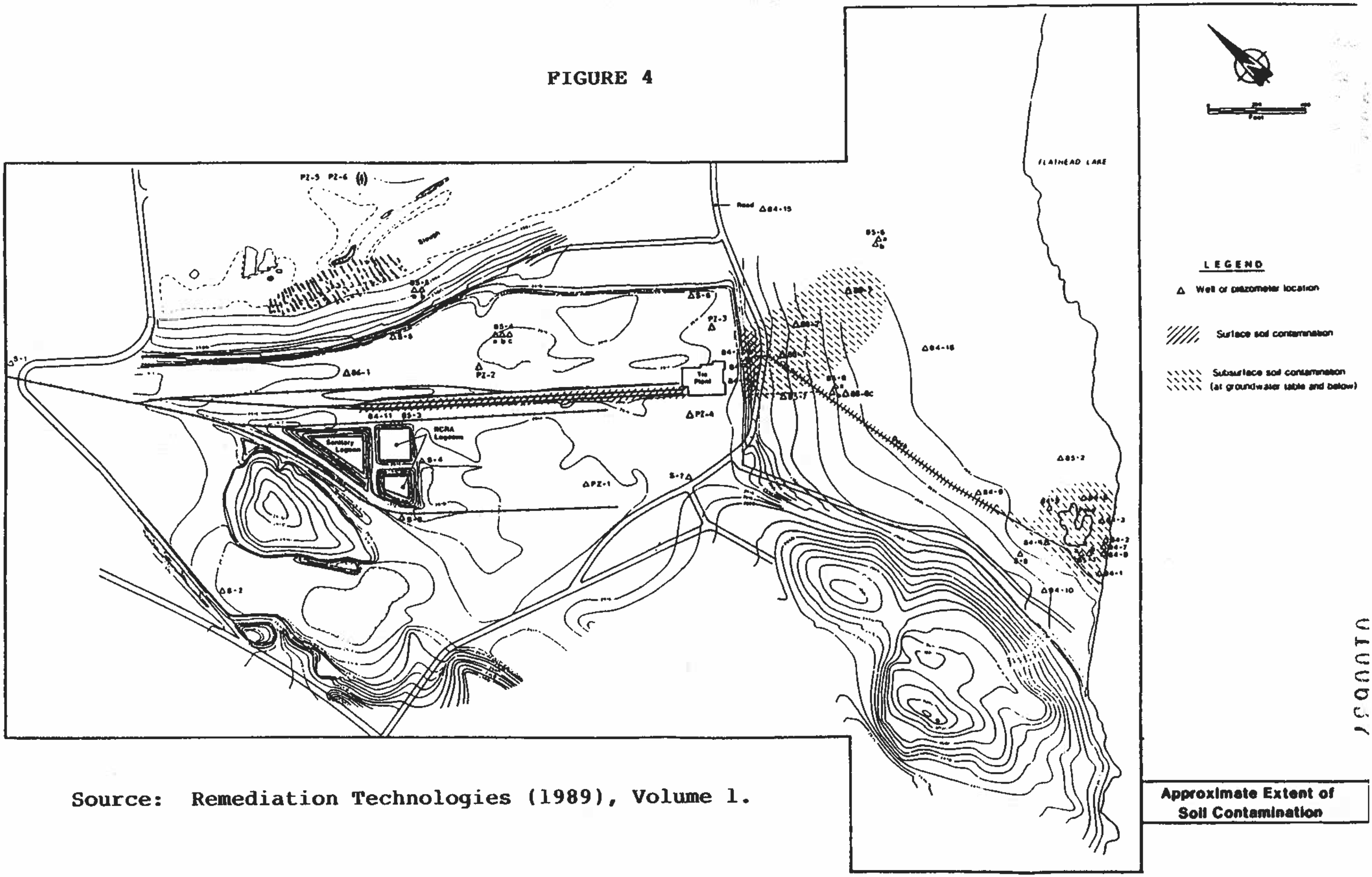
The primary source of site contamination was process wastewater from the treatment of wood products with creosote and zinc chloride preservative solutions. Process wastewater from creosote wood treating operations is listed as a RCRA hazardous waste under the category K001. Soil and debris contaminated by such wastewater is also considered K001 waste. As discussed previously, BN disposed of process wastewater at the Site in the CERCLA lagoon which overflowed via a ditch directly into Flathead Lake. A swamp pond which formed along the ditch also accumulated waste materials. Soils contaminated with creosote constituents and/or zinc have been found to be concentrated in the CERCLA lagoon, along the discharge ditch and in the former swamp pond and beach area. Other areas with contaminated soils include the drippage area along the railroad tracks where treated ties were removed from the retort (the "drip track"), and in the treated tie storage area in the slough. Figure 4 shows the approximate extent of known soil contamination. Ground water is contaminated with creosote in the vicinity of the CERCLA lagoon and the former swamp pond (Figure 5).

The following discussion will concentrate on the types of contaminants, affected media and known or potential routes of human and environmental exposure.

Contaminants

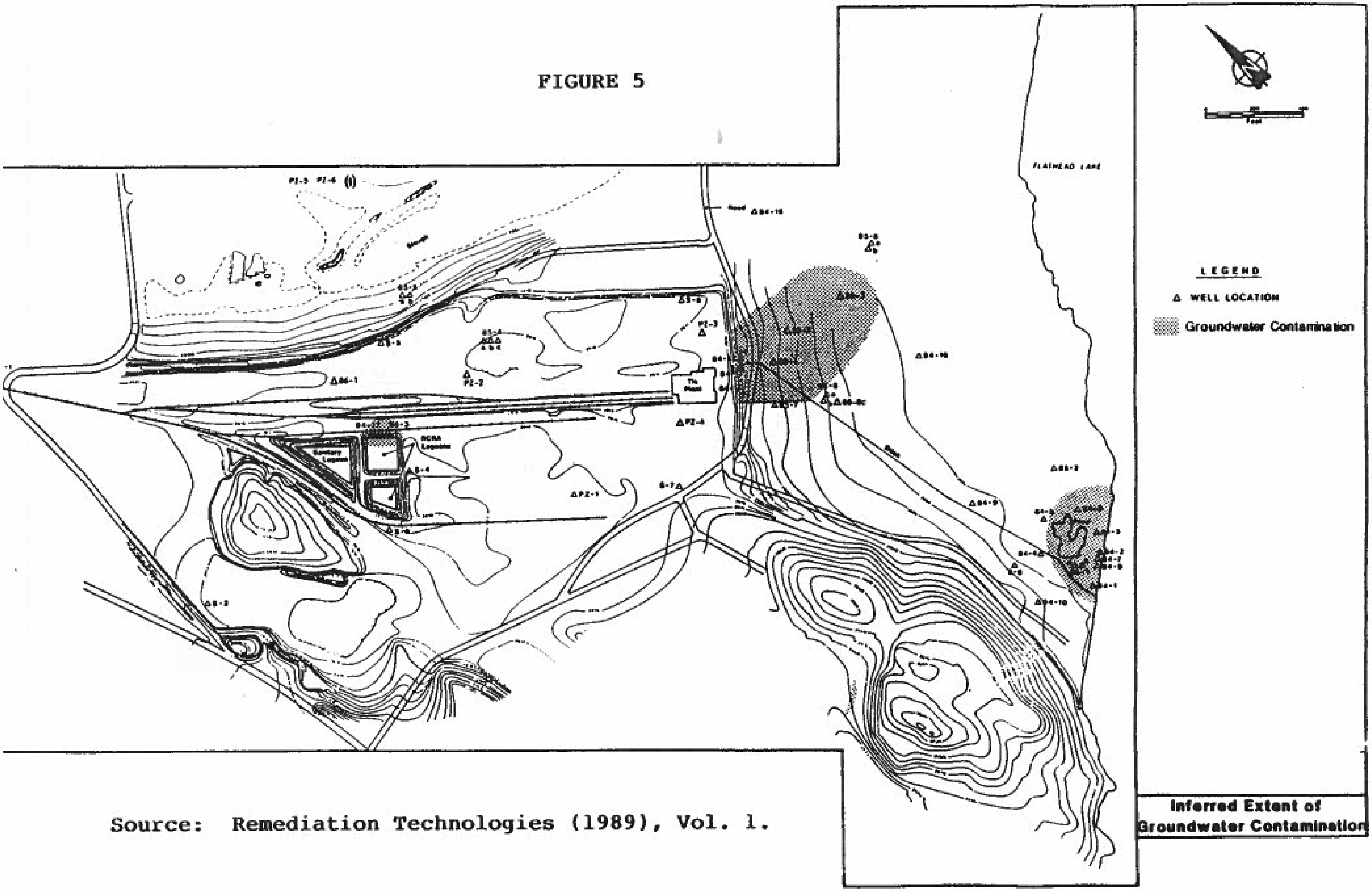
Initial samples of ground water, soils, and surface water were subjected to analysis for CERCLA Hazardous Substance List (HSL) compounds in order to develop a parameter list for future analyses. Creosote constituents constituted the majority of organic compounds detected in samples taken from the CERCLA lagoon area. Zinc was also found at elevated concentrations in this area. Creosote constituents and zinc were therefore

FIGURE 4



Source: Remediation Technologies (1989), Volume 1.

FIGURE 5



Source: Remediation Technologies (1989), Vol. 1.

selected for ongoing analysis at the site and are discussed in more detail below. Benzene was detected in one ground water sample, but was not found in other HSL samples and was not selected for further analyses. A number of inorganic compounds, in addition to zinc, were identified in the HSL samples and were selected for further analyses. These parameters are listed below under "Other Compounds." Other than zinc, inorganic constituents were not generally found to be present at elevated concentrations at the site.

Creosote: Creosote is a complex mixture of hundreds of identifiable constituents produced by the high temperature carbonization of coal. It consists mainly of liquid and solid polynuclear aromatic hydrocarbons (PAHs), although some tar acids (such as phenols and cresols), tar bases (such as pyridenes and acridine), and nitrogen bearing heterocyclic bases (such as quinoline and benzocarbazole) are also present. The composition and physical properties of creosote vary depending on the coal distillation process.

The PAHs compose the majority of the organic compounds in creosote and are the major constituents of concern at the BN-Somers site. Sixteen individual PAH compounds are listed as priority pollutants by the EPA. The physical and toxicological characteristics of the PAHs vary with relative molecular weight. Eight of the priority pollutant PAHs have relatively low molecular weights, are fairly soluble in water and have low organic carbon partition coefficients. The other eight PAHs tend to adsorb more strongly to solids when released into the environment, particularly if the organic carbon content is high. The water solubilities of the PAHs range from 3.93 ppm for Acenaphthalene to 7.00 x 10^{-4} ppm for Benzo(g,h,i)perylene. PAH compounds are known to be biodegradable; low molecular weight PAHs tend to degrade more quickly than high molecular weight PAHs. PAH compounds are also considered to be semi-volatile. The lower molecular weight compounds are typically more volatile than the higher molecular weight compounds. Vapor pressures among PAHs range between 2.90 x 10^{-2} torr for Acenaphthalene and 1.0 x 10^{-10} torr for Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene. Because of their greater solubility and volatility, the low molecular weight compounds are more mobile in the environment.

The high molecular weight PAHs are considered to be carcinogenic. Other creosote constituents considered to be carcinogenic include heterocyclic nitrogen bases and aromatic amines. Several of the low molecular weight PAHs are considered to be mutagens or co-carcinogens; others are carcinogenic inhibitors. The most significant known adverse health effect following exposure to noncarcinogenic PAHs is hemolysis.

No EPA drinking water standards exist for PAH compounds.

However, EPA has published ambient Water Quality Criteria for three PAH compounds to protect aquatic life and human health (Table 1).

Zinc: Zinc is a metallic element which may form compounds with both inorganic and organic ligands. It is toxic only at very high concentrations and is, in fact, an essential trace element for humans and domestic animals. No human health based standards or criteria exist for the consumption of zinc in water supplies, although a secondary drinking water standard of 5,000 ug/l was established for taste and odor. Zinc is not considered to be carcinogenic.

Zinc is very soluble in water. Zinc chloride has a solubility of 4320 g/l. In an aquatic environment concentrations of zinc in sediments exceed concentrations in ambient water. This effect is modified by pH, salinity, water hardness, and temperature. The EPA has published ambient Water Quality Criteria to protect freshwater aquatic life from adverse concentrations of zinc (Table 1). Contrary to the apparent relative resistance of humans to high zinc concentrations, many forms of aquatic life have a very low tolerance to zinc, reflected by the low ambient Water Quality Criteria. These concentrations decrease with decreasing water hardness.

Other Compounds: Benzene is a carcinogenic volatile organic compound with a solubility in water of 1,850 mg/l at 25^{o}C. The EPA has published both Water Quality Criteria and Maximum Contaminant Levels for benzene (Table 1). Volatile compounds do not tend to adsorb easily onto soils and tend to be very mobile in the environment. Benzene was detected at 67 ug/l in only one ground water sample from the CERCLA lagoon. It was not detected in other ground water or soil samples. Investigators did not analyze further for benzene during the Site investigations.

Several non-chlorinated phenolic compounds were also found at the BN-Somers site. Phenolic compounds tend to be mobile in ground water due to a relatively high solubility (on the order of $1.70 \times 10^{+1}$ to $9.30 \times 10^{+4}$ mg/l). These compounds are also among the more volatile compounds, with a vapor pressure on the order of 3.41×10^{-1} to 6.00×10^{-2} torr. Phenols are considered to be noncarcinogenic but cause various systemic effects. Water Quality Criteria have been published for phenol (Table 1).

Arsenic, selenium, lead, chromium, copper, barium, beryllium, mercury, nickel, and thallium were also detected in the HSL sampling and were selected as constituents for analysis in further sampling at the site. Safe Drinking Water Act Maximum Contaminant Levels and ambient Water Quality Criteria have been established for these compounds; these are provided in Table 1. Chromium, arsenates and copper have been used in the wood treating process at other wood treating plants, however, arsenic

TABLE 1

WATER QUALITY CRITERIA AND STANDARDS FOR WOOD PRESERVATIVES USED AT SOMERS

	EPA Ambient Water Quality Criteria (ug/l)				Drinking Water Standards (ug/l)	Maximum Contaminant Level Goal (ug/l)
	Aquatic Life		Human Health			
	Acute	Chronic	Food	Water & Food		
PAH Compounds						
Acenaphthene	1,700	520		20 (taste & odor)		
Fluoranthene	3,980		54	42		
Naphthalene	2,300	620				
Carcinogenic PAH***						
@ 10^{-5} Risk Level			0.311	0.028		
@ 10^{-6} Risk Level			0.0311	0.0028		
@ 10^{-7} Risk Level			0.00311	0.00028		
Other Constituents						
Benzene	5,300				5*	0
@ 10^{-5} Risk Level			400	6.6		
@ 10^{-6} Risk Level			40	0.66		
@ 10^{-7} Risk Level			4	0.066		
Phenol	10,200	2,560		3,500		
Arsenic			0 .018	0.0022	50*	
V	850	48				
III	360	190				
Barium				1,000	1,000	1,500

TABLE 1, CONTINUED

		EPA Ambient Water Quality Criteria (ug/l)				Drinking Water Standards (ug/l)	Maximum Contaminant Level Goal (ug/l)
		Aquatic Life		Human Health			
		Acute	Chronic	Food	Water & Food		
Beryllium		130	5.3	0.12	0.0068		
Chromium							
	VI	16[+]	11[+]		50	50	120
	III	1,700[+]	210[+]	3,433,000	170,000		1,200
Copper		18[+]	12[+]	1,000	100 (taste & odor)		1,300
Lead		82[+]	3.2[+]		50	50	20
Mercury		2.4	0.012	0.15	0.14	2	3
Nickel		1,400[+]	160[+]	100	13.4		
Selenium		260	35		10	10	45
Thallium		1,400	40	48	13		
Zinc		120[+]	110[+]		5,000	5,000**	

* Maximum Contaminant Level
** Secondary Drinking Water Standard
***Carcinogenic PAH values are for individual compounds or for combinations of these compounds.
\+ Hardness-dependent, 100 mg/L $CaCO_3$

Sources:

U.S. EPA (1986a) Superfund Public Health Evaluation Manual, EPA 5401-1/86/060, OERR.

U.S. EPA (1986b) Quality Criteria for Water, EPA 440/5-86-001 (51 Federal Register 43665).

and copper were not reportedly used at the Somers Site. Other than one subsurface soil sample which contained elevated arsenic, possibly due to laboratory error, no samples showed inorganics (other than zinc) at concentrations which significantly exceeded background.

Affected Media

Soils in the Somers area are identified as silty clay loams, consisting primarily of silts and fine sands. Most of the soils in the area were deposited by glacial or alluvial processes. Glacial soils are heterogeneous, commonly containing clayey and unsorted deposits. Regional soil thicknesses range from zero to over 500 feet. Subsurface conditions in the vicinity of the former tie plant vary with depth. The plant yard property is covered with a veneer of 0.5 to 10 feet of man-made gravel fill. Underlying the fill are discontinuous layers of silty sand and sandy silt underlain by a thick silt unit containing interbedded silty sands and clays.

The bedrock surface in the Somers area is very irregular. Bedrock outcrops are present to the west of the former RCRA impoundments and to the west of the discharge ditch and swamp areas. Away from the outcrop, borings to a depth of 100 feet failed to encounter bedrock.

Three aquifers have been identified at Somers. The uppermost unit is a water table aquifer located in alluvium. This unit yields small volumes of water to domestic and stock wells. Well encrustation from iron bacteria, low yields, and marginal water quality have prevented significant use of this aquifer in the Somers area (Noble 1986). Five residences in Somers, upgradient from the tie plant, have water supply wells completed in this aquifer; none are used for drinking water. The water table aquifer discharges to Flathead Lake during periods of low lake level and is recharged by the lake during summer months when lake levels are high.

Underlying the water table aquifer, and separated from it by low-permeability silty/clay materials, is an artesian aquifer. The artesian aquifer was encountered in two wells at depths of 60 and 90 feet at the Site. This aquifer consists of a number of sand and gravel deposits separated by discontinuous beds of fine-grained material. No residential wells in Somers are completed in this unit.

Underlying the artesian aquifer is the bedrock aquifer. It is present within the secondary structural features such as joints and fractures. One residential well and the Somers School well are completed in bedrock. Two municipal bedrock wells are proposed for the municipal supply and are anticipated to be constructed in 1989.

Affected Soils and Sediments: The majority of contaminated soils at the BN-Somers site have been found beneath and adjacent to the CERCLA lagoon, along the former discharge ditch, along the drip track and near the former swamp pond. The heaviest contamination in the form of oil/soil mixtures is confined to the upper few feet of the CERCLA lagoon and the surface of the drip track. Other areas of contamination have been found in the slough where treated ties were stored, in the swamp area and in beach sediments below the high water line. The contamination in the beach area is believed to be either a remnant of discharges from the ditch or from contaminated ground water originating in the swamp area. The primary contaminants of concern in soils and sediments are PAHs, but zinc in the slough is also of concern because of potential adverse impacts to aquatic life and waterfowl.

The highest concentration of PAH contaminants was found in the 15,600 square foot CERCLA lagoon. PAHs have been detected in samples from the CERCLA lagoon at concentrations from over 500,000 mg/kg at the surface to 369 mg/kg at a depth of 25 feet. Low molecular weight compounds predominate. The maximum zinc concentration in this area is 4,400 mg/kg. The maximum depth of high molecular weight PAH contamination is approximately 30 feet.

Test pits downgradient from the CERCLA lagoon show that visible contamination typically begins at a depth of 6 to 10 feet. This is the high water table mark. Contaminants have apparently been carried in ground water to this area from the CERCLA lagoon. The maximum total PAH concentration detected in these test pits was 3,300 mg/kg in the saturated zone. Surface soil samples show a maximum of 28 mg/kg total PAH in a sample collected immediately adjacent to the CERCLA lagoon. The maximum zinc concentration detected in these test pits was 3,770 mg/kg immediately adjacent to the CERCLA lagoon. Based on well borings, the maximum depth of contamination downgradient from the CERCLA lagoon is approximately 30 feet immediately adjacent to the lagoon. The contaminated area bounded by these test pits and wells is approximately semi-circular in shape with an area of about 48,100 square feet.

Soils in the drainage ditch are contaminated to a depth of about one foot and a width of less than five feet. The length of the ditch is approximately 1,200 feet. Maximum total PAH concentrations measured in the ditch near the swamp area after the 1985 Emergency Removal were 7,228 mg/kg. Average concentrations were 3,234 mg/kg.

The former swamp pond covered an area of about 29,000 square feet. Because of migration of contaminants from the pond, an area of 60,500 square feet was excavated in 1985. The excavated area was covered with clean gravels. Maximum residual PAH concentrations in the swamp area, taken after the removal, were 3,281 mg/kg. The average residual concentration was calculated to be 1,280 mg/kg. The water table in this area fluctuates seasonally, but is usually at or just below the ground surface. All residual contamination is therefore typically below the water table. Based on borings in this area, the maximum depth of contamination is 20 feet.

Beach borings show that sediment contamination downgradient from the former swamp pond begins at a depth of 2 feet and extends to a depth of over 8 feet. Contaminants have been found in an area covering approximately 22,500 square feet. The contaminated beach sediments are below the high water level of Flathead Lake. The maximum total PAH concentration detected in this area exceeded 400 mg/kg. The maximum zinc concentration detected was 45 mg/kg. Contamination is not continuous, but appears to be limited to decayed root channels.

The drip tracks occupy an area of approximately 42,000 square feet. Visible evidence of contamination in soil is limited to the upper 2.8 feet. No PAH contamination was detected in this area. This may be because samples were restricted to an area adjacent to the track bed itself. Zinc was detected at a maximum concentration of 12,000 mg/kg.

A portion of the slough adjacent to the tie plant is contaminated with PAH and zinc. The maximum concentration of PAH detected was 342 mg/kg. The maximum concentration of zinc found was 8,570 mg/kg. The area of contamination covers approximately 2,500 square feet; the maximum depth of contamination is about 4 feet.

Historical records indicate that contaminated water may have periodically been released into the retort building basement. It is therefore presumed that the soils in this area are also contaminated.

<u>Affected Ground Water and Drinking Water:</u> Contamination has been identified in the water table aquifer in two areas: in and downgradient from the CERCLA lagoon, and in the swamp pond area. The primary contaminants of concern in the ground water are PAH compounds and phenols. Certain metals have been detected above background, and sometimes above Maximum Contaminant Levels, however, the high suspended solid concentrations in these unfiltered samples appear to have caused the elevated concentrations of metals. Filtered samples taken immediately downgradient from the CERCLA lagoon did not exceed Maximum Contaminant Levels for any parameter. Samples taken in the immediate vicinity of the swamp pond also were within Maximum Contaminant Levels for inorganics.

Monitoring wells completed in the CERCLA lagoon itself contain visible evidence of oil contamination and concentrations of up to 4,000,000 ug/l total PAH. Monitoring wells located immediately downgradient from the CERCLA lagoon contained from 67 to 3,292 ug/l total PAH (all low molecular weight compounds) and from 785 to 206,400 ug/l total phenolics. The contaminant plume emanating from the CERCLA lagoon has migrated between 400 and 600 feet downgradient.

Monitoring wells completed in the former swamp pond area have produced oil in the purge water and samples containing up to 18,280 ug/l total PAH (all low molecular weight compounds).

The Somers water supply is currently drawn from Flathead Lake, at an intake located about 2,000 feet from the swamp pond area. Samples of the Somers drinking water supply occasionally showed high molecular weight PAH compounds. The cancer risk level associated with detected concentrations is less than 1×10^{-5}. Inorganic concentrations were all within Maximum Contaminant Levels.

Routes of Migration

The potential routes of migration from soil and sediment contaminant sources at the Site are primarily to air and water. The main potential route of migration from ground water is to surface water.

Exposed contaminated soils may volatilize or produce particulate emissions to air. This is of particular concern in the vicinity of the CERCLA lagoon which is unvegetated and located adjacent to a residential area. Both wind-borne particulates and vapor emissions can occur from this area. Other source areas such as the drainage ditch and slough, are vegetated and would be less likely to emit contaminants to air. The swamp and beach area soils and sediments are covered with clean fill and sand, respectively, which would also prevent air emissions.

Because of the proximity of the swamp pond to Flathead Lake and the presence of PAH contaminants in ground water, it must be assumed that contaminants are entering Flathead Lake. However, samples taken of lake water offshore of the swamp pond area showed very low concentrations of some low molecular weight PAHs. This may indicate a small but measurable impact. However, the concentrations detected were many orders of magnitude below Water Quality Criteria (two compounds were detected for which such criteria have been established). Inorganic analyses were all within Maximum Contaminant Levels and Water Quality Criteria.

VI. Summary of Site Risks

A baseline risk assessment was conducted at the Site by BN under EPA oversight. Based on this assessment, the EPA determined that contaminated soils and ground water pose the greatest risk to human health and the environment. The EPA has not found evidence of acute risks to human health posed by site contaminants. Field observations of fish and waterfowl have not revealed any impacts associated with acute exposures. The EPA has concluded that the risks present at the Site are those which result from subchronic or chronic exposure durations to the compounds of concern. These risks are discussed below.

Indicator Compounds

Indicator chemicals are used to identify the highest risk chemicals at a site so that the risk assessment is focused on the chemicals of greatest concern. The EPA has selected various indicator compounds based on prevalence, mobility, persistence and/or toxicity at the Site. The following groups of compounds were selected as indicator chemicals for risk assessment: 16 different compounds identified as polynuclear aromatic hydrocarbons (PAHs), phenols, and zinc.

Samples were not routinely analyzed for volatile organic compounds and nitrogen-bearing heterocyclic compounds, although the 1985 and 1986 source evaluation at the Site included analyses for benzene. As discussed previously, one sample of ground water from the CERCLA lagoon was found to contain benzene, however a soil sample from this area failed to verify the presence of benzene. The potential significance of benzene as a ground water contaminant was considered in the risk assessment. Additional sampling and analysis for benzene and other volatile constituents will be conducted during remedial design to verify these results.

Samples were routinely analyzed for a range of inorganic constituents. Of these, only zinc was found to be present at levels higher than background concentrations or accepted soil concentration guidelines (Remediation Technologies, 1989). High sediment content in some monitoring wells appears to have been responsible for some water samples exceeding Maximum Contaminant Levels (Remediation Technologies, 1989). Filtered ground water samples did not exceed Maximum Contaminant Levels for any parameter.

Toxicity Assessment

PAH compounds can be divided into two categories based on molecular weight. High molecular weight PAHs tend to be carcinogenic. Low molecular weight PAHs tend to be noncarcinogenic, although they may be cancer initiators or promoters. Some low molecular weight PAHs, such as naphthalene, are cancer inhibitors.

A number of conservative assumptions were made in conducting the risk assessment for the BN-Somers site. Benzo(a)pyrene is often used in estimating the risks associated with other carcinogenic PAH compounds. Benzo(a)pyrene is one of the most potent of the carcinogenic PAHs. The EPA's published potency factor for benzo(a)pyrene was used in evaluating the risks to humans associated with all carcinogenic PAHs.

For noncarcinogenic PAH compounds, the acceptable daily intake for chronic exposure (AIC) or reference dose (RfD) was used to evaluate the potential for systemic human health effects. The AIC or RfD numbers are threshold values below which no health effects are expected. Frequently, these values are established based on animal experiments. These values have safety factors built in to account for uncertainties in their development. Typically, these safety factors include a factor of 10 for the expected differences in response between humans and animals, another factor of 10 for the variability within a population, and a third factor of 10 for a limited database. The RfD/AIC and carcinogenic potency factors used in the risk assessment are provided in Table 2.

Available information on the toxicity of many of the indicator chemicals is limited and tends to be based on animal studies. In general, PAH compounds may cause adverse health effects from ingestion, inhalation, and dermal absorption. The effects of exposure to high concentrations of these compounds may be manifest in problems such as decreases in body weight, toxic effects in various organs such as the liver and kidney, and skin or eye irritation. Even at low concentrations, high molecular weight PAH compounds, such as Benzo(a)pyrene, are known to cause cancer in laboratory animals. Some of the lower molecular weight PAH compounds may be cancer initiators or co-carcinogens (cause cancer in the presence of another compound). The high molecular weight PAH compounds may have both carcinogenic and systemic effects. Phenolic compounds have been shown to cause skin irritation and kidney or liver pathology. Zinc is a necessary nutrient for humans; however, in high doses it has been shown to cause pulmonary edema, jaundice, gastrointestinal problems and respiratory tract infections.

Exposure Routes

The BN-Somers tie plant has been closed since 1986. The Site is surrounded by a residential community and the property could possibly be used for other commercial or residential development in the future. For these reasons, the Risk Assessment for the Site used a residential exposure scenario. The following exposure pathways were found to be the most significant:

<u>Existing exposure routes</u>:

- Direct contact/ingestion of surficial soils in the

TABLE 2

TOXICITY VALUES USED FOR RISK CHARACTERIZATION

Parameter	RfD/AIC (mg/kg/day) Oral	Cancer Potency Factor $(mg/kg/day)^{-1}$ Oral	Inhalation
PAHs:			
Naphthalene	0.05 to 0.005		
Acenaphthalene	.03		
Acenaphthene	.20		
Fluorene	.07*		
Phenanthrene	.07*		
Anthracene	.07*		
Fluoranthene	.07*		
Pyrene	.06		
Benzo(a)anthracene	.07*	11.50	6.11
Chrysene	.07*	11.50	6.11
Benzo(b)fluoranthene	.07*	11.50	6.11
Benzo(k)fluoranthene	.07*	11.50	6.11
Benzo(a)pyrene	.07*	11.50	6.11
Indeno(1,2,3-c,d)pyrene	.07*	11.50	6.11
Dibenzo(a,h)anthracene	.07*	11.50	6.11
Benzo(g,h,i)perylene	.07*	11.50	6.11
Phenol	.04		
Zinc	.21		

*Value assumed equal to average AIC for other noncarcinogenic PAH.

References for all values provided in Remediation Technologies (1989) Vol. 2.

vicinity of current residences;

- Direct contact/ingestion of surficial soils on the tie-plant property; and
- Inhalation of volatile compounds and fugitive dusts from the CERCLA lagoon and other contaminated areas.

Potential exposure routes:

- Ingestion of ground water from wells completed downgradient from the CERCLA lagoon; and
- Direct contact/ingestion of soils after development of the tie plant property.

Current or potential environmental exposure routes:

- Direct contact/ingestion of soils and sediments or water by wildlife, fish and other aquatic life; and
- Consumption of environmental contaminants via the food chain.

The following exposure routes were evaluated but were not found to presently pose a significant risk:

- Ingestion of drinking water from the municipal supply drawn from Flathead Lake;
- Ingestion of fish from Flathead Lake;
- Contact with lake water and beach sediments;
- Ingestion of vegetables from local gardens;
- Ingestion of soils and vegetation by grazing animals; and
- Ingestion of beef from grazing cattle.

Eight out of ten samples taken from the Somers municipal drinking water supply were within the 0.0028 ug/l EPA Water Quality Criterion for carcinogenic PAH compounds. This concentration equates to the 1×10^{-6} risk level. The remaining two samples were within the 0.028 ug/l criterion (a risk of 1×10^{-5}). There is no indication that Water Quality Criteria are exceeded in Flathead Lake. Low concentrations (on the order of a few nanograms per liter) of non-carcinogenic PAH compounds have been detected in lake water. These concentrations are typical of surface water bodies in the United States. Consumption of fish from Flathead Lake poses a negligible carcinogenic risk.

Contaminated beach sediments in Flathead Lake are covered by a few feet of clean sand. The beach is exposed only when lake levels are low. The lake levels are high during the summer months when swimming or playing at the beach is most likely to occur.

Although plants may incorporate some PAHs into their tissues, biomagnification levels are very low. Surface soil PAH concentrations outside of demonstrated source areas are also very low. Water available to residents for watering gardens adjacent to source areas comes from the municipal supply. Consumption of garden vegetables therefore does not pose an unacceptable risk to local residents.

A portion of the BN-Somers study area, adjacent to the discharge ditch, was used for grazing cattle in the past. Estimates of the uptake of PAHs by cattle, based on samples collected from the ditch, indicated that exposure would not result in a toxic effect. Furthermore, evidence in the literature indicates that PAHs are metabolized and excreted by vertebrate organisms, and that PAHs do not tend to accumulate in fatty tissues. Therefore, risk through human consumption of cattle that might graze in this area is not a concern.

The investigations also evaluated the possible effects of exposure through ingestion of drinking water from the proposed municipal wells. There is no evidence to suggest contamination of the bedrock aquifer or the overlying artesian aquifer. The presence of an aquitard beneath the contaminated water table aquifer will inhibit the migration of contaminants into the underlying artesian system. The proposed well locations are about 900 feet from the contaminated portions of the Site. Although it is considered unlikely, drawdown induced by the municipal wells could conceivably result in the expansion of ground water contaminant plumes and possibly some movement of contaminated water from the water table aquifer into the artesian or bedrock aquifer system. A pump test for the proposed wells has been designed to evaluate this possibility. The test will be conducted as soon as the wells are completed.

The following assumptions were used to evaluate risks posed by the exposure pathways determined to be of concern.

<u>Soil direct contact/ingestion exposure</u>:

- Children from 1 to 6 years old ingest 200 mg of soil per day. Older children and adults ingest 100 mg/day (USEPA 1989);
- Exposures are limited to the 7 months each year when the average monthly temperature is above freezing. A separate calculation is presented for children 1 to 6 years old to evaluate systemic effects. This calculation assumes daily exposure for a continuous 90-day period when the ground is not frozen;
- Children visit the tie plant property 30 times per year from the ages of 5 to 12 years;
- A 20 to 60% matrix effect is used to estimate the availability of PAH compounds bound to soils to the gastrointestinal tract (Umbreit et al 1986). (Matrix effects refer to the difference in the bioavailability

of a compound from soils compared to the bioavailability of the chemical itself).

- No biodegradation is assumed. Monitored concentrations are assumed to be constant for the next 70 years.

Inhalation exposure:

- An individual inhales 20 m^3 of air per day (USEPA 1986);
- Exposure occurs for the 7 months a year when the average monthly temperature is above freezing;
- An individual spends all day, every day at his/her residence over an average 70 year lifetime (USEPA 1986);
- Fugitive dust concentrations were estimated by an EPA-approved model contained in "Rapid Assessment of Exposures to Particulate Emissions from Surface Contamination Sites" (Cowherd et al, 1984);
- Exposure point concentrations 50 feet from the sources were estimated by the Near Field Box Model (Pasquill 1975, and Horst 1979) to evaluate risks to residents living adjacent to the tie plant; and
- Exposures to volatile emissions from the CERCLA lagoon were estimated using the Industrial Source Complex Short-Term Dispersion Model (Bowers et. al 1979).

Potential ground water ingestion exposure:

- Individuals drink 1 liter of water per day as children and 2 liters per day as adults (USEPA 1986);
- Potential subchronic/chronic exposures are calculated for children because of their smaller body weight; and
- The average concentration of contaminants in water remains constant over time.

Risk Characterization

In calculating risks from exposure to non-carcinogens, the hazard index is used. The hazard index approach assesses the overall potential for noncarcinogenic effects posed by multiple chemicals by assuming that multiple sub-threshold exposures could result in an adverse effect. The magnitude of the adverse effect is assumed to be proportional to the sum of the ratios of the sub-threshold exposures to acceptable exposures. Any single chemical with an exposure level greater than the reference level will cause the hazard index to exceed "1." Ratios in excess of "1" are considered to have the potential for a non-carcinogenic systemic health risk.

Risk estimates for carcinogens are expressed as the lifetime probability of cancer associated with a given dose. The EPA considers an acceptable risk from carcinogenic compounds to fall within a range of one excess cancer per ten thousand exposed individuals (a risk of 1×10^{-4}) to one excess cancer in ten million individuals (a risk of 1×10^{-7}), with a goal of one in a million (a risk of 1×10^{-6}). The one in a million goal may be modified if technological constraints prevent achieving this level. Risk levels calculated for the various exposure routes are described below:

Existing Exposures: Incidental ingestion of soils was found to be the primary contributor of risks to human health. Under the current residential exposure, assuming no contact with site source areas, the carcinogenic risk level was estimated to be 1.14 in one hundred thousand (1.14×10^{-5}). The hazard index for this route is less than one for noncarcinogenic systemic effects. For local children who also visit the CERCLA lagoon periodically, the additional carcinogenic risk is 8.65 in a million (8.65×10^{-6}). However, the hazard index for the CERCLA lagoon exceeds one, primarily due to the presence of naphthalene. Risks through exposure to carcinogenic compounds in the CERCLA lagoon and certain areas of the drainage ditch and slough exceed the one in ten thousand (1×10^{-4}) risk level for soils. It is assumed that drip track soils also exceed the one in ten thousand risk level, due to obvious heavy contamination.

No direct measurements were made of compounds in air after the tie plant was closed. Risk estimates for inhalation of indicator compounds were therefore determined by modeling the concentrations of contaminants which may be released from a source area. The risk from this exposure route is primarily due to naphthalene originating from the CERCLA lagoon. By estimating the exposure point concentrations through modeling, the hazard index exceeds one by this pathway. However, there is almost no information on the health effects of low doses of naphthalene in air. Also, the model used to determine the concentrations of volatiles from the lagoon provides unrealistically high concentrations due to an assumption in the model that the air above the source is completely saturated with each compound of interest. Models which accurately calculate the emissions of volatiles from contaminated soils have not been developed. The carcinogenic risk level is approximately seven in one-million (7×10^{-6}), primarily from exposure to fugitive dust.

Potential human exposures: The most significant future risk is due to the possibility of installation of drinking water wells in the shallow water table aquifer downgradient from the CERCLA lagoon. No carcinogenic compounds were detected in this area, but the assumption was made that benzene (a carcinogen) may be present because it was detected in one ground water sample from the CERCLA lagoon. Although benzene was not routinely analyzed for at the Site, the concentration found in the CERCLA lagoon sample was used to calculate the risk due to ingestion of ground water in this area. The estimated carcinogenic risk was determined to be slightly greater than one in ten thousand (1 x 10^{-4}). The hazard index for consumption of ground water in this area exceeds one due to high concentrations of naphthalene and phenolic compounds. In addition, the proposed Somers municipal wells, although planned for completion in bedrock, could conceivably draw-down the aquifer to such an extent that the water table aquifer in the vicinity of the contaminated areas begins to impact the quality of the bedrock aquifer. The pump test of the proposed wells will be designed to evaluate this possibility.

Risks through direct contact with soils were considered assuming that the tie plant is developed for residential use. These risks were determined to be essentially the same as for current residential use, assuming that residences are not placed in known source areas. Future excavation in the area downgradient from the CERCLA lagoon or in the swamp pond could open additional pathways for exposure, however, local ordinance currently prohibits excavation in these areas due to their location in the floodplain. Construction is unlikely in the swamp area because the water table is at ground surface at certain times of the year. Beach erosion could conceivably uncover contaminated sediments in Flathead Lake and make them available for direct contact during low lake levels.

Environmental exposures: Routes of environmental concern primarily include exposure of wildlife to direct contact with contaminated sediments in the slough and ingestion of environmental contaminants via the food chain. Also of concern is the potential for erosion to uncover contaminated beach sediments, allowing fish and other aquatic life in Flathead Lake to be exposed by direct contact or by ingestion of contaminants. Continued migration of contaminated ground water into the lake could also lead to detrimental impacts on water quality and aquatic ecology.

The potential for plants to concentrate and store compounds of interest is low because both zinc and PAH tend to bind to sediments, rather than water, and because plants metabolize PAHs. In general, biomagnification levels are low. However, sediments from certain parts of the slough adjacent to the tie plant were found to contain very high concentrations of zinc and PAH. Zinc concentrations were also very high in slough water. The concentrations detected may have the effect of limiting the reproduction or species composition of the benthic fauna.

An assessment was made to determine whether any adverse effects were manifest on waterfowl which inhabit the slough. Observations of waterfowl over a 3.5 month period did not reveal any physical or behavioral abnormalities. Analysis of waterfowl tissue for zinc indicated that concentrations were normal and consistent with concentrations measured in waterfowl from a nearby control slough.

Although no evidence of significant adverse effects to Flathead Lake was found through site sampling, the presence of contaminants in ground water, in the swamp pond area and in subsurface beach sediments indicate that the Site is affecting the local environment. This will tend to continue until the site is remediated.

VII. Description of Alternatives

The following discussion provides a description of the alternatives considered during the detailed analysis of the BN-Somers Feasibility Study (FS). The alternatives are numbered to correspond to the numbers in the FS report, which presents the alternatives in more detail. The remedial action costs and time frames are estimates which will be refined during remedial design. Although soil and ground water alternatives are presented separately, the remedy selection process in this Record of Decision treats both soil/sediment and ground water components as a single response action.

Alternatives for Contaminated Soils

Table 3 lists the alternatives considered in the detailed analysis for soil remediation. The alternatives are classified by treatment, containment and institutional control components.

<u>Alternative 1: No Action.</u> This alternative does not involve treatment or containment of contaminants, but does include erecting fences and posting warning signs in contaminated areas and instituting controls to prevent development of the Site. In addition, potential pathways of contaminant release from the Site would be monitored and provisions for appropriate action would be made in the event of a release that could cause an unacceptable risk.

Fencing and deed restrictions would be used to prevent access to contaminated areas. Fenced areas would include the CERCLA lagoon, the retort building, and the drip track. Restrictions would be placed in the deed to properties including the areas of the CERCLA lagoon, drip track, retort building, discharge ditch, former swamp pond and a portion of the slough. Ground water monitoring would be implemented in conjunction with the ground water no action alternative discussed later. This alternative could be implemented in a few months to half a year.

Fencing and institutional controls would not be completely reliable due to uncertainties about the maintenance of these controls. Since contaminated soils would be left in place, contaminants would continue to seep into ground water and ground water contamination would continue to affect Flathead Lake.

TABLE 3

SOIL ALTERNATIVES

TECHNOLOGY TYPE: REMEDIAL OPTION	PROCESS OPTION	ALT 1 No Action	ALT 3 a,b,d Excavate & Biologically Treat On-Site	ALT 3 c Excavate & Land Treat Off-Site	ALT 5 Excavate & Stabilize/ On-Site Disposal	ALT 7 a,b Excavate & Incinerate/ On-Site
BIOLOGICAL SOILS TREATMENT	Land Treatment		X	X		
THERMAL SOILS TREATMENT	Incineration					X
CHEMICAL SOILS TREATMENT	Stabilization				X	X
CONTAINMENT	On-Site Disposal		X	X	X	X
	Capping		X	X	X	X
INSTITUTIONAL CONTROLS	Fencing	X	X	X	X	X
	Deed Restrictions	X	X	X	X	X
	Zoning Restrictions	X	X	X	X	X
	Monitoring	X	X	X	X	X

Applicable or Relevant and Appropriate Requirements (ARARs) are not met by this alternative. Capital cost estimates, based on fencing, signs, administrative costs and legal costs, would be $238,000. Annual costs would be $2,500. The total present worth cost would be $262,000.

Alternative 3a: Partial Excavation with On-Site Biological Treatment of Soils. This alternative would involve excavating 11,100 cubic yards of contaminated soils in the CERCLA lagoon, drip track, drainage ditch and retort building areas. Some contaminated soils would remain below the water table in the CERCLA lagoon. Soils in these areas which exceed risk-based cleanup goals (3.6 mg/kg of total carcinogenic PAH compounds, 1,875 mg/kg total PAH, 3,000 mg/kg total phenolics, or 15,750 mg/kg zinc) would be excavated. A clay cap would be placed on the contaminated area in the slough. Wetlands restoration or replacement would be required.

The soils would be biologically treated on-site in a 6-acre treatment facility operated in accordance with RCRA requirements. Treatment would be conducted similarly to land treatment, but in a lined unit. Treatment would continue until total carcinogenic PAH concentrations are reduced to at least 36 mg/kg (the maximum acceptable risk level), total PAH levels are reduced to 1,875 mg/kg, and RCRA Best Demonstrated Available Treatment levels for naphthalene, pyrene, and phenanthrene are reached. Treatment would be expected to take between eight and ten years.

The treatment unit would be covered with an impermeable cap at closure to prevent direct contact with treated soils and to minimize the migration of rainwater into the unit. Long-term ground water monitoring, closure and postclosure care of the treatment facility would be implemented in accordance with RCRA regulations. Restrictions would be placed on the deed for the property housing the treatment unit. A temporary storage unit would be constructed, in accordance with RCRA requirements, to contain soils awaiting treatment. The excavated areas would be restored by backfilling with local borrow soils and vegetating.

Contaminated soils at BN-Somers are subject to RCRA restrictions on land disposal. In order to comply with these restrictions, no soils could be placed in the treatment unit after August 8, 1990, unless it is demonstrated that no migration of contaminants from the treatment zone would occur and a variance from the land disposal restrictions is granted. Due to the volume to be treated, it would not be possible to apply all of the soils by this statutory deadline. Therefore, a no-migration demonstration would be required. Soils contaminated by drippage of ties in storage (i.e. in the drip track and slough areas) have been proposed by EPA for consideration as RCRA hazardous wastes. These soils will therefore also be considered and handled as a hazardous waste during remedial action.

However, land disposal restrictions have not yet been developed for these wastes. The EPA is undertaking a land disposal restriction rulemaking that will specifically apply to soil and debris. Until that rulemaking is completed, the CERCLA program will not consider the RCRA land disposal restrictions to be relevant and appropriate to these soils.

At the completion of this remedial action, health risks posed by direct contact with contaminated soils would be reduced to 1×10^{-5} or lower in the excavated areas. Soils in the treatment unit would achieve a 1×10^{-4} or lower risk level and would be capped in place. The total capital cost of this alternative is estimated to be $2,296,000. Operations and maintenance costs would be $101,000 annually for 10 years and $47,000 annually for 30 years. The estimated total present worth cost of this alternative is $3,146,000.

Alternative 3b: Partial Excavation and On-Site Biological Treatment of Soil. This alternative is the same as Alternative 3a, except that in addition to remediating soils currently available for direct contact, this alternative would provide additional protection to surface water bodies by removing contaminated soils in the slough and beach areas. The total excavated soil volume would be 20,000 cubic yards.

Excavation of saturated sediments in the slough and beach areas would require the use of temporary sheet piling and perhaps coffer dams. Extensive dewatering would also be necessary. The size of the soil treatment unit would be expanded to 10 acres. Storage, treatment, restoration, monitoring, closure and postclosure activities would be the same as Alternative 3a. Wetlands restoration or replacement would be required. A no-migration demonstration would be required, as in Alternative 3a.

The total capital cost of this alternative is estimated to be $4,264,000. The annual operations and maintenance cost would be $121,000 per year for 10 years and $72,000 per year for 30 years.. The estimated total present worth cost of this alternative is $5,336,000.

Alternative 3c: Partial Excavation and Off-Site Land Treatment. This alternative would involve the same volumes and areas of excavation as Alternative 3b; however, soils would be biologically treated off-site at Burlington Northern's permitted land treatment facility in Paradise, Montana. Restoration of excavated areas at Somers would be the same as in Alternative 3b.

BN has completed a land treatment demonstration at Paradise and the State has issued a final permit for land treatment of soils currently at Paradise. A permit modification would be required to expand the area permitted for land treatment before Somers soils could be treated there. The EPA Off-Site Policy would be followed. In accordance with this policy, BN must implement a ground water corrective action plan at Paradise in order to be fully compliant with RCRA requirements before transporting waste from Somers. BN would also need to provide additional site characterization information on the area of the facility which would be used to treat Somers waste. The State would need to issue a permit modification to allow the use of this additional acreage. The Somers waste would have to meet the previously established waste application criteria for the Paradise land treatment unit. A no-migration demonstration may not be necessary under this alternative, since it is anticipated that 1) corrective action would begin and a permit modification could be made before excavation begins at Somers and 2) application of all of the Somers waste could be made before the August 8, 1990 deadline. If this were not the case, a no-migration demonstration would be required.

Under the conditions of the State permit for land treatment at Paradise (MDHES 1989), treatment must continue until residual total PAH contamination is reduced to 100 mg/kg. Treatment must then continue for another year. If a 20% or greater reduction of total PAH is observed during this time, treatment must continue until either a decrease of less than 20% from the previous year's total PAH concentration is observed or total carcinogenic PAH compounds are reduced to 5 mg/kg and total PAH compounds are reduced to 10 mg/kg.

In addition to RCRA requirements, EPA, State and U.S. Department of Transportation requirements would be met during transport of soils to Paradise.

It is anticipated that excavation and transportation of soils would take between six months and one year. Land treatment at Paradise would take an additional four to five years to achieve the cleanup levels required in the RCRA permit. The total capital cost of this alternative is estimated to be $3,182,000. The annual operations and maintenance cost is estimated to be $152,000 for five years and $53,000 for 30 years. The estimated present worth cost of this alternative is estimated to be $4,216,000.

<u>Alternative 3d: Deep Excavation and On-Site Biological Treatment of Soils.</u> This alternative would involve the same activities as Alternative 3b, except that it would include excavation of contaminated soils to a depth of 30 feet in the CERCLA lagoon, subsurface soils downgradient from the CERCLA lagoon, and excavation to a depth of 20 feet in the former swamp pond. Excavation below the water table would require the use of sheet piling and involve extensive dewatering. Removal, treatment and disposal of the generated water would be required. Excavation of the subsurface soils downgradient from the CERCLA lagoon would require that two private houses be temporarily relocated. Since

BN does not own these properties, access would have to be obtained.

A total soil volume of 106,400 cubic yards would be excavated. Approximately 22 acres on-site would be used for biological treatment of the soils. Storage, treatment, restoration, monitoring, closure and postclosure activities would be the same as Alternative 3a. The land disposal restrictions described under Alternative 3a would also apply and a no-migration demonstration would have to be made. Institutional controls on the use of ground water downgradient from the CERCLA lagoon would be implemented until ground water quality has returned to acceptable levels. These controls could take the form of notice in deed of the presence of hazardous waste in ground water beneath the property and a prohibition on construction of new wells for potable use.

Due to the greatly increased volume of soils to be treated, this alternative would take 16 to 20 years to complete. The total estimated capital cost would be $14,489,000 and the annual operations and maintenance cost would be $142,000 for 16 years and $79,000 for 30 years. The estimated total present worth cost of this alternative is $15,363,000.

<u>Alternative 5: Partial Excavation and On-Site Containment.</u> This alternative would involve construction of a two-acre, lined disposal facility on the Site in accordance with RCRA regulations. The disposal facility would be double-lined with high density polyethylene membrane and clay liners. Leachate collection and leak detection systems would be installed. A volume of 20,000 cubic yards of contaminated soils (the same soils described under Alternative 3b) would be excavated. The soils would be placed in the disposal facility after stabilization, but without treatment.

The excavated areas would be restored by backfilling with local borrow soils and vegetating. Disturbed wetlands would be replaced or restored. Ground water monitoring wells would be installed downgradient of the facility and long-term monitoring and maintenance would be implemented in accordance with RCRA requirements. Restrictions on the use of the property occupied by the landfill would be placed in the deed.

Residual contamination in source areas would be reduced to the same concentrations as provided in Alternative 3b by excavation. However, because no treatment would be involved, no reduction in toxicity would occur.

The time frame necessary to implement this alternative would be one year. Since all of the soils could be placed in the landfill before August 8, 1990, a variance to the land disposal restrictions would not be required. The total capital costs involved are estimated at $2,126,000 and the annual operations and maintenance cost are estimated at $22,000 for 30 years. The total present worth cost would be $2,333,000.

Alternative 7a: Partial Excavation and On-Site Thermal Treatment. This alternative would involve construction of a temporary incinerator on the Site. A volume of 20,000 cubic yards of contaminated soils (the same soils as described under Alternative 3b) would be excavated and processed to remove as much free oil and water as practicable. The recovered oil would be shipped to a creosote manufacturer for refining and recycling. Any wastewater generated would be managed in accordance with RCRA regulations. The processed soils would be incinerated. Pilot testing of an infrared conveyer furnace was conducted on creosote-contaminated soils from the BN Paradise facility. This method was found to be an effective way of treating such wastes. The actual thermal treatment unit used in this alternative would be determined during remedial design. Trial burns would be required prior to initiation of the project in order to refine engineering specifications. During operation, air emissions would be controlled in accordance with State and EPA emissions standards. Wastewater produced from the air pollution control system would be treated on site.

The ash residue from incineration would meet RCRA Best Demonstrated Available Technology concentrations. It would be landfilled in a new 2-acre facility on site and capped in accordance with RCRA regulations to reduce migration of liquids through the landfilled material. Due to generally low concentrations of metals in the contaminated soils, reduction of the mobility of metals in the treated ash is not expected to be required. However, if the immobilization of metals were found to be necessary, lime material would be added to stabilize the soils. Ground water monitoring wells would be installed upgradient and downgradient from the disposal facility and long-term monitoring, maintenance and restrictions on the use of the property would be implemented. However, these activities would not be necessary if the ash could be delisted as a hazardous waste. Since incineration would treat the contaminated soils to RCRA Best Demonstrated Available Technology levels, no variance from the land disposal restrictions would be required prior to landfilling the ash.

A period of two years would be required to complete incineration of the excavated soils. During this time, soils awaiting treatment would be stockpiled on site. The total estimated capital cost of this alternative would be $15,998,000. The annual operations and maintenance cost would be $26,000 for 20 years. The total present worth cost of this alternative is estimated to be $16,219,000.

Alternative 7b: Deep Excavation and On-Site Thermal Treatment. This alternative would involve the same areas of excavation and volumes described in Alternative 3d, except that excavated soils would be incinerated on-site. As in Alternative 3d, temporary relocation of two houses would be necessary to complete the excavations. Excavated areas would be restored as in Alternative 3d. The operation of the incinerator and disposal of the ash residue would be completed as in Alternative 7a, except that a 10-acre landfill would be required. The total time required to treat the excavated soils would be 2 years. This period is the same as Alternative 7a because a larger capacity incinerator would be used.

The total estimated capital cost of this alternative would be $62,643,000. Annual operations and maintenance costs would be $36,000 for 30 years. The total present worth cost of this alternative is estimated to be $62,909,000.

Alternatives for Contaminated Ground Water

Table 4 lists the alternatives considered in the detailed analysis for ground water remediation and classifies aspects of the alternatives into treatment, containment, and institutional control components.

Alternative 1: No Action. This alternative involves no engineering controls, but it does provide for monitoring contaminant pathways and instituting controls to prevent future development of water supply wells in the areas of ground water contamination.

Three new ground water monitoring wells would be installed. One of these wells would be completed in the lower artesian aquifer. These new wells and 11 existing wells would be sampled on a quarterly basis for PAH and phenolics. In addition, samples would be collected from the Somers municipal water supply on a quarterly basis. If results indicate a significant increase in contaminant migration or a decrease in the quality of the municipal supply, appropriate response measures would be developed and implemented. These might include implementation of ground water remediation and provision of an alternate municipal water supply.

Institutional controls on the construction of new wells downgradient from the CERCLA lagoon and in the swamp pond area would be implemented and maintained until ground water quality returns to acceptable levels. These controls could take the form of notice in deed of the presence of hazardous waste in ground water beneath the property and a prohibition on construction of new wells for potable use, if enacted by the Somers Water District. Institutional controls are not considered completely reliable. Under this alternative, ground water, and possibly

TABLE 4

GROUND WATER ALTERNATIVES

TECHNOLOGY TYPE		ALT 1	ALT 2	ALT 5	ALT 6
		No Action	Chem/Phys/ Hot Water	In-Situ Bio Trmt	In-Situ Bio Trmt/ Hot Water
REMEDIAL OPTION	PROCESS OPTION				
BIOLOGICAL GW TREATMENT	In-Situ			X	X
CHEMICAL GW TREATMENT	Peroxide/UV Oxidation		X	X	X
PHYSICAL GW TREATMENT	Oil/Water Separation		X	X	X
	Hot Water Flushing		X		X
GROUND WATER MONITORING		X	X	X	X
INSTITUTIONAL CONTROLS		X	X	X	X

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surface water would continue to degrade as existing plumes migrate. ARARs would not be met by this alternative.

Implementation of this alternative is expected to take less than six months at a total estimated capital cost of $79,000. Annual operations and maintenance costs would be $65,000 for 30 years. The total present worth cost is estimated to be $692,000.

Alternative 2: Hot Water Flushing with Physical and Chemical Ground Water Treatment. This alternative would involve installation and operation of an innovative hot water flushing system in conjunction with conventional ground water treatment. Injection and recovery wells would be installed in and around the CERCLA lagoon and former swamp pond areas. Temporary restrictions on the use of ground water in the affected areas would be implemented.

Creosote contamination in the aquifer would be flushed by hot water, and the recovered ground water would be treated by oil/water separation and an ozone/ultraviolet (UV) or hydrogen peroxide/UV system. Recovered oil would be shipped to a creosote manufacturer for recycling or would be treated under one of the soil alternatives. Hot water flushing is an unproven technology for creosote wastes. It may be difficult to implement in the complex hydrogeological conditions and low permeability aquifer at Somers. Pilot testing would be conducted to determine the practicability of this option and to develop engineering plans.

The cleanup and treatment levels would reduce the total PAH concentrations in the aquifer to 0.3 ug/l and the total carcinogenic PAH levels to 0.03 ug/l. Appropriate Water Quality Criteria and Maximum Contaminant Levels would also be met. The treated water would be reinjected into the aquifer beneath the main tie plant through an infiltration gallery. Excess treated water would be reinjected in a second infiltration gallery on the tie plant property or discharged to the Lakeside publicly owned treatment works (POTW), if an agreement could be reached with this facility. Ground water wells and the Somers municipal water supply would be sampled semi-annually to monitor contaminant migration and the performance of the remedy. Actions taken in the swamp area would need to comply with regulations governing actions in wetlands and floodplains. Discharge of treated water would have to be done in compliance with the Clean Water Act and Underground Injection Control programs, and the Montana non-degradation standards.

This alternative would be completed in approximately 20 years. Once completed, the residual carcinogenic risk to human health from consumption of affected ground water would be reduced to 1×10^{-5}. A cleanup concentration of 1×10^{-6} was considered but not implemented because current analytical methods are unable to reliably detect total carcinogenic PAH concentrations of 0.003

ug/l. The cleanup concentration for total PAH was set below the risk levels associated only with systemic effects in order to protect against certain effects from noncarcinogenic PAH compounds. As stated earlier, these may be cancer initiators or co-carcinogens.

The total capital costs involved are estimated to be $2,594,000. Annual operations and maintenance costs would be $690,000 for 20 years. Total present worth costs are estimated at $8,468,000.

Alternative 5: In-Situ Biological Ground Water Treatment. This alternative would involve installing an in-situ treatment system. The system extracts ground water through wells, adds nutrients and oxygen, and injects the water into the aquifer. It also monitors and controls the ground water gradient and contaminant plume. The biological treatment would stimulate growth of the naturally-occurring bacteria in the ground water. The bacteria would digest contaminants in the water and convert them into nonhazardous constituents. Injection and recovery wells would be installed in the CERCLA lagoon and swamp areas. After water is pumped from the wells, it would be treated in an oil/water separator and a ozone/UV or hydrogen peroxide/UV chemical reactor. Aquifer and ground water cleanup concentrations would be the same as Alternative 2. A portion of the treated water would be reinjected through an infiltration gallery after addition of nutrients and peroxide. The remaining treated water would be discharged to the Lakeside POTW, if an agreement can be reached with the facility, or into another infiltration gallery on the tie plant property. Ground water monitoring would be the same as in Alternative 2.

As with Alternative 2, pilot testing of this alternative would be required to demonstrate the technology's practicability and to establish design and operating parameters. Administrative requirements would be the same as for Alternative 2. Temporary institutional controls on the use of affected water would be implemented.

The estimated time frame for completion of this alternative is 15 years. The total estimated capital costs involved would be $2,197,000. Annual operations and maintenance costs would be $540,000 for 15 years. Total present worth costs are estimated to be $6,304,000.

Alternative 6: Hot Water Flushing with In-Situ Biological Treatment. This alternative would combine the hot water flushing technology of Alternative 2 with the in-situ biological treatment of Alternative 5. The areas remediated would be the same as in Alternatives 2 and 5. During the hot water flushing phase, produced water would be treated in an oil/water separator and an ozone/UV or peroxide/UV chemical reactor. After hot water flushing has removed the maximum practicable amount of contamination, the in-situ treatment process would be implemented to remove residual contamination. Aquifer and ground water cleanup concentrations would be the same as Alternatives 2 and 5. Pilot testing would be required to establish the technology's effectiveness and design and operating parameters prior to implementation. The administrative requirements of this alternative would be the same as for Alternatives 2 and 5. Temporary institutional controls would be used to prevent use of ground water in affected areas.

The total time to complete this alternative is estimated to be ten years. The total capital cost is estimated to be $2,617,000. Annual operations and maintenance costs would be $690,000 for two years and $540,000 for eight years. The total present worth cost is estimated to be $6,695,000.

VIII. Summary of the Comparative Analysis of Alternatives

This section summarizes the relative performance of the alternatives described above in relation to the nine evaluation criteria specified in OSWER Directive 9335.3-01 (U.S.EPA 1988). Although soil and ground water alternatives are evaluated separately, the remedy selection process in this Record of Decision treats both soil/sediment and ground water components as a single response action. Additional information is presented in the Feasibility Study for the BN-Somers site (Remediation Technologies 1989, Vol. III).

Analysis of Soil Alternatives

Overall protection of human health and the environment. All the alternatives, with the exception of the "no action" alternative would assure adequate protection of human health and the environment by eliminating, reducing or controlling risk through treatment or engineering controls. Alternatives 3a, 3b, 3c, and 7a would remove and treat soils that are contaminated above risk-based concentrations and that are available for direct contact. By removing and treating these soils, the risk of direct contact would be eliminated and the source of contaminants to ground water would be reduced.

Alternatives 3d and 7b, which involve deep excavation of source areas, would provide better protection than partial excavation if ground water treatment were not found to be successful. Alternative 5 removes the direct contact threat by excavating the contaminated soils and placing them in a lined landfill protected by an impermeable cap. Alternative 3a does not include remediation of beach sediments and therefore provides somewhat less long-term environmental protection than other alternatives.

Because the "no action" alternative would allow continued impacts on ground water from contaminated soils, it is not considered further in this analysis.

Compliance with ARARs. All alternatives could be designed to meet the applicable or relevant and appropriate requirements of Federal and State environmental laws. Alternatives which involve on-site biological treatment (3a, 3b, and 3d) would require a demonstration that no migration would occur outside of the treatment unit for as long as the wastes remain hazardous. The use of a lined treatment unit should help facilitate this demonstration. In Alternative 3c (off-site land treatment) it is expected that all of the excavated soils could be applied to the treatment unit before the effective date of the land disposal restrictions. If this were not the case, a demonstration of no migration would be required. Alternatives 7a and 7b (incineration) would reduce contaminant concentrations sufficiently to allow for land disposal of residual ash in compliance with the land disposal restrictions. The on-site containment alternative could be completed prior to the effective date of the land disposal restrictions.

Long-term effectiveness and permanence. Alternatives 3a, 3b, 3c, and 3d would permanently provide protection of human health and the environment by removing all soils that exceed risk-based concentrations and that are available for direct contact. The soils would be biologically treated to reduce contaminant concentrations to acceptable levels. On-site containment would not be considered a permanent remedy for two reasons. First, portions of the cap might need to be replaced over time, and second, the liner may fail and allow a release of contaminants from the untreated soils. The same concerns apply to a liner and cap associated with a land treatment unit, however, the waste would be permanently treated and the liner would only be necessary during the period of treatment. Once wastes are treated to health-based levels, and if leachate also meets health-based levels, the cap would only be necessary to prevent infiltration and pooling of water in the unit. Incineration would permanently destroy most of the organic contamination; however, the ash would need to be landfilled, unless it can be demonstrated to be non-hazardous.

Reduction of toxicity, mobility, or volume. All of the alternatives except 5 would significantly and permanently reduce the toxicity of the soils through treatment. On-site incineration or biological treatment would be required to continue until total carcinogenic PAH compounds are reduced to below 36 mg/kg and RCRA Best Demonstrated Available Technology concentrations for naphthalene, phenanthrene, and pyrene are met. Alternative 3c would require treatment to levels specified in the RCRA permit. Alternative 5 would reduce the mobility of the contaminants by containment and capping, but it does not involve treatment of waste materials. Most of the treatment alternatives reduce mobility, although air emissions may occur under the thermal or biological treatment options. No significant volume reduction would occur with any of the alternatives.

Short-term effectiveness. Sufficient acreage is available at Paradise to begin treatment of all the excavated soils under Alternative 3c immediately after excavation. There would be some minor, short-term risk of exposure to the community during transportation of the contaminated soils. Alternatives 3d and 7b would provide the fastest protection of ground water through deep excavation of the source areas. Some short-term risk of releases to Flathead Lake would be associated with beach and swamp area excavations. Biological soil treatment under the deep excavation option (Alternative 3d) would take six to 15 years longer than the other alternatives, due to the large soil volume, if almost the entire tie plant property were used for treatment. Alternative 5 would be effective in a relatively short time since contaminated soils would be placed directly into an impoundment and capped. All of the alternatives would pose some short-term risks of exposure to volatile PAH compounds during excavation.

The capacity for on-site biological or thermal treatment is limited. Therefore, under Alternatives 3a, 3b, 3d, 7a, and 7b, contaminated soils would be stockpiled and would be available for direct contact until treatment has been completed. In addition, exposure to air emissions from an incinerator or from a land treatment unit is possible. Alternative 3d would involve the longest exposure duration due to stockpiled soils and possible air emissions, because of the larger volumes of stored soils and the increased acreage of the biological treatment unit.

Implementability. All of the soil treatment and containment alternatives considered involve technologies that have been used successfully to solve similar contaminant problems at other Superfund sites. Demonstrations of the effectiveness of both incineration and land treatment were conducted on soils contaminated with creosote wastes from the BN-Paradise facility. The experience necessary to construct the remedies are available. A mobile incinerator could be obtained quickly. Alternatives involving deep excavation would require the use of construction methods that address the need to excavate below the water table. The same would be true of excavation in the slough and beach areas. Beach and swamp excavations would also have to protect against a possible blow-out due to the proximity of Flathead Lake. Alternatives 3d and 7b would also require the temporary relocation of two houses. Alternative 3c would require a modification to the State RCRA permit for the BN-Paradise land treatment facility in order to allow additional acreage for treatment. Ground water corrective action must begin at the Paradise facility before waste from Somers could be brought to the Site. This would be necessary to comply with the EPA Off-

Site Policy. On-site land treatment (Alternatives 3a, b, and d), and possibly off-site land treatment (Alternative 3c), would require a demonstration that no migration of hazardous constituents would occur from the treatment unit. Alternative 5 could be completed in the shortest period of time followed by the incineration alternatives (7a and 7b) and the off-site land treatment alternative (3c).

Cost. Table 5 provides a comparison of estimated capital, operation and maintenance, and net present worth costs of the various alternatives. Other than the no-action alternative, Alternative 5 would require the least capital outlay followed in order by Alternatives 3a, 3c, 3b, 3d, 7a, and 7b. Alternative 5 would also have the lowest present worth cost followed in order by Alternatives 3a, 3c, 3b, 3d, 7a, and 7b.

State Acceptance. The Montana Department of Health and Environmental Sciences (MDHES) concurred with EPA's proposed plan to land treat contaminated soils off-site, but initially withheld judgement on the actual treatment location. After receiving substantial public comment in opposition to Alternative 3c (off-site land treatment at Paradise), the State expressed support for Alternative 3b, on-site biological treatment, or treatment at another undetermined off-site location. The State also expressed support for incineration as a contingency alternative if ground water remediation were found to be impracticable.

Community Acceptance. EPA received substantial public comment in opposition to Alternative 3c, land treatment at Paradise. Public commentors were also opposed to Alternatives 7a and 7b, on-site incineration, but were generally supportive of on-site biological treatment. The public also commented that beach sediments should not be included in the areas of the Site to be excavated.

Analysis of Ground Water Alternatives

Overall protection of human health and the environment. All of the alternatives, with the exception of the "no action" alternative, would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls and institutional controls. Alternative 2 would remove creosote contamination from the aquifer by hot water flushing and would chemically treat the contamination at the surface. Alternative 5 would biologically treat the contamination in-situ. Alternative 6 would involve a combination of hot water flushing and in-situ biological treatment. In all of the treatment alternatives, pumping wells would provide hydraulic controls to prevent contaminated ground water from reaching Flathead Lake. Temporary institutional controls would prevent the use of contaminated portions of the aquifer as a drinking water supply.

TABLE 5

SUMMARY OF ESTIMATED REMEDIAL ACTION COSTS

FOR SOIL ALTERNATIVES

Soil Alternative	Total Capital Cost	Annual O&M* Cost	Total Present Worth Cost
1	$238,000	$2,500 (30 years)	$262,000
3a	$2,296,000	$101,000 (10 years) $47,000 (30 years)	$3,146,000
3b	$4,264,000	$121,000 (10 years) $72,000 (30 years)	$5,336,000
3c	$3,182,000	$152,000 (5 years) $53,000 (30 years)	$4,216,000
3d	$14,489,000	$142,000 (16 years) $79,000 (30 years)	$15,363,000
5	$2,126,000	$22,000 (30 years)	$2,333,000
7a	$15,998,000	$26,000 (30 years)	$16,219,000
7b	$62,643,000	$36,000 (30 years)	$62,909,000

* O&M = Operations and Maintenance

The "no action" alternative does not prevent continued degradation of ground water resources or continued adverse impacts on Flathead Lake; therefore it is not considered further as a remedial option.

Compliance with ARARs. All of the treatment alternatives can be designed to comply with all ARARs. The currently expanding ground water contaminant plume is considered a violation of the State's nondegradation standards; however, once ground water treatment is instituted, the plume will no longer be allowed to expand and this ARAR will also be met.

Long-term effectiveness and permanence. All of the ground water treatment alternatives are innovative and would require pilot testing to establish their practicability and site-specific design and operating parameters. It is possible that ground water remediation will be found to be effective in the CERCLA lagoon area but not in the swamp area because of aquifer permeabilities. If effective, all of these alternatives would provide long-term effectiveness and permanence by removing and degrading contaminants.

Reduction of toxicity, mobility, or volume. All of the treatment methods considered would reduce the toxicity, mobility and volume of contamination. Depending on the length of time each system is operated, the various systems can all reach the treatment concentrations of 0.03 ug/l total carcinogenic PAH, 0.3 ug/l total PAH, as well as Water Quality Criteria, Drinking Water Standards and Maximum Contaminant Levels.

Short-term effectiveness. Alternative 6 could remediate the aquifer in the shortest period of time. Both Alternative 2 and Alternative 6 would be effective in the short term because hot water flushing would quickly remove the heaviest contamination from the aquifer. However, Alternative 2 would have to be operated for 5 to 10 years longer than the methods involving in-situ treatment to achieve the same cleanup levels. Institutional controls on the use of contaminated ground water would be necessary to provide short-term protection during the remediation period in all of the treatment alternatives.

Implementability. All of the methods considered would require pilot testing to determine practicability and design and operating parameters. It is possible that ground water remediation will prove to be impracticable at the Site, or may be practicable only in the CERCLA lagoon area. Pilot testing is expected to take between six months and one year. Once implemented, institutional controls on the use of affected ground water would be required until treatment is complete. An agreement with the Lakeside POTW would have to be obtained, or all of the produced water would have to be reinjected at the BN-Somers site.

Cost. Table 6 presents the estimated capital, operation and maintenance costs, and net present worth costs for each alternative. With the exception of the no-action alternative, Alternative 5 would require the least capital outlay followed in order by Alternatives 2 and 6. Alternative 5 involves the lowest present net worth cost, followed in order by Alternatives 6 and 2.

State acceptance. The Montana Department of Health and Environmental Sciences concurred with EPA's proposed plan, which involved hot water flushing combined with in-situ biological treatment (Ground Water Alternative 6).

Community acceptance. The community was generally supportive of Alternative 6, but expressed concerns about possible nutrient additions to Flathead Lake and resultant algae blooms.

IX. The Selected Remedies

Based upon consideration of the requirements of CERCLA, a detailed evaluation of the alternatives, and public comments both the EPA and the State have determined that a modified Soil Alternative 3b (excavation and on-site biological treatment), and Ground Water Alternative 6 (hot water flushing and surface chemical treatment followed by in-situ biological treatment) comprise the most appropriate remedy for the BN-Somers site. These alternatives and the associated response objectives are discussed below.

Modified Soil Alternative 3b

Soil Alternative 3b involved excavation of approximately 20,000 cubic yards of creosote and zinc contaminated soils in the CERCLA lagoon, drip track, drainage ditch, beneath the retort building, and in the slough and beach areas. EPA has selected a modified Alternative 3b, which includes excavation of all of these areas except the beach sediments, for a total excavated volume of approximately 11,700 cubic yards. After consideration of public comment and based on its own engineering evaluation, EPA agreed that the risks to Flathead Lake from a beach excavation outweighed the benefits of removing the contaminated sediments. The contaminated beach sediments are currently covered by a few feet of clean sand. These sediments will be reviewed every five years to ensure that leaving them in place continues to be protective.

Under the soil component of the selected remedy, a portion of contaminated soils will remain below the water table in the CERCLA lagoon and swamp. These soils will be treated as part of the ground water component of the remedy. A temporary storage unit will be constructed on-site and operated according to RCRA

TABLE 6

SUMMARY OF REMEDIAL ACTION COSTS

FOR GROUND WATER ALTERNATIVES

Ground Water Alternative	Total Capital Cost	Annual O&M* Cost	Total Present Worth Cost
1	$79,000	$65,000 (30 years)	$692,000
2	$2,594,000	$690,000 (20 years)	$8,468,000
5	$2,197,000	$540,000 (15 years)	$6,304,000
6	$2,617,000	$690,000 (2 years) $540,000 (8 years)	$6,695,000

* O&M = Operations and Maintenance

requirements to contain soils awaiting land treatment. The excavated areas (other than wetlands) will be restored by backfilling with clean borrow soils and vegetating. Replacement or restoration of wetlands destroyed during the 1985 Emergency Removal action at Somers will be accomplished, as well as replacement or restoration of any additional wetlands lost during the final remedial action.

The excavated contaminated soils will be biologically treated on-site in a 10-acre lined land treatment facility. A land treatment demonstration will be conducted prior to the application of any waste to the treatment unit. Treatment of all of the soils to acceptable health-based levels is expected to take between eight and ten years. Toxicity testing will be conducted to ensure that the overall toxicity of the soils is adequately reduced by treatment. If, at completion of treatment, any leachate collected in the unit is within the ground water cleanup concentrations established in this Record of Decision, the facility may be closed by perforating the liner system and covering the unit with a vegetative cap. However, if the leachate contains contaminant concentrations greater than the ground water cleanup concentrations, the land treatment unit will be covered with an impermeable cap at closure to minimize the migration of rainwater into the unit and leaching of contaminants. Unless and until soils are treated to background contaminant concentrations, up to 30 years of ground water monitoring and post-closure care of the treatment facility will be implemented in accordance with RCRA. If hazardous constituents remain in the treatment unit at closure, restrictions will be placed on the deed for the property housing the unit.

It is anticipated that the first application of contaminated soils to the treatment unit will be made before the August 8, 1990, effective date of the RCRA land disposal restrictions. Any subsequent applications occurring after the effective date will necessitate a demonstration that no migration of hazardous constituents above health-based levels will occur from the treatment unit. This demonstration will be made before any waste is applied to the land treatment unit in order to ensure that the remedy may proceed after the effective date of the land disposal restrictions. Evidence from the land treatment demonstration conducted at BN's Paradise facility indicates that if the Somers unit is operated similarly, no migration will occur to ground water. The use of a liner will also help in making this demonstration. Modeling of possible releases to air will be made as an initial demonstration of no-migration. Actual monitoring of treatment operations will be used to verify the no-migration demonstration.

Placement of contaminated soils in the temporary storage unit will also be subject to the RCRA land disposal restrictions if such placement occurs after August 8, 1990. If the soils are placed into a waste pile, they will first be pretreated in order to obtain a treatability variance from the land disposal restrictions or a demonstration will be made that hazardous constituents will not migrate from the unit above health-based levels. Otherwise, the soils will be placed in a storage tank until treatment can occur.

Response Objectives - Soil

The response objectives for soil remediation are to reduce exposure from direct contact to an acceptable level and to ensure that the migration of contaminants to ground water is minimized.

Both Federal and State ARARs were reviewed to determine if there are any standards that indicate the acceptable concentrations for contaminants in soils. This review indicated that no Federal or State standards exist for these compounds in soils. Therefore, the soil cleanup levels were determined by the risk assessment process. Table 7 presents the cleanup concentrations which were established for the various compounds; all of these concentrations must be achieved. Any soils at the Site which exceed concentrations of 3.6 mg/kg total carcinogenic PAH, 1,875 mg/kg total PAH, 15,750 mg/kg zinc, or 3,000 mg/kg phenolics will be excavated. The total carcinogenic PAH concentration equates to a risk level of one in one hundred thousand (1×10^{-5}). The total PAH, zinc, and phenolic concentrations are considered protective against systemic (noncarcinogenic) effects.

The establishment of the excavation cleanup concentration for total carcinogenic PAH considers the minimum individual PAH constituent concentration which can be detected in soils. This concentration is approximately 1 mg/kg. For this reason, a one in one million (1×10^{-6}) cleanup (equating to a total carcinogenic PAH concentration of 0.36 mg/kg) cannot be verified. At the completion of remedial action, health risks posed by direct contact with soils will be reduced to at least 1×10^{-5}, which can be verified analytically.

The initial treatment of soils will reduce total carcinogenic PAH concentrations to 36 mg/kg and will reach RCRA Best Demonstrated Available Technology levels of 7.98 mg/kg for naphthalene, 7.98 mg/kg for phenanthrene, and 7.28 mg/kg for pyrene. The treatment concentration of 36 mg/kg equates to a one in ten thousand (1×10^{-4}) risk level, the maximum acceptable carcinogenic risk according to EPA standards. EPA's goal is a risk level of 1×10^{-6}; therefore, once the initial treatment levels are achieved, treatment will continue until the decrease in total PAH has been less than 20% from the previous year, or background concentrations are reached. At this point, another application of soils may be made or the facility may be closed.

TABLE 7

REMEDIATION CONCENTRATIONS

SELECTED REMEDIES	CHEMICAL	REMEDIATION CONCENTRATIONS	
MEDIA:		Human Health	Aquatic Life
Soil - Excavation:	Carginogenic PAH (1×10^{-5} risk)	3.6 mg/kg*	
	Total PAH	1,875 mg/kg*	
	Total phenolics	3,000 mg/kg*	
	Zinc	15,750 mg/kg*	
Soil - Initial treatment residuals:[1]			
	Carcinogenic PAH (1×10^{-4} risk)	36 mg/kg*	
	Naphthalene	7.98 mg/kg+	
	Phenanthrene	7.98 mg/kg+	
	Pyrene	7.28 mg/kg+	
Ground Water:	Carcinogenic PAH (1×10^{-5} risk)	0.030 ug/l**	
	Total PAH	0.300 ug/l*	
	Acenaphthene	20 ug/l**	
	Fluoranthene	42 ug/l**	
	Naphthalene		620 ug/l**
	Benzene	5 ug/l***	
	Phenol	3,500 ug/l**	2500 ug/l**
	Total Phenolics	15,000 ug/l*	
	Zinc	5,000 ug/l****	110 ug/l**

[1]After achieving initial treatment residuals, land treatment will continue until the net reduction in total PAH concentration for a particular year is less than 20% compared to the previous year. Incineration will meet RCRA requirements for a destruction efficiency of 99.99%, in addition to the initial treatment residuals.

Key to sources of remediation goals:
* Risk Assessment
** Clean Water Act Water Quality Criterion
*** Safe Drinking Water Act Maximum Contaminant Level
****Safe Drinking Water Act Drinking Water Standard
+ RCRA Best Demonstrated Available Technology Level

If background concentrations can be reached, certain RCRA postclosure care requirements would not be necessary. Based on the land treatment demonstration conducted on soils contaminated with creosote waste at BN's Paradise facility, it is estimated that each waste application will require four to five years to treat.

Ground Water Alternative 6

Ground water Alternative 6 involves hot water flushing of contaminated ground water, ozone/UV or peroxide/UV treatment at the surface, and in-situ biological treatment of residual contamination. Injection and recovery wells will be installed in the CERCLA lagoon and former swamp pond areas. Temporary institutional controls designed to restrict the use of ground water in the affected areas will be implemented. Creosote contamination in the aquifer will be flushed out by hot water and the recovered ground water will be treated in a chemical reactor. Once hot water flushing has removed the maximum practicable amount of contamination, an in-situ biological treatment process will be implemented to remove residual contamination. Treated water will be injected into the aquifer beneath the main tie plant through an infiltration gallery or used to irrigate the land treatment unit. Excess water will be discharged to the Lakeside POTW, if possible. Recovered oil will be shipped to a creosote manufacturer for recycling or handled with the soil alternative. Ground water wells and the Somers municipal supply will be monitored semi-annually until cleanup concentrations are achieved.

Hot water flushing and in-situ treatment are unproven technologies for creosote wastes. They may be difficult to implement in the complex hydrogeological system and low permeability aquifer at Somers. Pilot testing will be conducted so that EPA may determine the practicability, design and operational constraints of the process.

Response Objectives - Ground Water

The response objectives for ground water remediation are to reduce, by treatment, potential exposures from ground water ingestion and to ensure contaminants in ground water do not adversely affect the quality of Flathead Lake.

Both Federal and State ARARs were reviewed to determine if there are any standards indicating the acceptable concentrations contaminants in ground water. This review identified Water Quality Criteria for total carcinogenic PAHs, acenaphthene, fluoranthene, naphthalene, benzene, phenol, and zinc, a Maximum Contaminant Level for benzene and a Secondary Drinking Water Standard for zinc. These standards are summarized in Table 1. Table 7 presents the cleanup concentrations established for the remedial action. These concentrations must be met throughout the contaminant plumes.

A one in one hundred thousand (1×10^{-5}) cleanup concentration of 0.03 ug/l will be set for total carcinogenic PAH. A concentration of 0.003 ug/l (one in a million or 1×10^{-6} risk level) was considered, but not selected because the analytical methods available do not reliably allow for verification of this total concentration. The cleanup concentration for total PAH compounds, considering systemic but not carcinogenic effects, is 0.3 ug/l, based on risk assessment. This concentration includes a safety factor to provide additional protection against cancer initiators or co-carcinogens as well as against other carcinogenic PAH compounds, such as the nitrogen-bearing heterocyclics which were not typically analyzed for at the Site.

The Water Quality Criteria of 110 ug/l for zinc and 2,560 ug/l for phenol will also be used as cleanup concentrations because of the potential for ground water to discharge directly into Flathead Lake. The Water Quality Criteria for acenaphthene and naphthalene will automatically be met by achievement of the total PAH cleanup concentration.

Contingency Remedies

Traditional ground water pump and treat methods would not be effective for aquifer remediation at Somers because of the low permeability of the contaminated aquifer at the Site and the nature of creosote contamination. Ground water Alternative 6 involves two innovative technologies, hot water flushing and in-situ biological treatment. These are the most promising methods given the hydrogeologic conditions at Somers. Both technologies require pilot testing to determine their practicability at the Site. Pilot tests will be completed before any soils are applied to the land treatment unit. At the conclusion of pilot testing, EPA will use the criteria established in OSWER Directive 9355.3-01 (USEPA 1988) to determine whether ground water remediation will be practicable at the Site.

Contingency Remedy A. If pilot testing indicates that ground water Alternative 6 would not be practicable, a modified soil Alternative 7b involving deep excavation (excluding beach sediments) and incineration will be implemented. In this case, the same areas described above for modified soil Alternative 3b will be excavated with the addition of approximately a 20 foot excavation in the swamp area and approximately a 30 foot excavation in the CERCLA lagoon and downgradient areas. The volume to be excavated will total approximately 98,300 cubic yards. This deeper excavation will be designed to remove as much contaminated material as possible below the water table, in order to reduce the source of contamination to ground water.

Incineration was chosen over biological treatment as the technology to treat these soils because the volume excavated could be treated in 2 years by incineration, but would take at least 16 years to biologically treat on site using essentially all of the available tie plant property for land treatment. Because of the proximity of homes to the areas which would be used for biological treatment, that option was not chosen. Biological treatment using the 10-acre site outlined in Alternative 3b would allow a visual and noise buffer zone; however treatment would take over 50 years. If the large soil volume considered under this contingency remedy were land treated, the liner systems for both the treatment and soil storage units would have to be maintained for up to 50 years. The reliability of these materials would tend to be reduced over extended periods of operation. Incineration was chosen over land treatment because thermal treatment can achieve the same or better treatment levels in a much shorter period of time without requiring the long-term management of hazardous waste storage and treatment facilities.

Excavation below the water table would require sheet piling and extensive dewatering and treatment. Excavation downgradient from the CERCLA lagoon would require the temporary relocation of two houses. The excavated soils would be incinerated on the Site after removing as much water and free oil as possible. The oil would be shipped to a creosote manufacturer for recycling. The incinerator would be operated according to RCRA requirements. The ash residue from incineration would be landfilled in a new 10-acre facility on-site and closed and capped according to RCRA. Long-term monitoring and restrictions on the use of the property would not be implemented, unless the ash cannot be delisted or does not reach background contaminant concentrations. The cleanup concentrations for soil excavation above the water table would be the same as for Alternative 3b. In addition, the goal of excavation beneath the water table would be to remove all soils which are visibly contaminated or contain detectable high molecular weight PAH compounds. Incineration would meet RCRA Best Demonstrated Available Technology levels and would achieve a destruction efficiency of 99.99%, in accordance with RCRA requirements, in addition to reducing total carcinogenic PAH concentrations to less than 36 mg/kg (Table 7). Institutional controls designed to prevent the use of contaminated ground water would be implemented in the contaminated area, until ground water quality returned to acceptable levels.

Contingency Remedy B. If pilot testing indicates that ground water remediation would only be practicable in the area of the CERCLA lagoon, but would not be effective in the swamp area, most probably due to lower permeability aquifer materials, the swamp area soils will be excavated to a depth of approximately 20 feet, in addition to the excavated areas outlined in modified soil Alternative 3b. The swamp area excavation is expected to generate approximately 44,800 cubic yards of soil, in addition to the 11,700 cubic yards from other areas at the Site. The response objectives and cleanup levels would be the same as those described under Contingency Remedy A. For the same reasons outlined under Contingency Remedy A, the total of 53,500 cubic yards of excavated contaminated soil would be incinerated on-site, a process which would take approximately 2 years.

X. Statutory Determinations

Under its legal authorities, the EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. Specifically, when complete, the selected remedial action must comply with applicable or relevant and appropriate standards established under Federal and State environmental laws unless a statutory waiver is granted. The selected remedy must be cost-effective and utilize permanent treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous wastes. The following sections discuss the selected and contingency remedies for the Site in light of these statutory requirements.

Protection of Human Health and the Environment

The soil component of the selected remedy (excavation and on-site biological treatment) protects human health and the environment through removal and treatment of soils. Biological treatment will be conducted in accordance with RCRA requirements which will ensure that the treatment operation is protective. This remedy will eliminate the direct contact threat currently present and will minimize future effects on ground water and surface water by removing the sources of waste above the water table. The cancer risks associated with source areas will be reduced from the present level of greater than one in ten thousand (1×10^{-4}) to a level of one in one hundred thousand (1×10^{-5}) or better. Excavated soils will be treated to a risk level of better than one in ten thousand (1×10^{-4}). These levels are within the acceptable range. Short-term risks associated with this remedy, such as air releases during excavation, can be controlled. Although contaminated beach sediments will not be excavated, these sediments are covered with two feet of clean sand, preventing direct contact. Excavation of these sediments was determined to pose a risk to the water quality of Flathead Lake which was greater than the risk of leaving them in place. The beach sediments will be reevaluated every five years to ensure that no further action is necessary.

The selected ground water alternative (hot water flushing, surface chemical treatment, and in-situ biological treatment) also protects human health and the environment by treatment of ground water to acceptable levels. This remedy will eliminate both the potential for risk to human health from consumption of contaminated ground water and the impact to the environment from the discharge of contaminated ground water to surface water. The cancer risks posed by ingestion of contaminated ground water will be reduced from at most one in ten thousand (1×10^{-4}) to one in one hundred thousand (1×10^{-5}) or lower. There are no short-term risks associated with this remedy which will not be controlled.

Each of the contingency remedies protects human health and the environment by excavating and destroying contaminants in soils through thermal treatment. Some short-term adverse effects may occur during a deep excavation in the swamp, but these risks will be greatly reduced through proper engineering controls or design features. If the selected remedy component for ground water proves not to be practicable, institutional controls will be implemented, in addition to excavation of source soils, in an effort to prevent access to contaminated ground water until natural degradation has reduced residual contamination to acceptable levels. Implementation of such institutional controls will meet the protection standards set by Section 121 of CERCLA in conjunction with other contingency soil remedies.

Attainment of Applicable or Relevant and Appropriate Requirements

The selected remedy for both soil and ground water cleanup will meet all applicable or relevant and appropriate requirements (ARARs). Contingency remedy A may temporarily violate the State of Montana nondegradation requirements during the time that the ground water contaminant plume downgradient of the CERCLA lagoon excavation is undergoing natural degradation, since there may be some expansion of the plume during this time. However, this requirement will not be met only if it is found to be technically impracticable to remediate the aquifer. Otherwise, the contingency remedies will meet all applicable or relevant and appropriate requirements. Attachment A lists the ARARs identified for the selected and contingency remedies.

Cost-Effectiveness

The selected remedy is cost effective because it has been determined to provide overall effectiveness proportional to its costs, the net present worth value being approximately $11,000,000. The selected remedy effectively and permanently reduces contamination in both media to acceptable levels and provides a level of protection equal to or exceeding that of the other alternatives. Incineration rather than land treatment of the same soil volume would be over three times as expensive while providing a similar degree of protection. Containment of contaminated soils would be less expensive but would not reduce toxicity, mobility or volume through treatment.

If ground water remediation is found to be impracticable in the CERCLA lagoon and/or the swamp pond area, the contingency alternatives involving deep excavation and on-site incineration of soils are the next most cost-effective solutions. Although incineration would be the most costly option to treat the large volume of soils which would be excavated, incineration would achieve treatment goals in a much shorter time (two years, as compared to 30 to 50 years for land treatment of the same volume), requiring a much shorter period of operation and management of the treatment unit. Therefore, the overall cost effectiveness of incineration is deemed to be greater than land treatment for the volume of soils to be treated. The present worth cost of incineration would be within an order of magnitude of the cost of land treatment.

The EPA has determined that the selected and contingency remedies are cost-effective, based on the fact that the cost is proportional when considering the risk reduction being achieved and the short-term effectiveness of the remedies.

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

The alternatives were analyzed to determine which would utilize treatment technologies to the maximum extent practicable to achieve the response objectives of controlling direct contact exposure to soils, minimizing the impact to ground water from soil contamination, preventing ingestion of unacceptable concentrations of contaminants in ground water, and minimizing the impact to surface water from ground water contamination. By employing land treatment or incineration to reduce the contaminant concentration in soils and by using chemical and biological treatment to reduce concentrations in ground water, the selected and contingency remedies use permanent treatment technologies to the maximum extent practicable for the Site. Containment without treatment may afford greater levels of short-term effectiveness for soil, but it does not outweigh the need for long-term effectiveness afforded by treatment.

Protection of ground water will be achieved by utilizing alternative technologies to remediate the aquifer. Hot water flushing or in-situ bioremediation of ground water alone would take five to ten years longer to achieve cleanup goals than the preferred remedy which combines aspects of each. If ground water remediation is not practicable, then institutional controls designed to prevent usage of contaminated water will be implemented, in addition to excavation of source material, until natural processes return contaminant concentrations to acceptable levels.

Preference for Treatment as a Principal Element

By biologically treating contaminated soils and chemically and biologically treating contaminated ground water, the selected remedy addresses the principal threats at the Site through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied. If ground water remediation cannot be achieved due to technological limitations, then a contingency remedy involving incineration of contaminated soils both above and below the water table, will be implemented, also addressing the statutory preference for treatment. If ground water remediation is impracticable, the statutory preference for treatment of contaminated ground water downgradient from the CERCLA lagoon could not be met, to the extent that contaminated ground water must be left in place.

XI. Documentation of Significant Changes

a) The Proposed Plan was released for public comment in May 1989. The Proposed Plan identified Soil Alternative 3c, excavation and off-site land treatment at BN's Paradise, Montana facility, as the preferred soil component of the cleanup alternative. One of the other soil alternatives (Alternative 3b) presented in the Proposed Plan and the FS involved excavation of the same areas and volumes of soil with biological treatment on-site. The original preference for Alternative 3c was based on the following considerations: 1) space was available off-site to begin treatment of all the soils almost immediately after excavation, 2) the off-site treatment unit was located on agricultural land providing a visual and noise buffer zone between the unit and local residences, and 3) the similarity in contaminated soils from Somers and Paradise and BN ownership of both facilities would allow for a coordinated approach to cleanup of both sites.

During the comment period, EPA and the State of Montana received considerable public comment in opposition to off-site treatment of Somers soils at Paradise. The State of Montana requested EPA to reconsider its preference for this alternative. As a result, EPA extended the comment period on the Proposed Plan and again asked the public to comment on all soil cleanup alternatives, including on-site biological treatment. A second public meeting was also held in Somers.

The EPA, in consultation with the Montana Department of Health and Environmental Sciences, decided to select the on-site biological treatment remedy for soils (modified Alternative 3b) in addition to ground water Alternative 6. Although Alternative 3b included excavation of contaminated beach sediments, these have not been included in the selected alternative because of concerns about possible adverse impacts to Flathead Lake resulting from such an excavation. The public was given the opportunity to comment on an alternative involving no excavation of beach sediments (Alternative 3a). Rather than select Alternative 3a, which did not provide for excavation of contaminated sediments in the slough, EPA decided to modify Alternative 3b.

b) The EPA proposed plan recommended that land treatment, if conducted on-site, continue until the total carcinogenic PAH concentration was reduced to below 36 mg/kg and RCRA Best Demonstrated Available Technology concentrations were achieved. This Record of Decision more clearly defines the treatment levels to be achieved in the land treatment unit. The Record of Decision requires that once initial health-based levels and RCRA Best Demonstrated Available Technology concentrations have been met, treatment will continue until the decrease in total PAH has been less than 20% from the previous year. The initial health-based level to be achieved provides for a reduction in carcinogenic risk to a one in ten thousand (1×10^{-4}) level, which is at the upper end of EPA's acceptable risk range. Additional treatment would reduce residual concentrations to a level closer to EPA's goal of one in one million (1×10^{-6}). If treatment results in leachate concentrations within health-based levels, the land treatment unit can be closed with a vegetative, rather than an impermeable cap, allowing for a broader range of future uses of the property. EPA recognizes, however, that it may not be possible to reduce residual carcinogenic PAH concentrations much below the initial level of 36 mg/kg. Therefore, if, after treating for another year, the total PAH concentration is not reduced at least 20% over the previous year, another soil application may be made or the unit may be closed.

c) Finally, EPA's proposed plan contained two contingency remedies in the event that ground water remediation proved to be impracticable at the Site. The first contingency remedy would be implemented if ground water cleanup is found to be impracticable in both the CERCLA lagoon and swamp areas. Under this contingency, the proposed plan recommended incineration of the excavated soils. Consistent with the proposed plan, Contingency Remedy A in this Record of Decision retains incineration as the treatment technology. However, Contingency Remedy B, in which deep excavation will be implemented only in the swamp area if ground water remediation is found to be impracticable there, has been changed in the Record of Decision from that recommended in the proposed plan. Instead of land treating the excavated soils both at the BN Paradise facility and on-site, as recommended in the proposed plan, the Record of Decision calls for incineration of these soils.

EPA's decision to change the treatment technology under Contingency Remedy B stems from the change in treatment location under the selected alternative from land treatment of soils at Paradise to land treatment on-site at Somers. Since the Paradise facility will not be used to treat any of the Somers soils, all of the excavated soils must be treated on-site. Because of the proximity of the available treatment area to local houses, the treatment unit will be restricted to a size of 10 acres in order to provide a visual and noise buffer zone between the unit and the houses. The volume of soils which would be excavated under this contingency remedy would require 30 years or more to treat using a land treatment process versus two years to incinerate. During the treatment period, both a temporary storage unit and the treatment unit must be managed to prevent migration of hazardous wastes into the environment. Both units would be lined, however the reliability of a liner would tend to decrease with use over time. For these reasons, and because treatment levels would be achieved in two years as opposed to 30, EPA decided to select incineration as the treatment method under Contingency Remedy B.

From among the protective, ARAR-compliant, and cost-effective remedies, the EPA, in consultation with the State, determined that the selected remedy provides the best balance with respect to long-term effectiveness, reduction in toxicity, mobility, and volume afforded through treatment, short-term effectiveness, and implementability and cost, while also weighing the statutory preference for treatment as a principal element and giving consideration to community and State acceptance. On-site biological treatment will provide a comparable level of protection to the off-site treatment remedy originally preferred. If the selected ground water remedy cannot be implemented, the contingency alternatives provide the next best balance among the evaluation criteria.

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ATTACHMENT A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

SOIL ALTERNATIVES

STATUTE OR REGULATION/CITATION	APPLICABLE OR RELEVANT & APPROPRIATE	COMMENTS
FEDERAL REQUIREMENTS		
Location-Specific:		
Executive Order 11990 40 Code of Federal Regulations (CFR) Part 6	A	Protection of wetlands during beach, swamp and slough excavation.
Executive Order 11988 40 CFR Part 6	A	Floodplain management during excavation of beach, swamp and slough. Activities must not affect or be affected by presence of a floodplain.
Floodplain Management 40 CFR Part 6 App. A	A	" "
Fish and Wildlife Coordination Act 16 United States Code (USC) 661 et seq.	A	Habitat of local or migratory endangered species (peregrine falcon and bald eagle) must be preserved during site activities.
Endangered Species Act 50 CFR Parts 200 & 402	A	" "

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Resource Conservation & Recovery Act 40 CFR Part 264, Subpart B	A	Location standards for construction of land treatment unit, waste pile or incinerator.
National Historic Preservation Act, Section 106, 16 U.S.C. 470 et seq., 36 CFR Part 800.	A	Tie plant buildings proposed for demolition are eligible for National Register of Historic places; mitigation must be provided.
<u>Action-Specific</u>:		
Resource Conservation & Recovery Act 40 CFR Part 264, Subpart C	A	Preparedness and prevention requirements.
Subpart D	A	Contingency plans and emergency procedures.
Subpart F	A	Ground water monitoring and corrective action requirements in the event of ground water contamination from treatment, disposal or temporary storage unit.
Subpart G	A	Closure and post-closure requirements for treatment, disposal or temporary storage unit.
Subpart J	A	Requirements for tank systems may be imposed if excavated soils are stored in tanks while awaiting treatment.
Subpart L	A	Requirements for construction, operation, and closure of a temporary storage unit.
Subpart M	A	Requirements for construction, operation, and closure of a land treatment unit.
Subpart N	A	Requirements for construction, operation and closure of a landfill for disposal of incinerator ash.
Subpart O	A	Requirements for construction, operation and closure of an incinerator.
40 CFR Part 268, Subparts A, B, C, D & RCRA Section 3004	A	Placement of hazardous waste in temporary storage, land treatment or disposal unit or landfill is subject to land disposal restrictions.
51 FR 40641	A	" "

51 FR 25760	A	" "
42 U.S.C. 6924(d)(3) (e)(3)	A	Best Demonstrated Available Technology standards must be met prior to placement of RCRA hazardous waste in a land disposal unit. Applies to placement of incinerator ash in a landfill or soils in a land treatment unit, unless a no-migration demonstration is made.
Occupational Safety and Health Act 29 CFR 1926, Subpart P, and 1910 40 CFR Part 262, Subparts B,C,D	A	Worker safety.
STATE REQUIREMENTS		
<u>Chemical-Specific</u>:		
Ambient Air Quality: Administrative Rules of Montana (ARM) 821, 925, 926	A	Control of emissions during soil excavation and treatment.
ARM 16.8.1402, 1404, 1406	A	Sets emission standards for an incinerator.
ARM 16.8.1403	R&A	Restricts particulate emissions from industrial processes; R&A to incinerator.
<u>Location-Specific</u>:		
Historic Preservation Montana Code Annotated (MCA) 22-3-432, 433	R&A	Applies to State-owned lands. Tie plant buildings are eligible for the National Register; mitigation must be undertaken when they are demolished.
ARM 12.8.501, 505-508	R&A	" "
Floodplain & Floodway Management MCA 76-5-102	A	Excavation and construction activities in the swamp, slough and beach areas must not adversely affect the floodplain or its uses and must withstand flooding.
MCA 76-5-202	A	" "

MCA 76-5-401, 402, 403, 404, 405, 406	A	" "
ARM 36.15.204, 216	A	" "
ARM 36.15.501	A	" "
ARM 36.15.603-606	A	" "
ARM 36.15.701, 703	A	" "
Endangered Species MCA 87-5-103, 107	A	Bald eagle and peregrine falcon habitats must be protected.
MCA 87-5-501	A	" "
ARM 12.5.201	A	" "
Natural Streambed & Land Preservation MCA 75-7-208	R&A	No streams affected but protection must be provided to Flathead lakeshore during excavation in the beach or swamp areas.
Hazardous Waste Management ARM 16.44.702	A	Prohibits siting hazardous waste treatment, storage or disposal facility within a floodplain or near an active fault.
<u>Action-Specific</u>:		
Occupational Safety and Health Administration MCA 50-70-113	A	Worker safety requirements.
ARM 16.42.101, 102	A	Noise and air emissions limitations to protect workers.
Ambient Air Quality MCA 75-2-102	A	Requirements for monitoring and limiting air emissions during soil excavation and treatment.
MCA 75-2-201, 211	A	" "

ARM 16.8.704	A	" "
ARM 16.8.804, 807-809, 811, 822	A	" "
ARM 16.8.922, 923, 927, 931, 932, 938	A	" "
ARM 16.8.929, 930, 933	R&A	Applies to major stationary sources; relevant and appropriate for operation of an incinerator.
ARM 16.8.932, 935	A	Impact analysis required for air emissions source.
ARM 16.8.1003	R&A	Applies to Federal Class I area.
ARM 16.8.1004	A	Visibility models prescribed for impact assessment.
ARM 16.8.1007	R&A	Preconstruction visibility monitoring required in Federal Class I area; relevant and appropriate for operation of an incinerator at the Site.
ARM 16.8.1102-1105, 1109	A	Emissions controls required for a treatment unit.
ARM 16.8.1302	A	Open burning prohibition.
ARM 16.8.1401, 1411, 1423, 1424, 1425, 1427	A	Emissions standards for a treatment unit.
Solid Waste Management MCA 75-10-212, 214, 221	A	Solid waste generated during various site activities is subject to various disposal, siting and management requirements.
ARM 16.14.505, 508, 509, 521, 523	A	" "
Hazardous Waste Management MCA 75-10-406	A	Requirements for management of hazardous waste excavated and treated in a biological or thermal treatment unit or stored or disposed of on site. Includes monitoring requirements.

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ARM 16.44.102, 106, 109, 110, 113, 120, 123	A	" "
ARM 16.44.124	A	Requirements for conducting a land treatment demonstration.
ARM 16.44.303, 310, 311, 321, 322, 323, 324, 333	A	Identification and listing of hazardous wastes.
ARM 16.44.401-417	A	Generator requirements; hazardous waste will be generated by excavation of contaminated materials.
Public Water Supply MCA 75-6-101	A	Protection of water/sewer lines during excavation.
ARM 16.20.402	A	" "

Note:

Section 121 of SARA exempts on-site CERCLA activities from obtaining permits. However, the substantive requirements of listed laws or regulations must be met.

Administrative or procedural requirements of listed State laws and regulations are not considered as ARARs, however, the substantive provisions of these requirements are ARAR.

GROUND WATER ALTERNATIVES

STATUTE OR REGULATION/CITATION	APPLICABLE OR RELEVANT & APPROPRIATE	COMMENTS
FEDERAL REQUIREMENTS		
Chemical-Specific:		
Safe Drinking Water Act 40 CFR Part 141	R&A	Maximum Contaminant Levels are treatment concentrations for ground water.
Location-Specific:		
Executive Order 11990 40 CFR Part 6	A	Protection of wetlands during construction and operation of ground water treatment unit.
Executive Order 11988, 40 CFR Part 6	A	Floodplain management during operation of ground water treatment unit. Activities must not affect or be affected by presence of a floodplain.
Endangered Species Act 50 CFR Parts 200 and 402	A	Habitat of local or migratory endangered species (bald eagle and peregrine falcon) must be preserved during site activities.
Fish and Wildlife Coordination Act 16 USC 661 et seq.	A	" "
Resource Conservation and Recovery Act 40 CFR Part 264 Subpart B	A	Location standards for construction of ground water treatment unit.
Action-Specific:		
Pretreatment 40 CFR Part 403.5	A	Requirements for indirect discharge of treated ground water to a POTW.

Safe Drinking Water Act 40 CFR Part 144, Subparts A, B, C, E, Part 146, Subparts A & B, Part 147, Subpart BB	A	Requirements for reinjection of treated ground water.
Occupational Safety and Health Act 29 CFR 1926 Subpart P and 1910	A	Worker safety.
Resource Conservation and Recovery Act 40 CFR Part 264		
Subpart C	A	Preparedness and prevention requirements.
Subpart D	A	Requirements for a contingency plan and emergency procedures.
Subpart F	A	Ground water monitoring and corrective action requirements in the event of ground water contamination from ground water treatment operation.
Subpart G	A	Closure and post-closure requirements for ground water treatment unit.
Subpart I	A	Container storage requirements apply to storage of contaminated ground water for treatment.
Subpart J	A	Requirements for tank systems used during ground water treatment.
40 CFR Part 268 Subparts B, C, D & E.	A	Reinjection of treated ground water may be subject to land disposal restrictions.
RCRA Section 3004(d)(3) (e)(3)	A	" "
51 FR 40641	A	" "
51 FR 25760	A	" "
42 U.S.C. 6924(d)(3)(e)(3)	A	Best Demonstrated Available Technology standards would apply to treatment of hazardous wastes prior to disposal.

40 CFR Part 270 Subpart F	A	Requirements for sending treated ground water to a POTW or reinjecting.
STATE REQUIREMENTS		
<u>Chemical-Specific</u>:		
Nondegradation MCA 75-5-303	A	Prohibits degradation of ground water or Flathead Lake during cleanup activities.
ARM 16.20.702, 703	A	Discharge limits would apply to reinjection of treated water.
Public Water Supplies ARM 16.20.203, 205	A	Maximum Contaminant Levels are treatment concentrations for ground water.
Surface Water Quality ARM 16.20.617	A	Water Quality Standards are treatment concentrations for ground water.
Montana Ground Water Pollution Control ARM 16.20.1003, 1011	A	Degradation prohibited during reinjection of treated ground water.
<u>Location-Specific</u>:		
Endangered Species MCA 87-5-103, 107	A	Bald eagle and peregrine falcon habitats must be protected.
MCA 87-5-501	A	" "
ARM 12.5.201	A	" "
Floodplain & Floodway MCA 76-5-102	A	Ground water treatment activities must not adversely affect the floodplain or its uses and must be constructed to withstand flooding.
MCA 76-5-202	A	" "
MCA 76-5-401, 402, 403, 404, 405, 406	A	" "

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ARM 36.15.204, 216	A	" "
ARM 36.15.501	A	" "
ARM 36.15.603-606	A	" "
ARM 36.15.701, 703	A	" "
Hazardous Waste Management ARM 16.44.702	A	Prohibits siting ground water treatment facility within a floodplain or near an active fault.
<u>Action-Specific</u>:		
Occupational Safety and Health MCA 50-70-113	A	Worker safety requirements.
ARM 16.42.101, 102	A	Noise and air emissions limitations to protect workers.
Public Water Supplies MCA 75-6-101, 105 112	A	Ground water treatment operation must not adversely affect municipal water supply.
ARM 16.20.213	A	" "
Surface Water Quality ARM 16.20.602, 605, 631, 633, 635	A	Ground water cleanup standards and sampling methods required during ground water treatment operations.
ARM 16.20.632	R&A	Operating standards for facilities operating prior to July 1971; relevant and appropriate to ground water treatment operations at the Site.
Water Quality Act MCA 75-5-101	A	Policy statement.
MCA 75-5-602, 605	A	Monitoring requirements for discharge of treated water to POTW.

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Surface & Groundwater Appropriations MCA 85-2-505	A	Prohibition on wasting ground water during ground water treatment operations.
Montana Pollution Discharge Elimination System ARM 16.20.907, 916	A	Prohibition on the use of public water wells for injecting contaminated ground water.
Hazardous Waste Management Act ARM 16.44.102, 109, 110, 120	A	Construction, operation and monitoring requirements for ground water treatment unit.
ARM 16.44.310, 311, 321-324, 333	A	Identification and listing of hazardous wastes.
ARM 16.44.401-417	A	Generator requirements would apply to handling of spent carbon used to treat ground water.
Water Well Construction MCA 37-43-105	A	Policy Statement.
MCA 37-43-101, 104	R&A	Water supply wells for drinking water will not be constructed, but construction requirements R&A are relevant and appropriate to wells used in ground water treatment.
MCA 37-43-202	R&A	" "
ARM 36.21.638, 640-662, 664, 666-679	R&A	" "
Montana Ground Water Pollution Control ARM 16.20.1002, 1010, 1013, 1015, 1016	A	Regulations on discharge of pollutants to ground water apply to reinjection of treated water.

<u>Note:</u>

Section 121 of SARA exempts on-site CERCLA activities from obtaining permits. However, the substantive requirements of listed laws or regulations must be met.

Administrative or procedural requirements of listed State laws and regulations are not considered as ARARs, however, the substantive provisions of these requirements are ARAR.

ATTACHMENT B.

BURLINGTON NORTHERN (SOMERS PLANT) SUPERFUND SITE

FLATHEAD COUNTY, MONTANA

RESPONSIVENESS SUMMARY

A. OVERVIEW

The preferred alternative for remediation of the Burlington Northern Somers Site, recommended by EPA in the proposed plan, addressed the soil and ground water contamination problems at the site. The preferred alternative involved a) excavation and land treatment of soils at a Burlington Northern facility in Paradise, Montana, and b) hot water flushing with chemical treatment and in-situ bioremediation of ground water. EPA also proposed contingency alternatives in the event that ground water treatment proves to be impracticable at the site and source area soils must be excavated to depths significantly below the water table. In this event, depending on the extra volume of soils excavated, EPA proposed to either land treat the soils both on-site and off-site or, if the soil volume is very large, to incinerate the soils on site.

Judging from the comments received during the public comment period on the proposed plan, Paradise residents would strongly object to any alternative which would bring contaminated soils from Somers to Paradise for treatment. The Montana Department of Health and Environmental Sciences (MDHES), after receiving significant public comment against such an alternative, requested that EPA reconsider its preference for treatment of soils at Paradise. Comments received from residents of Somers and nearby communities as well as local environmental groups indicated support for the concerns of the community of Paradise and general acceptance of on-site biological treatment of soils using a land treatment process. Commentors also expressed support for the proposed ground water treatment method, but were concerned that adequate pilot testing be done to assure that excess nutrients from the in-situ treatment system are controlled. The Flathead Lake Protection Association (FLPA), which has an EPA technical assistance grant, and Burlington Northern Railroad (BN) both opposed the contingency alternative involving on-site incineration. MDHES expressed a preference for incineration under either contingency alternative. The FLPA and many other commentors requested that contaminated beach sediments be left in place due to concerns about a possible release of contaminants to Flathead Lake during excavation.

The responsiveness summary consists of the following sections:

- Background on Community Involvement
- Summary of Comments Received during the Public Comment Period and Agency Responses.
- Remaining Concerns.
- Summary of Community Relations Activities at the BN Somers Site.

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the Somers Site has involved both local residents and public interest groups active in issues affecting the greater Flathead valley. Somers residents have been particularly concerned about local public health issues and the potential impact of contamination on their drinking water supply while valley-wide interest has been focused primarily on the potential impacts of the Site on Flathead Lake. Additional concerns include the effects of the Site on local property values, possible future limitations on the use of the Site property for development, and access to the local beach area for recreational use.

The EPA approved a Technical Assistance Grant for the Flathead Lake Protection Association in January, 1989. The Association has participated in reviewing and interpreting Site technical reports and other documents and has provided information to the community and comments to EPA on the RI/FS and proposed plan for Site cleanup. Another environmental group, the Clark Fork Coalition, became involved in the Site because of the EPA proposal to treat Somers soils at the BN Paradise facility which is located on the Clark Fork River.

During the 1985 comment period on the Administrative Order and Work Plan for the RI/FS, EPA received a number of comments, questions and concerns. Some of the major issues raised and how EPA and the State addressed them are described below:

- A number of commentors expressed concern that EPA oversight procedures would be inadequate and that the public would not be kept informed.

  <u>EPA Response:</u> EPA responded that it would use a number of methods to keep the public informed, including periodic public meetings, public comment periods on important documents such as the work plan, publishing regular fact sheet updates, and establishing a file of site material at the Somers School. All of these activities were undertaken.

EPA also indicated that the agency would oversee BN's field activities and would split 10 to 25 percent of the samples collected during the Remedial Investigation/Feasibility Study (RI/FS). Split sampling was routinely conducted during the RI/FS.

- Several commentors expressed concerns about the content of the Administrative Order (AO), the procedures for changing it and the need for additional studies that might be required under it. EPA was requested to allow the public to review any proposed changes to the AO in advance.

  EPA Response: EPA responded that if any changes were proposed to the AO, EPA would make them available to the public for review. As a result of public comments received on the work plan which accompanied the AO, EPA did decide to conduct additional sampling (see next item) and the modification to the work plan was made available to the public for a two week comment period.

- EPA was requested to conduct additional sampling in the slough area and the Waterfowl Production Area (WPA) near the Somers tie plant.

  EPA Response: EPA, in consultation with the Montana Department of Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service, decided that additional investigations of the WPA and slough area were necessary. Ultimately, sediments from these areas were sampled, waterfowl observations in the slough area were undertaken and waterfowl sampling was conducted.

During the progress of the RI/FS, EPA received a number of significant comments which are summarized below.

- A former tie plant employee alleged that BN had dumped zinc treated ties in a Somers landfill and that zinc from the buried ties had migrated to a nearby drinking water well.

  EPA Response: EPA and MDHES sampled drinking water wells located downgradient from the landfill and tested the samples for metals. The levels of metals found were well below the maximum levels EPA allows in drinking water.

- Local residents expressed concerns that additional investigations were necessary to evaluate any hazards to private water wells located across the slough from the tie plant.

EPA Response: Additional sediment and water samples were taken from the slough and piezometers were installed to better define the movement of water in the vicinity of the slough. The results indicate that, while it does contain patchy areas of contamination, the slough is an area of discharge for the water table aquifer which would tend to prevent contamination from moving beyond the area to local wells.

- Concerns were expressed about EPA's proposal in June of 1988 to remove the Somers site from the proposed National Priorities List (NPL), because of its status as a Resource Conservation and Recovery Act-regulated site. Commentors indicated a preference for retaining the site on the NPL in order to continue the Superfund process which allows for significant public involvement. Specific concerns were expressed about the potential loss of the Technical Assistance Grant to the Flathead Lake Protection Association if NPL status is not retained, since NPL status is a prerequisite for the availability of such a grant.

  EPA Response: EPA decided to delay removal of the Site from the NPL until negotiations with the potentially responsible parties (PRPs) for the conduct of the Remedial Design/Remedial Action (RD/RA) have been completed. If the PRPs enter into a consent decree with EPA to conduct the work, the cleanup of the Site will be handled under the oversight of the EPA Superfund program. The Site would then be removed from the NPL; however, it is possible that the PRPs would agree to fund the Technical Assistance Grant through the completion of the work. If the PRPs are unable or unwilling to clean up the Site, EPA can repropose and finalize the Site on the NPL and then take action itself.

- EPA was informed of an oily seep which had appeared near the lakeshore away from the tie plant site, but in the vicinity of an old railroad line associated with an abandoned sawmill. Although BN excavated the contaminated area and removed the contaminated soils, area residents were concerned that the problem could be more widespread. Concerns were also expressed that the oil might be the result of dumping of materials from the tie plant. The location of the seep was near the proposed location for a new municipal well for the town of Somers. EPA was requested to include this area within the Somers tie plant Superfund Site.

  EPA Response: EPA contacted the State Water Quality Bureau to inform them of the contaminated area and also initiated the review process for the Site to be considered for the NPL, or for State Superfund action. The first activity which will be undertaken in this process is a Preliminary Assessment. If this initial evaluation indicates that the Site may have problems significant enough to qualify it for Superfund action, a Site Investigation will be conducted. Depending on whether there is currently a release of contaminants or the threat of a release, and depending on the severity of the problem, the Site may be eligible for the NPL, or it may be eligible for action under the State Superfund program.

- The Somers Water District twice experienced water line ruptures where the municipal water lines pass through the Somers tie plant property. In each case, the District, EPA and MDHES were concerned that water carrying contamination might have backflowed from the ruptured area into local homes.

  EPA Response: Immediately after both water line ruptures, EPA and MDHES sampled water from homes located on the water line below the point of the rupture. The Somers Water District directed affected residents not to drink their water and BN provided bottled water to these residents. The results of the water analyses indicated that the water was safe to drink, therefore the Water District lifted its restrictions on use (except for an ongoing boil order because of the possibility of giardia in the unfiltered water supply).

C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

Comments received during the BN Somers public comment period on the draft FS and proposed plan are summarized briefly below. The comment period was held from May 18, 1989 to August 3, 1989. The comments are categorized by relevant topics.

Remedial Alternative Preferences

Each of the major commentors on the draft FS and proposed plan expressed a preference for specific alternatives:

1. MDHES concurred with the soil alternatives evaluation in the EPA proposed plan and with off-site treatment as an acceptable alternative for soil remediation, but withheld judgement on the selection of a treatment location pending the evaluation of a RCRA permit application for the Paradise facility. During the public comment period on the proposed plan, the State received substantial comment in opposition to transporting more soils from Somers to Paradise for

treatment and MDHES requested EPA to reconsider its preference for that alternative and to consider on-site treatment or treatment at another off-site location. MDHES concurred with the ground water alternatives evaluation and with EPA's proposed plan for groundwater remediation, but withheld judgement on the disposition of any additional soils or sludges that might be generated if ground water remediation proves to be impracticable. MDHES indicated a preference for incineration of soils as the contingency remedy if ground water remediation proves to be impracticable.

EPA Response: EPA seriously considered the State's, as well as the community's, preferences and has decided on the on-site remedial action described in the Record of Decision (ROD). This remedial action will involve excavation and on-site biological treatment of soils by a land farming method. The ground water remedial action will be the same as that described in the proposed plan. However, if ground water remediation is not practicable in the vicinity of the former swamp pond or CERCLA lagoon, deep soils in these areas must be excavated. All of the excavated soils will then be incinerated on-site rather than land treated at both Paradise and Somers as originally proposed.

2. The Flathead Lake Protection Association (FLPA), and over 50 commentors, supported on-site land treatment of soils, but recommended that beach sediments not be included in the areas of excavation and incineration not be considered as a contingency alternative for soils. The commentors also recommended that slough sediments and soils in a spur track on the tie plant property be excavated and land treated. The same commentors supported EPA's proposed plan for ground water remediation with a pilot study and demonstration that nutrients from the treatment area will not adversely affect Flathead Lake.

EPA Response: As discussed in the response to comment #1 above, EPA has decided on the on-site remedial action described in the ROD. After considering arguments presented by the FLPA, and based on EPA's own analysis that excavation of beach sediments may pose a greater environmental hazard than leaving them in place, EPA decided to exclude the beach sediments from those which will be excavated and treated. However, the beach sediments will be reevaluated every five years to ensure that no action is necessary in this area. Further site sampling will be done during the design of the remedial action to investigate whether the spur track soils require remediation and to develop an estimate of the volume of these soils which might require excavation and treatment. EPA's original proposed plan for ground water remediation called for pilot testing of the hot water flushing and in-situ bioremediation processes to determine their practicability at the Site. A part of this study will include a demonstration that the addition of nutrients will not be harmful to Flathead Lake. For the reasons outlined in this Record of Decision, EPA has retained incineration as the contingency remedy if ground water remediation is not practicable.

3. The Clark Fork Coalition, the Board of County Commissioners of Sanders County, the Eastern Sanders Conservation District, two members of the Montana House of Representatives and approximately 60 residents of the towns of Paradise and Plains commented in opposition to EPA's proposal to transport contaminated soils from Somers to Paradise for treatment. The Governor of Montana and Montana's representatives to the U.S. Senate and House of Representatives were requested by an number of these commentors to intercede on behalf of the community. In general, the community of Paradise preferred to limit the volume of contaminated soils in their vicinity because of concerns about the proximity of the Paradise facility to the Clark Fork River and fears that a failure of the land treatment unit or waste storage pile might further contaminate the local aquifer or might eventually cause contamination of the river.

   A number of the Paradise residents expressed disbelief that the land farming method would break down the creosote contaminants in the soil. Some individuals indicated to EPA that members of the community were considering violent action if soils were transported to Paradise from Somers.

   <u>EPA Response:</u> Considerable evidence exists that creosote contaminants can safely and effectively be broken down using land farming methods. A land treatment demonstration at the BN Paradise facility provided additional evidence of the reliability of this method. Although EPA recommended treatment of Somers soils at Paradise because this alternative provided the best balance among the criteria EPA uses to evaluate potential cleanup methods, community acceptance of the final alternative is also an important consideration. EPA therefore reexamined the other soil cleanup alternatives discussed in the proposed plan and decided to select on-site treatment of soils.

4. Burlington Northern Railroad (BN) commented in support of the EPA proposed plan for both soil and ground water remediation and supported wetlands restoration/replacement in areas damaged by contamination or remedial activities. However, BN commented against incineration of soils if ground water remediation is found not to be practicable and source area soils in the CERCLA lagoon and swamp area must

be excavated. The primary reason given for BN's opposition to incineration is that the method is not as cost effective as land farming. BN also commented that EPA's cleanup concentrations for ground water were overly conservative.

EPA's Response: EPA agrees that cost effectiveness is an important consideration in selecting a remedial alternative. However, a significant factor in cost effectiveness involves the short-term effectiveness of a remedy. The time period necessary to treat the approximately 11,700 cubic yards of soil to be excavated under the selected alternative is 8 to 10 years. If deep excavation is required in the CERCLA lagoon and swamp areas, the time required to store, manage, and treat the soils could exceed 50 years using a 10 acre treatment unit. Since the treatment area will be located in the center of the town of Somers, a larger unit (which could shorten the time required to treat) would not be acceptable. Incineration could be completed within 2 years, providing for a much shorter period in which hazardous wastes must be managed, both in storage and treatment. EPA has decided that the contingency alternative for treatment of soils from deep excavation in the CERCLA lagoon and/or swamp areas will be incineration.

Technical Questions/Concerns Regarding Remedial Alternatives

Soil Alternatives

1. A commentor asked why EPA was recommending land treatment when the RCRA land disposal restrictions would ban it.

   EPA Response: The land disposal restrictions which were enacted as part of the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act do not ban the land disposal of hazardous waste, but rather place certain restrictions on such disposal to ensure that human health and the environment are protected. The statute defines land disposal to include land treatment facilities. Contaminated soils at the Somers Site are considered to be hazardous wastes under the category K001, bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote. These soils, with the exception of soils contaminated by drippage of ties are subject to the land disposal restrictions. The effective date of the restrictions for these soils is August 8, 1990.

   In order to apply Somers contaminated soils to a land treatment unit after August 8, 1990 in accordance with the land disposal restrictions, the soils must first be treated to RCRA Best Demonstrated Available Technology standards <u>or</u> a variance to the treatment standard or treatment method must be obtained, <u>or</u> a demonstration must be made that there will be no migration of hazardous constituents from the treatment unit for as long as the waste remains hazardous. As discussed in the EPA proposed plan for the Site, land treatment will only occur after a demonstration of no-migration is made.

2. A number of commentors questioned why EPA recommended the Burlington Northern Paradise facility as a treatment location, rather than Somers or a remote, unpopulated off-site location.

EPA Response: EPA initially recommended treating the Somers soils at the BN Paradise facility for the following reasons:

1) BN was already in the process of establishing a land treatment facility at Paradise to treat soils contaminated by tie treating operations. The soils at both Somers and Paradise were contaminated by creosote and both properties are owned by BN. EPA preferred to approach the cleanup of the two sites in a coordinated manner. A pilot demonstration conducted at the Paradise facility showed that land treatment under the area soil and climate conditions effectively breaks down the creosote contaminants in soils. and the State hazardous waste program review of BN's demonstration and other information contained in the permit application for the Paradise facility indicated that the operation could be conducted at Paradise without adversely affecting the environment.

2) Treatment could be completed more quickly at Paradise due to the availability of sufficient acreage to apply all of the Somers soils immediately after excavation. At Somers, areas suitable for land treatment are limited. Treatment would therefore have to be done in stages, with soils awaiting treatment being stockpiled at the Site. Treatment of all of the excavated soils would therefore take approximately twice as long at Somers as at Paradise.

3) The Paradise facility includes agricultural land which is located some distance away from local residences and which could be used for land treatment. A visual and noise buffer zone would therefore be provided between the town and the treatment unit. At Somers, the tie plant is located in the middle of the town. Because of space limitations at Somers, very little visual or noise buffer zone would be provided.

The possibility of developing a third location for land treatment, away from both Somers and Paradise, was also considered. Such an option would delay initiation of treatment of soils due to the need to obtain additional land, conduct a land treatment demonstration, and obtain the necessary State operating permit. In many cases, areas which are uninhabited have climate or soil conditions which are not conducive to land treatment or the availability of irrigation water is limited. It is also not unlikely that, as was the case at Paradise, local residents would be opposed to the establishment of a treatment unit for Somers soils in their vicinity. In addition, this option would involve the creation of yet a third site managing hazardous waste. For all of these reasons, EPA did not select another off-site location.

3. The FLPA commented that selection of a new off-site location for treatment of soils (other than Paradise) would cause further delays in site cleanup that are not warranted.

EPA Response: EPA agrees, for the reasons given above in comment number two, that developing a new off-site location would delay the cleanup of the Somers Site. For this, and the other reasons provided above, EPA has selected on-site land treatment as the cleanup option for soils.

4. A commentor asked for an estimate of the difference in time for land treatment to be completed at Somers versus elsewhere.

EPA Response: Based on the land treatment demonstration conducted by BN at the Paradise facility, an individual application of soil is expected to take four to five years to degrade to acceptable levels. At Paradise, because all of the Somers soils could be applied at once, the total treatment time would have been four to five years. At Somers, the soils will have to be treated in two applications; therefore the total treatment time will be eight to ten years. If another off-site location were used, it would take three to four years to obtain the land, conduct a demonstration and obtain a necessary operating permit. The total time to complete treatment would depend on the volume of soils which could be applied to the unit in one application and the breakdown times under conditions in that area.

5. The FLPA commented that soil excavation must be continued until "clean" material is encountered based on sample data obtained during excavation. The FLPA further recommended that an on-site analytical laboratory be used to verify the proper extent of excavation, followed by certified laboratory verification. The FLPA requested that the verification method be presented to the Association before implementation.

EPA Response: EPA agrees that excavation must continue until analysis of residual soils indicates that cleanup levels have been met. EPA also agrees that the use of an on-site analytical laboratory, followed by verification analyses, would decrease the turnaround time for sample results. Such a laboratory would also be useful in monitoring the effectiveness of soil and ground water treatment methods. However, the method by which these analyses are made will be determined during the Remedial Design process. The verification method to be used would be presented to the public for comment once draft project plans are developed.

6. A commentor indicated that cleanup of swamp pond sediments was sloppily attempted several years ago and additional removal and treatment is necessary in this area.

   <u>EPA Response:</u> In the 1985 Emergency Removal, the heaviest contaminated soil and surface water were removed from the swamp and replaced with clean fill and rip rap was placed along the lakeshore. This interim action was not intended to be a final remedy for the area but was rather intended to stabilize the shoreline to reduce the chances of a washout of contaminated material into Flathead Lake. EPA agrees that additional treatment is necessary, but has selected a ground water treatment method to accomplish this goal rather than additional excavation of soils. However, if pilot testing shows that ground water treatment would not be practicable in this area, EPA has proposed a contingency remedy which would involve excavating and treating the contaminated soils.

7. The FLPA and over 50 commentors recommended that beach sediments be left in place because it would be very difficult to control leakage within the contaminated sediments during excavation leading to the possibility of creating a greater environmental hazard than that presented by leaving the sediments in place.

   <u>EPA Response:</u> As noted in the proposed plan, EPA recognized the difficulty of a beach excavation and the possibility of an escape of contaminants to the lake during excavation, but felt that engineering controls could be used to reduce this effect. However, based on public concerns about the possibility of increased environmental degradation and EPA's own analysis of the risks and engineering practicability, EPA has decided to leave the beach sediments in place. The concentrations of creosote contaminants detected in Flathead Lake water have been very low and typical of background concentrations in surface water. EPA does not therefore believe that contaminated beach sediments are currently impacting the quality of lake water to an extent which would necessarily require remediation. These sediments are presently covered with clean beach sands and are therefore unavailable for direct contact. However, because

contaminated sediments will be left in place, EPA will review this decision every five years. If at a future date the contaminated sediments appear to be causing an unacceptable impact to human health or the environment, action may be taken to remediate the situation.

8. A commentor suggested that contaminated soils should be stockpiled as soon as possible to prevent additional contaminants from entering the ground water.

   EPA Response: EPA agrees that soils which are adversely affecting ground water should be excavated as soon as possible. However, some areas of soil contamination at the Site are not associated with contaminants in ground water and may not require immediate excavation. For these areas, it may be preferable to leave the soils in place to await treatment, rather than excavating and stockpiling them. The decision on what soils will be excavated and stockpiled will be made during the Remedial Design process.

9. One commentor suggested excavating and storing the soils at the Somers site while looking for another off-site treatment location.

   EPA Response: For the reasons given in the response to comment number two, EPA is not looking for another off-site treatment location.

10. A commentor asked EPA to describe how the soils would be excavated.

   EPA Response: Soils above the water table will be excavated using standard construction methods. The fiber optic line and water line in the vicinity of the CERCLA lagoon must be taken into consideration. Saturated soils and sediments, such as those in the slough or below the water table, would be excavated using sheet piling to prevent caving. Dewatering would be necessary, as well as temporary storage and final treatment of the produced water. If swamp area soils must be excavated, a coffer dam may be necessary to prevent a blowout due to pressure from Flathead Lake.

11. A commentor asked where the excavated soils would be stockpiled on site.

   EPA Response: Excavated soils which are not immediately applied to the land treatment unit will be placed in a lined temporary storage unit within the tie plant property. The storage unit will be placed as far from local houses as possible.

12. A commentor asked what material would be used to backfill

the excavated areas at Somers, where it would be obtained and how it would be transported to Somers.

EPA Response: Clean soil will be obtained off-site and transported to the Site by truck.

13. The Clark Fork Coalition and the Flathead Lake Protection Association (FLPA) recommended that land treatment should be preceded by a full-scale demonstration or experiment designed to determine whether the system is capable of meeting required criteria within a specified period of time. The FLPA commented that completion of only an "equivalency demonstration" whereby Somers soils are shown to be the same as those at Paradise would be inadequate and that the demonstration must show that contaminants will not migrate out of the unit. The FLPA further commented that the contaminants of interest should include nitrogen and petroleum compounds as well as secondary metabolic products.

EPA Response: The construction and operation of a land treatment unit at the Somers Site must be conducted in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA). These requirements include a demonstration that a proposed land treatment operation be capable of completely degrading, transforming or immobilizing hazardous constituents in the treatment zone. For a new unit, such as that at Somers, the demonstration may consist of field tests, laboratory analyses or available data. Any laboratory analysis or field test must a) accurately simulate the characteristics and operating conditions for the proposed treatment unit, b) be likely to show that hazardous constituents in the waste will be completely degraded, transformed or immobilized in the treatment zone, and c) be conducted in a manner that protects human health and the environment, including the potential for the migration of hazardous constituents to ground water or surface water.

It is EPA's intention to use a combination of available data from the Paradise land treatment demonstration and laboratory analysis to determine the operating conditions necessary at Somers. Most of the nitrogen and petroleum compounds and secondary metabolic products mentioned by commentors are not listed hazardous constituents under RCRA (in many cases the breakdown products are unknown) and there is little or no information about the toxicity or carcinogenicity of these compounds. Rather than attempt to identify such compounds, the land treatment demonstration and the operation of the land treatment unit will include tests to determine whether the constituents present at completion of treatment are toxic or mutagenic.

14. The Clark Fork Coalition and the Flathead Lake Protection Association recommended that the land treatment cells should be double-lined and equipped with a leachate collection and leak detection system, that any leachate collected should be handled as a hazardous waste, and if a leak is detected corrective action should begin immediately.

EPA Response: Although not required under the applicable RCRA regulations, the Somers land treatment unit will be underlain by a liner with a leachate collection system in order to assist in a demonstration of no-migration. Any leachate collected will be recycled as irrigation water for the land treatment unit or treated in the ground water treatment system, if necessary. The specific type of liner system for the land treatment unit will be determined during remedial design. Depending on the nature of the liner system which is finally chosen, a leak detection system may or may not be possible. For example, a liner system consisting of a synthetic liner underlain by a clay liner would not allow the effective use of a leak detection system. Typically, land treatment units are not underlain by any kind of liner. The Paradise land treatment demonstration, which was conducted without a liner, showed that hazardous constituents remained in the treatment zone. The use of a liner at Somers would provide a further guarantee that no constituents can escape below the unit. If monitoring were to indicate that hazardous constituents have escaped the treatment unit, corrective action would immediately be required.

15. One commentor asked whether there was any evidence that land treatment was effective. Another commentor asked whether land farming methods had ever been tried using a liner system.

EPA Response: Land treatment has been used for over 25 years to treat oily sludges in the petroleum industry. Land treatment of creosote waste is being done at the BN facility in Brainerd, Minnesota, at the Brown Wood Preserving Site in Live Oak, Florida and the Scott Lumber site in Alton, Missouri and has been selected as the treatment method for the BN facility in Paradise and the Champion Mill in Libby, Montana. Except for the Paradise facility, all of these treatment units are underlain by a liner system.

16. A commentor asked whether creosote would get into the food chain if crops were planted on the closed unit.

EPA Response: Pursuant to applicable RCRA requirements, after a land treatment unit is closed, food crops can only be grown if a demonstration is made that hazardous constituents will not be transferred to food or feed portions of the crop or be ingested by grazing food chain animals and that soil contaminant concentrations are not greater than those in untreated soils from the same region under similar conditions.

17. A Somers resident asked about the visual appearance of a land treatment unit and whether this would affect property values in Somers.

<u>EPA Response:</u> A typical land treatment unit resembles an unvegetated plowed field. The soils to be treated are applied in a flat layer and periodically irrigated and tilled. Because the Somers unit will be lined, the liner will be visible at the boundaries of the unit. The unit will be bermed to prevent any runoff of rain water. The tie plant buildings will probably be demolished and removed prior to construction of the unit. The drip track, and possibly the spur line at the Site will also be removed. Because of the removal of these structures, many of which are not in good condition, the appearance of the plant property may be improved. Although there may be no short-term improvement in property values during the treatment period, it is not expected that property values will decline. At the completion of cleanup the property values in the town may increase due to improved environmental conditions.

18. A commentor asked whether there is a technology available to degrade the contaminated soils without tilling them and which would allow the soils to be covered with vegetation during the degradation period.

<u>EPA Response:</u> The land treatment process involves the breakdown of contaminants by soil bacteria. The bacteria require oxygen to live and grow. Biweekly tilling is necessary to ensure that all the soils receive enough oxygen to support the bacteria necessary for contaminant breakdown. It is therefore not possible for vegetation to be grown on the unit.

19. A commentor asked whether the treatment unit size would be enlarged or the thickness of soils applied to the unit increased if additional soils are found which need to be treated.

<u>EPA Response:</u> It is not expected that soil volumes will be significantly greater than anticipated, since a safety factor was provided in calculating the expected volume. However, if additional soils are found which require treatment, the period of treatment will be extended to allow for additional applications of soil. Each application of soil is limited by the depth to which tilling can

effectively occur (approximately 10 inches); however, subsequent applications can be made after each previous application is treated to acceptable levels. The treatment unit size will not be enlarged, in order to keep the unit as far as possible from local houses.

20. A commentor asked what the source of the irrigation water would be.

<u>EPA Response:</u> Ground water collected as part of the aquifer cleanup will be treated and some of the water will be used for irrigating the land treatment unit. Any leachate collected from the treatment unit would also be used as irrigation water.

21. A commentor asked whether the land treatment unit could be constructed so that windy conditions would not cause a release of dust into the air. Another commentor asked who would regulate such emissions.

<u>EPA Response:</u> The land treatment demonstration must include the development of appropriate management and operating methods to control dust emissions from the unit. Soil moisture in the unit will be carefully controlled to ensure that the bacteria receive adequate moisture to survive and break down the contaminants. Additional moisture will be added as necessary to ensure that the soils do not generate dust during dry windy days. Because the land treatment activities will be conducted on a Superfund Site, the lead regulatory agency, in this case EPA, will be responsible for ensuring that these practices are followed.

22. A commentor asked whether the soils which have been treated will be removed before a subsequent layer is applied or whether the additional soils will be placed on top of treated soils.

<u>EPA Response:</u> The additional soils will be placed in a layer on top of the previously treated soils. It is expected that a maximum thickness of about 20 inches will accumulate in the unit before closure.

23. The FLPA recommended that at closure, the land treatment unit be covered with a vegetative, rather than an impermeable cap. The Association suggested providing drainage through the liner after a demonstration that water infiltrating the closed treatment unit would present no health risk.

<u>EPA Response:</u> If the cleanup of soils proceeds to the point that any water passing through the soils meets health-based concentrations and would not exceed any other applicable or

relevant and appropriate requirements, then the liner system may be perforated and the unit covered with a vegetative cap. If the soil cleanup proceeds to the point where the soils have met health-based concentrations, but water passing through the soils contains contaminant concentrations above levels acceptable for drinking water, then an impermeable cap will be necessary to prevent rainwater from entering the unit. This determination will be made by collecting and analyzing any leachate produced in the unit.

24. A number of commentors asked what future use could be made of the area used for land treatment.

<u>EPA Response:</u> The EPA Record of Decision requires that land treatment continue until contaminant concentrations are reduced to levels acceptable for direct contact. Once these levels have been achieved the soils may no longer be considered a hazardous waste, if the requirements of 40 CFR Part 260.22 are met. However, if treatment does not result in contaminant concentrations at or below background, use of the property would be restricted and long term monitoring of the unit would be required.

25. BN commented that incineration is not as permanent or environmentally sound as land treatment and should therefore not be considered as a contingency alternative for soil remediation. In support of this argument, BN referenced CERCLA requirements that remedies be permanent solutions, take into account the long-term uncertainties associated with land disposal, and the short- and long-term potential for adverse health effects from human exposure. BN argued that incineration could produce air emissions and would produce an ash which must be landfilled, thereby failing to meet the requirements of CERCLA, while land treatment produces emissions of less concern and a residue which does not require landfilling.

<u>EPA Response:</u> For the following reasons, EPA argues that incineration meets the statutory requirements of CERCLA: a) Incineration is a method of treatment which permanently and effectively reduces the toxicity of soils. For creosote constituents, incineration has been determined by EPA to be the best demonstrated available technology (e.g., able to reduce the concentration of contaminants to the lowest levels possible). b) The ash which remains after incineration typically contains residual levels of creosote constituents which are so low, if present, that the material may no longer be considered a hazardous waste. The ash may then be handled as a solid waste. Even if the waste is still considered hazardous, the residuals are typically lower than with any other available method. c) Although

incinerators do produce air emissions, these can be very effectively removed to render the air stream safe for release to the atmosphere.

Although incineration is the best demonstrated available technology for creosote, biological treatment methods such as land treatment provide comparable levels of cleanup for soil and debris contaminated by creosote. Land treatment can also produce some air emissions, although for creosote wastes these can relatively easily be controlled within health-based levels. Although land treatment residuals do not require landfilling, EPA considers the land treatment unit itself to be a land disposal unit subject to the land disposal restrictions. EPA has selected land treatment as the first method of choice for treating the Somers soils. However, if the additional areas outlined in the contingency remedy are excavated, incineration will be used to treat the soils.

26. Because the same cleanup concentrations would apply to both land treatment and incineration, BN argued that incineration would significantly increase the cost of the contingency remedy without improving its effectiveness. BN commented that incineration is therefore not a cost-effective alternative, contrary to the mandate of CERCLA.

<u>EPA Response</u>: CERCLA does require that the selected remedy be cost effective, however cost effectiveness is determined by evaluating a number of effectiveness criteria (long- and short-term effectiveness and reduction of toxicity, mobility and volume through treatment) against the corresponding cost of an alternative. Both land treatment and incineration provide good long-term effectiveness and reduction of toxicity, mobility and volume; however, incineration can be completed in a much shorter time than land treatment when considering a very large volume of soil. The contingency remedy involving excavation of approximately 98,300 cubic yards of soil would take approximately 50 years to land treat versus two years to incinerate. The contingency remedy involving excavation of 53,500 cubic yards of soil would take approximately 30 years to complete, versus two years to incinerate. In addition to achieving treatment concentrations in a much shorter time, incineration does not require the long-term management of hazardous waste storage and treatment facilities. In EPA's judgement, the preceding reasons are sufficient to make incineration more cost effective than land treatment.

27. BN proposed that if, based on pilot testing, ground water remediation is found not to be practicable at the Site, the contingency remedy for treating the large volume of soils which would be excavated should be land treatment at both

Paradise and on-site at Somers. BN argued that short-term effectiveness concerns relating to the long-term operation of a treatment unit and a waste pile are not significant reasons to abandon land treatment in favor of incineration.

EPA Response: Based on significant public comment in opposition to land treatment of Somers soils at Paradise and a request by the MDHES that EPA reconsider its preference for this option, EPA has decided not to send soils to Paradise for treatment. All of the soils which would be excavated under the contingency alternatives would therefore have to be treated entirely on-site. Land treatment under Contingency A would require approximately 50 years to complete while Contingency B would take approximately 30 years. Incineration under either contingency would take approximately 2 years. Based on a consideration of the time involved to treat and manage the soils versus the cost of treatment, and the other reasons discussed under comment #26 above, EPA selected incineration under both contingency options.

28. The FLPA commented that incineration would pose potentially unacceptable air emission risks, particularly in light of the inversions common to the upper Flathead Valley.

EPA Response: EPA does not agree that the risks of incineration would be unacceptable. Gaseous emissions can be controlled by secondary burning or paralysis and air scrubbing, resulting in a stream safe for release to the atmosphere.

Ground Water Alternatives

1. BN commented that EPA's proposed plan did not define under what circumstances ground water remedies will be considered effective, a determination which will be important in deciding under what circumstances EPA will abandon ground water remediation in favor of deep excavation of soils. BN recommended that both technical and economic considerations be included in making this decision.

EPA Response: In deciding under what circumstances ground water remedies would be abandoned in favor of source removal and treatment, EPA would use the same technical evaluation criteria used in the initial selection of a remedy. These criteria include: overall protection of human health and the environment, compliance with other environmental laws, reduction in toxicity, mobility or volume, long-term effectiveness, short-term effectiveness, implementability and cost.

2. The FLPA recommended that modeling efforts be used to design

remediation and evaluate alternatives, but cautioned that available data from aquifer slug tests are uninterpretable (specific concerns are outlined below under Comment 3.). The Association recommended that additional aquifer tests be conducted and the modeling conducted during the RI/FS be repeated taking into account the inhomogeneity and anisotropy of the affected aquifer and the lack of unidirectional steady state flow.

EPA Response: EPA does not agree that a repetition of the modeling exercise conducted during the RI/FS would be worthwhile, even after collection of additional field data. The RI/FS modeling effort examined the sensitivity of predicted contaminant transport to various input parameters. The model exhibited sensitivity to a number of parameters in addition to hydraulic conductivity, notably retardation coefficient, initial source concentration and solute decay rate. The results were relatively insensitive to the dispersivity of the aquifer. Even if some improved parameter estimates could be obtained with additional field studies, the sensitivity of the model to source concentrations and solute degradation rates would result in a model with uncertainties comparable to the current results. It is unlikely that additional data or modeling will affect the choice of a preferred remedial alternative or the requirements for additional aquifer testing and pilot testing of the ground water cleanup alternative.

It will be necessary to refine the current estimates of hydraulic conductivity and other parameters that will affect the behavior of the hot water flushing and in-situ bioremediation well fields. This information can be efficiently performed as part of the pilot test of the remedy. Additional modeling efforts will be useful in the planning and analysis of the pilot test. This modeling will take into consideration the heterogeneity and anisotropy of the aquifer, seasonal variation in Flathead Lake stage, and thermal effects. The pilot study will incorporate all aspects of the planned operation, including thermal effects, effects of oxygen injection and effects of nutrient addition. It will also incorporate adequate monitoring of ground water conditions, particularly near Flathead Lake and will address local geochemical factors such as high iron and calcium concentrations, and well as biochemical effects. During drilling of additional wells necessary for pilot testing, additional stratigraphic information will be obtained and parameters such as grain size distribution, thermal coefficients, organic carbon content and microbial populations will be measured. Additional aquifer testing will also be used to confirm site-specific aquifer properties such as hydraulic conductivity, specific yield, and possible leaky effects, constant-head boundary effects and anisotropy of individual strata.

3. The Flathead Lake Protection Association commented that the slug test results in the Somers FS were uninterpretable. Specific comments and responses are provided below:

a. Background water level fluctuations should be measured for an extended period of time prior to the test.

<u>EPA Response:</u> The water table fluctuations at the Site were monitored with continuous recorders on several wells and the fluctuations in water table elevations were generally not discernible from day to day. Therefore, it was not expected that fluctuations would occur during the 20-minute period used to conduct each slug test.

b. The slug should have a known volume.

<u>EPA Response:</u> The slug used by Remediation Technologies was 10 feet long with a radius of 0.07 foot and thus a volume of 0.14 cubic foot.

c. No statement was made regarding whether or not the initial displacement was calculated or measured.

<u>EPA Response:</u> The initial displacement, H_o, was measured rather than calculated. H_o was determined using the depth to water measured at the instant after slug removal, based on the transducer reading. The amount of time that elapsed between slug removal and transducer introduction averaged about ten or twenty seconds. Since there was not a large aquifer response early in the test after the transducer was placed, the lag time in slug removal and water level measurement was not considered significant.

d. Since the transducer was lowered after the slug was removed, initial displacement could not be measured, therefore the displaced volume which must be known is not reported.

<u>EPA Response:</u> As noted above, the slug volume was 0.14 cubic foot. The transducer was lowered immediately after slug removal in order to obtain, as nearly as possible, a measurement of the initial water level displacement.

e. No mention was made whether or not the transducer was set at some measured depth.

<u>EPA Response:</u> The transducer was lowered in the well until the water table was encountered. The depth at which the transducer was placed was then measured and noted. The transducer readings, which measure height of water above the

transducer, were then converted to depth below the surveyed measuring point using the measured depth of the transducer. this depth to water, in feet, is reported on the data tables as the "water level" measurement.

4. The FLPA and other commentors requested that, prior to EPA acceptance of bioremediation of ground water for the Site, potential impacts of the treatment process on Flathead Lake (such as nitrate addition) and ground water management techniques be evaluated.

   EPA Response: EPA agrees. As outlined in this Record of Decision, pilot testing of the ground water alternative will be conducted. This testing will include an evaluation of the effectiveness of the system to contain nutrients used for in-situ biological treatment.

5. A commentor asked what nutrients would be used in ground water treatment, in what concentrations and how they would be injected.

   EPA Response: The nutrients typically used in biological ground water treatment include nitrogen and phosphorus. The nutrients will be stored in solid form, then liquified, diluted, and injected into the aquifer through wells. Hydrogen peroxide will be used to provide an oxygen source. The peroxide will be stored in a 35% strength and diluted to a 0.03 to 0.05% solution for injection.

6. A commentor asked whether EPA would test the hot water flushing methodology. Another commentor asked how long ground water treatment would take.

   EPA Response: Both the hot water flushing and in-situ biological treatment systems will be pilot tested to determine their practicability in both the swamp and CERCLA lagoon areas and to develop operating parameters for the systems. The anticipated time necessary to complete actual treatment using these methods is approximately 10 years.

7. A commentor asked why EPA is making a recommendation for ground water cleanup without knowing whether the alternative will work or not.

   EPA Response: Based on the hydrogeological information available for the Site, EPA believes that ground water remediation will be effective. However, pilot testing will be required to refine the available understanding of Site conditions and to determine whether such treatment will be practicable (i.e., effective in a reasonable period of time). In case ground water treatment proves to be impracticable, EPA has also selected contingency alternatives which involve excavation and treatment of source area soils.

8. A commentor asked whether the injection wells would last for the 10 years expected for treatment or whether they would tend to plug up.

EPA Response: Plugging of injection wells is a potential problem due to the formation of iron precipitates or the buildup of excessive amounts of bacteria. This effect can be minimized by carefully regulating the amounts of injected oxygen and nutrients. Pilot testing will be used to determine operating parameters necessary to control plugging.

9. A commentor expressed concerns that pumping ground water would decrease ground water discharge to the slough which would then be unavailable for irrigation.

EPA Response: Pumping of ground water will occur in the area in and downgradient from the CERCLA lagoon (south of Somers Road) and in the swamp area along Flathead Lake. Pumping of ground water will not occur in or upgradient from the slough; therefore ground water discharge to the slough should be unaffected by the ground water remediation project.

10. A commentor asked whether there would be a guard or posted "keep out" signs around any hazardous materials which would be stored on site such as fertilizer or hydrogen peroxide and whether security would be improved at the site to prevent access to the treatment unit or the buildings on the site.

EPA Response: Any materials which could be hazardous to human health or the environment will be appropriately managed. This may involve locking the material in a secure storage area or posting warning signs. The materials used in land treatment of soils and treatment of ground water consist mainly of fertilizer and hydrogen peroxide.

11. A commentor asked where the ground water treatment unit would be located and whether it would be secured.

EPA Response: The location of the ground water treatment system will be determined during remedial design; however, the system will be located on BN property. The treatment unit will be secured to prevent any risk to the public and to prevent vandalism of the unit.

Cleanup Concentrations

1. The Clark Fork Coalition and the Flathead Lake Protection Association recommended that the end result of land treatment should be contaminant concentrations achievable using the RCRA Best Demonstrated Available Technology for creosote contaminated soils and a one in one hundred thousand (1×10^{-5}) to one in one million (1×10^{-6}) carcinogenic risk level for any other listed hazardous constituent and for any secondary metabolic or physico-chemical degradation intermediates or products which will result from the transformation of primary constituents. The use of a Microtox assay was suggested prior to closure. In addition, the Coalition recommended that prior to final closure of the land treatment unit, the soils should be treated so that they are no longer considered hazardous under RCRA and the delisted waste should be disposed of in an off-site landfill.

EPA Response: The EPA proposed plan recommended that land treatment continue until RCRA Best Demonstrated Available Technology concentrations were achieved and the total concentration of carcinogenic polynuclear aromatic hydrocarbons was less than 36 mg/kg (1×10^{-4} risk level). After consideration of public comment, EPA is further requiring that once these initial levels are achieved, treatment will continue until the net change in total PAH concentration from the preceding year is less than 20%.

EPA shares the concerns of commentors that secondary products of biological degradation may also be harmful to human health and the environment; however, there is insufficient information both on the nature of these secondary products and their toxicity to develop a risk level for cleanup. Microtox or Ames assays can be used to evaluate toxicity and mutagenicity, but results do not directly correlate to human or animal health effects. The use of such assays will be required during land treatment, however, in order to ensure that the toxicity and mutagenicity of the residual soils has decreased with treatment.

The RCRA standard for delisting material (a finding that the material is no longer hazardous) is based on the material meeting health-based levels. Since this Record of Decision requires a reduction in concentrations to health-based levels, the treated soils may be "delistable", if the requirements of 40 CFR Part 260.22 are met.

EPA will not require that the treated soils be removed from the land treatment unit and moved to another disposal location. A land treatment unit is considered to be both a treatment and a disposal facility under RCRA. Because soils will be applied to the land treatment unit after the effective date of the RCRA land disposal restrictions, a demonstration that the waste will not migrate out of the unit will be made. Furthermore, the soils must be treated to health-based levels prior to closure. EPA therefore finds no reason to remove the soils from the unit once treatment is completed.

2. The Clark Fork Coalition suggested that the determination of a risk level for secondary products of degradation might be accomplished used a linear extrapolation from the primary contaminant risk levels or might be based on mutagenic potency.

   <u>EPA Response:</u> As discussed above, there is inadequate information on both the intermediate breakdown products of land treatment of creosote-contaminated soils and the health effects of these products to determine risk levels associated with various concentrations. Since there are a large number of polynuclear aromatic hydrocarbons (PAHs) and since each may form a large number of degradation products, there are hundreds or thousands of possible compounds to consider. There is no scientifically valid way to estimate the carcinogenic risk of a chemical mixture without knowing a) the chemical identity of all chemicals present, b) the concentration of each, and c) the cancer potency factor for each. This is presently impossible for the breakdown products of the PAHs.

   Although an Ames test can be used to measure mutagenicity, mutagenic potential does not necessarily correlate with carcinogenic potential. Moreover, it would not be possible to distinguish PAH-related mutagenicity from that due to natural compounds or other contaminants in the soil. Although the Ames test may be useful in confirming or refuting the assumption that residual PAHs (and/or other contaminants) are undergoing degradation to less biologically active molecules, it is not possible to identify a specific level of mutagenic activity that is acceptable.

   It is important to note that, while the potential cancer risk from PAH degradation products is not trivial, both the exposure assessment and risk assessment use accepted EPA standards and assumptions which are conservative. For example, in the Somers risk assessment, the assumption that all PAHs are as carcinogenic as benzo(a)pyrene is believed to be very conservative; the margin of safety generated by this and other assumptions should compensate for any carcinogenic activity contributed by PAH intermediate degradation products.

3. BN commented that EPA's cleanup goals ignore the most current scientific information. BN recommended using a relative potency approach to developing cleanup goals based on the following arguments:

a) In developing cleanup concentrations for Somers, EPA used a Cancer Potency Factor for polynuclear aromatic hydrocarbons (PAHs) which was based on the assumption that the carcinogenic potency of all carcinogenic PAH compounds were equal to that of Benzo(a)pyrene, the most carcinogenic of the PAHs (the "traditional potency approach"). According to BN, this Cancer Potency Factor has been withdrawn by EPA and calculations using this number are unnecessarily conservative.

<u>EPA Response:</u> EPA has not withdrawn the original cancer potency factor for benzo(a)pyrene, although revisions to this factor are under consideration. It is generally understood that most carcinogenic PAH compounds are less potent than benzo(a)pyrene and EPA is in the process of developing relative potency factors for a number of these compounds. However, the new potency factor for benzo(a)pyrene and relative potency factors for other PAHs have not yet been finalized. For this reason, and also to account for the presence of other carcinogenic compounds which are not typically analyzed for (see comment number two), EPA continues to base its cleanup levels on the original, more conservative numbers.

b) Various authors have analyzed the individual potencies of the various PAH compounds and note a variation relative to Benzo(a)pyrene (the "relative potency approach").

<u>EPA Response:</u> See response to a), above.

c) An EPA decision at the Brown Wood Preserving Site utilized the relative potencies of the PAHs in developing cleanup goals.

<u>EPA Response:</u> EPA continues to base its Somers cleanup concentrations on the traditional approach. This approach, equating the potency of all carcinogenic PAH compounds to that of benzo(a)pyrene has also been followed at a number of other Superfund sites (Libby Ground Water Site, Libby, Montana; BN Brainerd Site, Brainerd, Minnesota; Reilly Tar and Chemical Company Site, St. Louis Par, Minnesota).

d) The EPA RCRA Facility Investigation Guidance and EPA's proposed listing of certain wood treating wastes as hazardous both use the relative potency concept.

EPA Response: The RCRA Facility Investigation Guidance clearly specifies that the health based concentrations provided were developed using relative potency values which are still under EPA review.

e) The relative potency approach is more scientifically sound than the traditional potency approach and is therefore more consistent with the EPA "Superfund Public Health Evaluation Manual" (Exec. Summ. pg. 3) and "EPA's "CERCLA Compliance with Other Laws" guidance (pp. 1-76 and 1-85).

EPA Response: The referenced section of the Superfund Public Health Evaluation Manual discusses the process of changing toxicity data in EPA's databases as new information becomes available. However, the revised potency factors for the PAH compounds have not yet been finalized or been approved by EPA or added to its databases. The referenced sections of the CERCLA Compliance with Other Laws manual discuss the use of criteria, advisories and guidance as "To Be Considered" in developing cleanup criteria. However, EPA has not published the PAH relative potency factors as criteria, advisories or guidance in final form.

f) BN urged EPA to consider the effect the Relative Potency Approach would have on the amount of soil which would be excavated and treated and on ground water remediation timeframes and the cost of remediation. BN also asked EPA to consider the conservative assumptions which are already built into the risk assessment process.

EPA Response: The effect of the volumes of soil and cleanup timeframes is irrelevant to the development of cleanup concentrations which are based on risk assessment. EPA agrees that conservative assumptions, in addition to the cancer potency factors, are already built into the risk assessment process. However, because of the number of potentially carcinogenic compounds associated with creosote which are not routinely analyzed for at the Site and because of the lack of available information on these compounds, EPA feels that a conservative approach is warranted. In summary, EPA is retaining the cleanup levels presented in the proposed plan.

4. BN argued that EPA's ground water cleanup goal of 0.3 ppb for total PAH ignores EPA's own published risk-based PAH standards for individual PAH compounds because the EPA goal is so much lower than these standards. The standards referenced by BN include various ambient water quality criteria as well as health-based water concentrations for two carcinogenic PAH compounds.

EPA Response: The cleanup concentration for total PAH in ground water was set below levels published for individual PAH compounds because of the possible presence of other suspected or known carcinogens, such as the nitrogen-bearing heterocyclic compounds and aromatic amines, which are not routinely analyzed for and for which little toxicity information exists. Also, a number of PAH compounds, although not in themselves cancer-causing, may promote the cancer activity of other carcinogens. Since the cleanup concentration for the total of the carcinogenic PAHs, which are typically the most difficult to degrade, is 0.03 ppb or an order of magnitude less than that for total PAH, the cleanup concentration for total PAH should also be achieved by treatment. A total PAH concentration of 0.3 ppb will assure that all creosote compounds are being reduced to acceptable levels. This approach has also been taken at the BN site in Brainerd, Minnesota, the Reilly Tar and Chemical site in St. Louis Park, Minnesota, and the Libby Ground Water Site, in Libby, Montana. Furthermore, considering that the cleanup level for carcinogenic compounds would result in a 10^{-5} rather than EPA's goal of a 10^{-6} health risk, it is appropriate to take a more conservative approach to cleanup of total PAH compounds.

5. BN commented that EPA's proposed PAH ground water cleanup goals are so low as to be unverifiable using reliable, accepted, and practical analytical methods. BN proposed to set ground water cleanup goals at the practical quantitation limits using EPA's "Test Methods for Evaluating Solid Waste," Method 8310 (SW-846) consistent with the approach proposed by BN in their RCRA ground water correction plans for the Somers and Paradise plants.

<u>EPA Response:</u> Methods presented in SW-846 will not achieve detection at the concentrations required for the cleanup concentrations at the Site. EPA does not argue that the use of standard analytical methods would allow verification of the established ground water cleanup concentrations. However, these concentrations can be verified using special sampling and analysis techniques such as those used by both EPA and BN during the RI/FS. Furthermore, the need for low (part per trillion) detection limits will not occur for some years until concentrations have been considerably reduced by treatment.

6. The Flathead Lake Protection Association (FLPA) commented that, while EPA's cleanup goals for PAH contaminants in soil and ground water were acceptable, standards for volatile compounds, such as benzene, and standards for heterocyclic nitrogen compounds (which may be more serious carcinogens than PAHs) should also be provided.

<u>EPA Response:</u> EPA has established a Safe Drinking Water Act

Maximum Contaminant Level for benzene of 5 ug/l. This concentration will be a cleanup standard for the Somers Site if benzene is detected in ground water. EPA has not set standards for the heterocyclic nitrogen compounds, some of which are carcinogenic. Since no cancer potency factors are available for those compounds, no risk-based cleanup standards can be derived. Instead, EPA has set the total PAH cleanup concentration at a level intended to account for the presence of compounds which may be of concern but about which little toxicity or carcinogenicity information exists.

7. The Montana Department of Health and Environmental Sciences (MDHES) commented that EPA's treatment goals for soils were not sufficiently stringent. The State recommended continuation of land treatment to background concentrations in order to ensure that the land treatment unit could undergo clean closure without restrictions on the future use of the property.

<u>EPA's Response:</u> In order to accommodate the State's concerns, and as noted above under comment number 1 above, this Record of Decision specifies that once the initial land treatment concentrations specified in EPA's proposed plan are achieved, land treatment will continue for at least another year. If a 20% or greater total PAH reduction is achieved during this year, then treatment must continue until the decrease in total PAH has been less than 20% from the previous year. At this point another application of soil may be made or the facility may be closed. If the final contaminant concentration is at background, no post-closure care will be required. If the leachate produced from the unit is within EPA's cleanup concentrations for groundwater, the liner may be perforated and the unit covered with a vegetative cap. If the leachate is at concentrations greater than EPA's cleanup concentrations for ground water, the intact unit must be covered with an impermeable cap. In either case, if soils are contaminated above background concentrations, RCRA post-closure care requirements will be imposed.

<u>General Technical Comments on Remedial Alternatives</u>

1. A commentor asked what criteria would be used to determine how long a time is too long to conduct a treatment operation such that another alternative would be selected.

<u>EPA Response:</u> In deciding under what circumstances one treatment method would be abandoned in favor of another, EPA would use the same technical evaluation criteria used in the initial selection of a remedy. These criteria include: overall protection of human health and the environment, compliance with other environmental laws, reduction in

toxicity, mobility or volume, long-term effectiveness, short-term effectiveness, implementability and cost. If it were determined that an alternative other than those contained in the selected and contingency alternatives were necessary, EPA would request public comment on its proposal to implement such an alternative.

2. The FLPA expressed concerns regarding possible impacts from the Site on the proposed Somers bedrock water supply. Because the bedrock aquifer appears to be unconfined, the nature and degree of contact between the bedrock and the contaminated aquifer must be defined. Prior to any acceptance of a remedial action, the FLPA recommended that EPA evaluate the degree of connection and potential impacts of increased local ground water utilization.

   EPA Response: As outlined in the Feasibility Study, an extended pump test of one of the new municipal supply wells will be undertaken to ensure that aquifer parameters of interest are obtained. Pump test results will be analyzed to ensure that drawdown will not ultimately result in additional spreading of ground water contamination at the Site or contamination of the municipal supply.

Use of the Paradise Land Treatment Facility

1. Paradise residents expressed concerns that contaminants might escape the land treatment unit and contaminate the local aquifer.

   EPA Response: Burlington Northern conducted a land treatment demonstration at Paradise which showed that contaminants were retained within the upper few feet of the soil profile (the treatment zone) and were not released into the aquifer. Based on a review of this demonstration, as well as other permit application material, the Montana Department of Health and Environmental Sciences found that the proposed operation was environmentally sound and granted BN a permit for land treatment of contaminated soils currently at the Paradise site.

2. Paradise residents expressed concerns that the Somers soils would be placed in piles at the Paradise site and that local drainage could be affected.

   EPA Response: Although the final EPA decision will not involve transportation of Somers soils to Paradise, the original proposal would have involved transporting the soils to Paradise and immediately applying the soils in a smooth layer onto the land treatment plot. The soils would not have been placed into piles, therefore local drainage would not have been affected.

3. A Paradise resident expressed concerns that BN may use so much water during land treatment that it could affect other water users.

<u>EPA Response:</u> BN applied for a license from the local Paradise water board for a well to withdraw water for irrigating the land treatment unit. However, the location of this well would be downgradient from other nearby users (such as the town of Paradise), therefore local users should not be affected.

4. Paradise residents asked MDHES about dump trucks and tank trucks seen entering and leaving the Paradise facility. The public was concerned that BN was illegally dumping material at the site.

<u>EPA Response:</u> The dump trucks seen entering the facility were carrying rip rap to be used in armoring the existing waste pile which sits partially in the floodplain of the Clark Fork River. Tank trucks were used to empty two tanks at the site and to periodically remove water which accumulates in the waste pile.

5. A Paradise resident asked how much of the soil now at Paradise was taken from Somers during the 1985 removal action.

<u>EPA Response:</u> 3,000 cubic yards, or about 15% of what is currently in the Paradise waste pile, is soil which was removed from Somers in the 1985 Emergency Removal from the swamp pond area. The remaining soils in the waste pile are from the Paradise facility.

6. Paradise residents expressed concerns about the recent burning of buildings at the Paradise facility. An insulated storage tank caught fire and residents were concerned that fumes from the fire might be toxic. Residents were also concerned that BN was operating without good oversight from the State or EPA.

<u>EPA Response:</u> BN contractors hired to demolish the buildings at the Paradise plant chose to burn some of the buildings without obtaining a necessary permit from the State Air Quality Bureau or notifying State or Federal authorities, although a local permit was obtained. The Air Quality Bureau has issued BN a citation for violation of State Air Quality rules.

7. Paradise residents asked for a guarantee that wheat could be grown in five years on the land treatment unit.

EPA Response: No guarantees can be made, however the land treatment demonstration at Paradise indicates that treatment to very low residual contaminant levels is possible. In order to grow food chain crops on the treatment plot, BN must demonstrate that no substantial risk to human health and the environment would result. This demonstration must show that hazardous constituents will not be transferred to food or feed portions of the crop or be ingested by grazing food chain animals and that soil contaminant concentrations are not greater than those in untreated soils from the same region under similar conditions.

8. A number of Paradise residents expressed concerns that the 2-year land treatment demonstration conducted at the BN Paradise facility was not long enough and that common sense indicated that creosote contaminants could not be broken down by biological activity.

   EPA Response: The land treatment demonstration, which operated for a period of 1/2 years, indicated that creosote contaminants could be effectively broken down within an anticipated 4 to 5 year period. Although in high concentrations creosote is used to prevent the biological breakdown of wood products, in low concentrations, such as those in soil, bacteria are able to metabolize creosote and break it down into nonhazardous constituents.

9. The Eastern Sanders Conservation District and others commented that the Paradise site is on the flood plain of the Clark Fork River, is very close to the river banks, and in the event of a flood, the creosote contaminated soils might be dumped directly into the river. The District requested that BN locate a suitable site outside of the flood plain.

   EPA Response: The land treatment unit at Paradise is already located completely outside of the floodplain.

10. A Paradise resident asked whether the BN Paradise Site could be added to the National Priorities List (NPL) of Superfund sites.

   EPA Response: In 1980, EPA conducted a Preliminary Assessment and a Site Inspection to evaluate whether the Paradise facility should be included on the Superfund NPL. Based on this evaluation, it was determined that Resource Conservation and Recovery Act (RCRA) authorities were sufficient to bring about corrective action of all environmental problems at the plant. EPA's policy is to defer to RCRA authority where such authority is sufficient to assure cleanup; therefore, the Paradise Site is not eligible for the NPL.

11. Paradise residents inquired whether the community would be eligible for an EPA Technical Assistance Grant.

EPA Response: EPA Technical Assistance Grants are only available to communities affected by a Superfund site. A maximum of one grant is available per site. In 1988, the Flathead Lake Protection Association received a Technical Assistance Grant for activities related to the Somers Site. The FLPA will work with other interested groups to provide information or interpretation of data related to the Site.

12. Paradise residents asked how the public was notified of the Paradise RCRA permit action and recommended that articles in the newspaper be used rather than legal notices.

EPA Response: MDHES initially informed the public of the RCRA permit action by legal notice in the following newspapers: the Missoulian, the Plainsman, the Sanders County Ledger and the Kalispell Daily Interlake. A mailing was also sent to all individuals on the mailing list for the site and notices were sent to radio stations KUFM and KDXT in Missoula. When it became apparent that this approach was not reaching all interested parties, MDHES undertook a mass mailing to all Paradise box holders. A public meeting was held in the nearby town of Plains, Montana.

Health and Environmental Effects

1. One commentor asked about the effect of zinc on environmental populations.

EPA Response: Zinc is an essential trace element for humans and domestic animals; however, in high enough doses, zinc may be toxic. Environmental receptors may be sensitive even to low doses of zinc. Reported effects of zinc on ducks and poultry include paralysis, growth reduction, decreased hemoglobin and hematocrit levels and mortality at high concentrations. Local birds observed during waterfowl observations at the Somers Site showed no symptoms of zinc toxicity.

2. Three commentors noted that EPA has not researched the health problems of people in Somers to determine what they are dying of. Two commentors indicated that most Somers residents do not die of natural causes and that there is a high incidence of cancer and heart disease in the community.

EPA Response: EPA's approach to risk assessment at the Somers Site involved the following steps, 1) determining the chemical compounds of concern to human health and the environment and the concentrations of those compounds at the Site, 2) determining the possible receptors of those compounds (i.e., locals residents, wildlife, etc.), 3) determining the pathways by which contaminants can reach these receptors, such as in the air, in the water or in soils, and 4) calculating the risk associated with these exposures. In order to reduce the risks associated with the Site, EPA has decided to a) excavate and treat all soils which are contaminated above health-based concentrations and which are available for direct contact and b) to treat contaminated ground water so that it can, in the future, be used as a drinking water source.

Although it would be possible to conduct a survey to determine what local residents typically die of, this information would not assist EPA in developing a cleanup plan for the Site. It is typically very difficult to determine a direct cause and effect relationship between contaminants, such as those in creosote, and human deaths which may be caused by a number of factors. For example, certain compounds in creosote are cancer-causing; however, many other compounds in the environment such as radon, benzene in gasoline, etc. are also cancer-causing. Personal habits, such as smoking, and heredity also play a part in human health. A death from cancer in a community where creosote has been used may therefore be due to a number of factors, not simply exposure to creosote. Rather than attempting to sort out the effect of creosote from other factors causing illness in the community, EPA has chosen to remove the exposure pathway by excavating contaminated soils and treating ground water so that remaining soil and water is safe for human and environmental contact.

Possible Additional Areas of Contamination

1. One commentor reported that in the late 1950's and early 1960's the ditches near the retort building and along School Addition Road contained standing creosote. The same commentor reported that the field below the retort building was full of creosote when he was a boy and that he found pools of creosote in the swamp area in the fall of 1988. The commentor indicated that the estimates of soil to be excavated may be low because these areas were not considered. Another commentor indicated that the oil observed in the ditches in the 50's and 60's was runoff from oil commonly applied to the dirt roads at that time.

   EPA Response: During Site investigations, soil and water samples were taken in the field below the retort building, in the swamp area and in the ditch along Somers Road. Monitoring wells were also installed in these areas as well as along School Addition Road. Sampling in these areas indicates that creosote contamination above health-based levels is present within the CERCLA lagoon, in the immediate vicinity of the old drainage ditch and below a layer of clean soil across Somers Road from the plant and in the swamp area. Ground water sampling indicated contamination only in the areas within and downgradient from the CERCLA lagoon and in the swamp area.

Based on the information provided by these commentors, samples will also be taken in the roadside ditch along School Addition Road to evaluate whether soil contaminant concentrations are present at levels requiring remediation.

2. One commentor reported a pocket of oil oozing from the ground south of the boiler by the Somers yacht club as well as an oil sheen on ground water last fall near the public water supply pump house. EPA was requested to either add this area to the Somers Superfund site or designate the area as a new site.

<u>EPA Response:</u> The entire area around the Somers pump house and the yacht basin is composed of wood chip fill material which is stained in some areas and which would be expected to release naturally occurring phenolic compounds. The pocket of oil discovered near the Somers yacht club appears to be associated with a former rail line which led onto a pier in Flathead Lake. The oil appeared to be asphaltic in nature, rather than creosote. Burlington Northern excavated the area of the ooze and drummed the excavated material for shipment to a disposal facility.

Because this area is not immediately contiguous with the Somers site and because the contamination involved appears to differ from that directly associated with the tie plant, it is unlikely that the area will be added to the Somers Superfund Site. However, EPA has initiated the process of reviewing this area for possible Superfund consideration. The first step in this review will consist of a Preliminary Assessment of existing information. If it appears that the area is of sufficient concern, a limited Site Inspection will be undertaken. Depending on the severity of the problems, the area may be eligible for listing on the National Priorities List or for action under the State Superfund program.

3. A commentor indicated that another location needing attention is the northern end of the plant yard area (in a triangle formed by monitoring wells S-1, S-2, and 86-1) which was used for treated tie storage and in the area near Well 86-1 between the slough and the drip track.

<u>EPA Response:</u> The areas mentioned by this commentor were

sampled during the Site investigations. A test pit (TP-2 in the Somers RI Report) was installed and sampled to investigate contamination in the former treated wood storage area. No significant contamination was found in this sample. The area between the drip track and the slough was also sampled and monitoring wells were installed in this area. No ground water contamination was detected.

4. The FLPA recommended that EPA include the spur line on the west side of the tie plant property in the areas to be excavated and treated.

   EPA Response: Although the spur line was not reportedly used to carry treated ties, the soil and ballast under the track is stained. Samples will be taken to evaluate whether soil contaminant concentrations are present at levels requiring remediation.

Public Participation Process

1. There were a number of requests that EPA extend the public comment period based on the length of the documents available for review and the new information contained in these documents.

   EPA Response: The Remedial Investigation Report was released to the public in April 1989, although most of the information contained in the report had previously been released. The Feasibility Study Report and EPA proposed plan were released to the public on May 18, 1989. EPA held a public meeting in Somers on June 6, 1989 to receive any questions or comments on these documents. A second public meeting was held in Paradise on June 21, 1989, and a third meeting was held in Somers on July 27, 1989. The comment period initially allowed 30 days for comment, but was extended on two occasions; with the extensions, the comment period ended August 3, 1989.

2. The Flathead Lake Protection Association and the Clark Fork Coalition recommended that the Somers Site not be removed from the Superfund National Priorities List. The Clark Fork Coalition also suggested that, if the Somers Site is removed from the National Priorities List, a mechanism be developed to ensure that EPA retains supervisory authority over the site remediation.

   EPA Response: The Somers Site was proposed for the Superfund National Priorities List in 1984, however the Site was never finally added to the List. In 1988, EPA proposed to remove the Site from the proposed NPL because it is a regulated facility under the Resource Conservation and Recovery Act which also has the authority to handle the cleanup. EPA will not retain such sites on the NPL unless potentially responsible parties (PRPs) such as BN are unable or unwilling to conduct the cleanup. EPA has not yet taken final action to remove the Site from the NPL.

Upon completion of this Record of Decision, EPA will offer PRPs the opportunity to conduct the cleanup. If the PRPs agree to do the work, a Consent Decree which specifies the terms of this agreement will be signed and filed in court. In order for EPA to continue to oversee the cleanup as a Superfund action, the PRPs must agree in the Consent Decree to pay EPA's oversight costs. The Site will then be removed from the proposed NPL, but the cleanup will be handled as a Superfund action under EPA oversight. If the PRPs refuse to do the cleanup, then EPA must repropose and finalize the Site on the NPL in order to conduct the work itself using the Superfund.

3. The Clark Fork Coalition and the Flathead Lake Protection Association suggested that the PRP should be required to fund the position of a citizens' technical advisory in the event that the present Technical Assistance Grant expires or is terminated due to the removal of the Somers Site from the Superfund National Priorities List or for any other reason. The Coalition recommended that such a technical advisor have all rights and privileges of access to data and information as those available under the EPA Technical Assistance Grant program.

<u>EPA Response:</u> If and when the Somers Site is removed from the proposed NPL, the Flathead Lake Protection Association will no longer be eligible for the Technical Assistance Grant. By statute, such grants are only available at sites on the National Priorities List. The Potentially Responsible Party may be willing to fund a similar technical advisor in the event that the EPA Grant is terminated, however, this is not a legal requirement under CERCLA. If such a position were funded, EPA would provide the same rights and privileges of access to the advisor as are available to all members of the public.

4. Paradise residents asked how the public could affect the final EPA decision for site cleanup and whether it was necessary for the public to develop a different alternative or whether their feelings would make a difference.

<u>EPA Response:</u> Community acceptance is an important factor which may modify or change EPA's evaluation of the best alternative for site remediation. Because of significant public opposition received to EPA's proposal to transport Somers soils to Paradise for treatment, EPA has instead decided to conduct treatment of these soils at the Somers

Site.

5. Commentors asked what the public's recourse is if the EPA or MDHES decisions are not what the public wants or if the selected remedy does not solve the problem.

<u>EPA Response:</u> MDHES permit decisions are subject to a formal appeal procedure outlined in the State RCRA regulations. EPA Superfund decisions are not subject to a formal appeal procedure, but the public will be provided an opportunity to review the final Record of Decision for the Somers Site and will be asked to comment on the Consent Decree which is developed to implement the remedy. The Consent Decree will also contain the scope of work outlining the work to be performed. EPA may change these documents based on public comments. If at some future time, it is apparent that the selected remedy will not adequately solve the problems at the Site, EPA may select a new alternative or change somewhat the selected alternative. In this case, depending on the significance of the proposed change, the public may again be asked to comment.

6. A Paradise resident commented that Somers residents should set up talks between themselves, the regulatory agencies and BN.

<u>EPA Response:</u> After the close of the comment period, EPA received a petition from 41 Somers residents requesting EPA to set up additional meetings to discuss issues of concern to the Somers community. In a letter to all Somers residents, EPA agreed to set up regular meetings and requested that the community organize an informal citizens advisory committee to meet with the agency and BN. A Somers resident is coordinating this activity.

Other Comments

1. Several commentors expressed concerns that the weeds growing on the tie plant property may pose a fire hazard to the town of Somers. Legal action against BN was threatened.

<u>EPA Response:</u> Burlington Northern indicated that they have contacted the local weed district and have sprayed their property according to local guidelines.

2. A commentor asked why the Railroad cars are back at the Somers Site.

<u>EPA Response:</u> Burlington Northern indicated that the spur line must be used in order for the railroad to be allowed to keep the line open. For this reason, railroad cars are periodically stored on the spur line at the Site.

3. A commentor asked what the next steps are in the Superfund process at the Somers Site, including when the Consent Decree will become effective and when field work will begin at the Site.

<u>EPA Response:</u> EPA expects to send a Special Notice letter to the Potentially Responsible Parties (PRPs) at the Site shortly after finalizing this Record of Decision. The letter will offer the PRPs the opportunity to conduct the cleanup and will mark the beginning of a four month negotiation period in which EPA and the PRPs work toward an agreement on the work to be performed and the language of the Consent Decree which will enforce the agreement. Once the Consent Decree is signed, a 30 day public comment period will be held before the document is filed in court. The entire negotiation, comment period, and filing process can take 6 months or more. It is therefore expected that actual field work will not begin until the spring or summer of 1990.

4. The Somers Water District noted that a new sewer system is planned for the town and the route of the sewer line may cross BN property.

<u>EPA Response:</u> The work plan for the Site cleanup should be completed in the winter or spring of 1990. Once the work plan is finalized the Water District should have a better idea of where treatment units will be placed so that the best sewer line location can be determined.

5. A Somers resident commented that, if the proposed cleanup alternatives result in a site which is suitable for revegetation, BN should be encouraged to donate the land to the community of Somers for use as a park or a walking, biking area. The commentor noted that presently, Somers children hike through the property to shorten their walk to school.

<u>EPA Response:</u> The ultimate disposition of the tie plant property will be up to Burlington Northern, but will be limited by restrictions on the deed to the property housing the closed RCRA impoundments and possibly, depending on the degree of treatment achieved, the land treatment unit. Such deed restrictions are intended to protect the cover placed on a unit housing hazardous waste to ensure that the materials are not disturbed. BN must also complete up to 30 years of monitoring and post-closure care of the RCRA impoundments. These restrictions may limit future use of the property.

In order to prevent children from gaining access to hazardous areas of the Site, the treatment units will be fenced and any buildings or materials at the Site will be secured.

6. Both BN and the FLPA commented that disturbed wetlands, such as the slough and swamp areas should be restored.

   EPA Response: EPA has required the restoration or replacement of wetlands in the Record of Decision. These activities will be conducted in coordinated with the U.S. Department of the Interior.

7. A commentor asked how many gallons of waste were released into the environment.

   EPA Response: An accurate estimate of the amount of waste released to the environment is not possible. The average rate of wastewater discharge from the plant was 350 gallons per day. However, this water was not always released to the environment. Originally, this water was used as makeup water for the boiler. Drippage and sludges from the retort was reported to amount to approximately 1,000 pounds every 1.5 to 2 years. In recent years, sludges were disposed of off-site at a commercial RCRA disposal facility. No records exist of past disposal practices, although workers recall that some materials were used to patch holes and oil local roads.

8. A commentor expressed distrust of BN and the regulatory agencies, noting that BN did not follow the approved plans for closure of the RCRA impoundments at Somers. The old liner in one impoundment was supposed to have been steam cleaned, but this was not done.

   EPA Response: The MDHES-approved closure plan for the RCRA impoundments at the Site allowed BN to salvage a secondary liner in one impoundment which was not in contact with any wastes. Prior to storage of this material, BN was to inspect the liner and brush and steam clean it as needed to ensure that no visible residue remained. During the closure activities the secondary liner was found to be intact and undamaged. Visual inspection showed no evidence of contamination or residues, therefore the liner was not steam cleaned.

9. The Somers Water District expressed concerns that the water mains which run through the tie plant may freeze and rupture again. The District would like to see the mains relocated.

   EPA Response: EPA agrees that the water mains should be moved as soon as possible. BN has indicated a willingness to conduct that part of the water main excavation which will occur through the known contaminated area below the retort building to ensure that any hazardous wastes generated are properly handled. If the line is placed in a contaminated area, the pipe must be protected from contamination. EPA would oversee this work. However, if replacement of this line occurs before the final remedial action at the Site is undertaken and soils in the area of the relocated main must be excavated, the new line may have to be removed and replaced.

10. Commentors asked whether and when the tie plant structures will be demolished. Residents are concerned about site safety. The same commentor asked how the demolished buildings would be removed from the Site.

    EPA's Response: The Site buildings are eligible for the National Register of Historic Places. EPA is therefore required to coordinate with the State Historic Preservation Office (SHPO) to ensure that appropriate mitigation measures are taken to protect or document these resources during remedial action. EPA has recommended that the retort building must be demolished in order to access contaminated soils beneath the building, however, SHPO concurrence must be obtained before demolition. Once the buildings are demolished, the material will be transported from the Site by truck. Security at the Site will be improved to prevent access to buildings at the Site.

11. Two commentors expressed concern that truck traffic and chaos during cleanup will adversely affect the roads, town and people of Somers but that this can be minimized by conducting the cleanup in as short a time as possible.

    EPA Response: It is anticipated that maximum activity at the Site will occur during a period of a few months when soils are excavated and backfilled and the various treatment units and the temporary soil storage unit are constructed. After that time, maintenance of the treatment units should provide little disruption to the town.

D. REMAINING CONCERNS

Issues and concerns that EPA was unable to address during remedial planning activities include the following:

1. It is not certain that land treatment will reduce contaminant concentrations in soils to levels sufficiently low to allow unlimited future use of the property. If residual concentrations are reduced to background, no postclosure restrictions on the use of the property will be imposed. However, if residual concentrations are above background, postclosure monitoring and restrictions on the

use of the property will be necessary.

2. It is also not possible to determine whether the land treatment unit will need to be closed with an impermeable cap or whether it can be covered with a vegetative cap. If residual soil contaminant concentrations are reduced to health-based levels and any leachate collected in the treatment unit contains concentrations within EPA's required ground water cleanup levels, then a vegetative cap will be allowed. If this is not the case, an impermeable cap will be necessary.

3. Until pilot testing is completed, it will not be possible to determine whether the selected or a contingency remedy will be undertaken at the Site.

SUMMARY OF

COMMUNITY RELATIONS ACTIVITIES AT THE

BURLINGTON NORTHERN (SOMERS PLANT) SUPERFUND SITE

Community relations activities conducted at the Burlington Northern Somers Site ("the Site") to date have included:

- EPA and the Montana Department of Health and Environmental Sciences (MDHES) conducted interviews with members of the community to determine issues of concern related to the Site and to identify effective methods for the agencies to respond to concerns and communicate with the public. Interviews were conducted in 1985 and 1988.

- EPA developed a Community Relations Plan in 1985 and revised the plan with the assistance of MDHES in 1989.

- EPA issued Press Releases at the following times:

  - 1984 - announcing EPA's proposal to add the Somers site to the National Priorities List.

  - 1985 - announcing a public comment period on the Remedial Investigation/Feasibility Study (RI/FS) work plan and EPA's administrative order on consent with BN.

  - 1987 - announcing a public comment period on an amendment to the RI/FS work plan.

  - 1989 - announcing an extension to the comment period on EPA's proposed plan.

- EPA established a Site information repository in 1985 and, in 1989, an Administrative Record file at the Somers Central School Library.

- EPA issued a fact sheet in 1985 and 6 updates on Site activities between 1985 and 1989.

- EPA released the following documents for comment:

  - 1985 - Administrative Order on Consent and RI/FS project plans.

  - 1987 - Amendment to the RI/FS work plan.

  - 1989 - RI/FS reports and EPA proposed plan.

- EPA held public meetings at the following times:

- o 1985 - to update the community prior to commencement of work under EPA oversight.

- o 1985 - to discuss Administrative Order on Consent and RI/FS project plans.

- o 1987 - to update the public on EPA activities at the site. Meeting was held immediately following a State RCRA public hearing on closure plans for RCRA-regulated impoundments.

- o 1989 - to discuss the preliminary findings of the RI and to review cleanup technologies under consideration.

- o 1989 - three public meetings were held to discuss the EPA proposed plan.

o EPA twice provided extensions to the public comment period on the proposed plan.

o EPA funded a Technical Assistance Grant (TAG) for the Flathead Lake Protection Association in 1988. Regular communication was maintained with the TAG consultant.