

**RECORD OF DECISION
SAEGERTOWN INDUSTRIAL AREA SITE**

DECLARATION

SITE NAME AND LOCATION

Saegertown Industrial Area Site
Saegertown Borough, Crawford County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Saegertown Industrial Area Site (the "Site"), Saegertown Borough, Crawford County, Pennsylvania, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedial action for this Site. The information supporting this decision is contained in the Administrative Record for this Site.

The Commonwealth of Pennsylvania concurs with the selected remedy.

ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, that actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision ("ROD"), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The Saegertown Industrial Area Site is an industrial park approximately 100 acres in size. The remedial action selected for the Site is a final remedy which will address soil and ground water contamination on portions of the Site. The soil contamination represents the principal threat. Therefore, excavation and treatment of the contaminated soil will be required. The ground water contamination represents a significant threat. Therefore, remediation of the contaminated ground water will be required.

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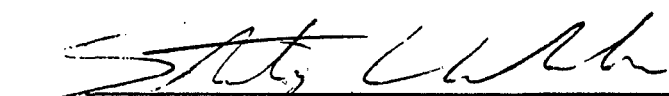
The selected remedial action includes the following components:

- Excavation and onsite incineration of contaminated soil and sludge from the lagoon, sludge bed, and pond areas on the former General American Transportation Corporation ("GATX") property which is a part of the Site;
- Restoration or replacement of the pond and wetland area on the former GATX property;
- Long-term ground water monitoring on the former GATX property;
- Delineation of the ground water plume in the vicinity of the Lord Corporation property, which is also a part of the Site;
- Extraction and treatment of contaminated ground water in the vicinity of the Lord Corporation property, combined with air sparging and vapor extraction in the source area of contamination; and
- Long-term ground water monitoring in the vicinity of the Lord Corporation property.

STATUTORY DETERMINATIONS

The selected remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedial action utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedial action will result in hazardous substances remaining at the Site, a review by EPA will be conducted within five years after the initiation of the remedial action, and every five years thereafter, as required by Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), to ensure that the remedial action continues to provide adequate protection of human health and the environment.


Stanley L. Laskowski
Acting Regional Administrator
Region III

1/29/93
Date

AR305074

RECORD OF DECISION
SAEGERTOWN INDUSTRIAL AREA SUPERFUND SITE
DECISION SUMMARY
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DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

The Saegertown Industrial Area Site (the "Site") is an industrial park in the Borough of Saegertown, Crawford County, Pennsylvania. (See figure 1, p. 2). Saegertown is located approximately 25 miles south of the City of Erie, Pennsylvania, and 5 miles north of the City of Meadville, Pennsylvania.

The Site is approximately 100 acres in size and is located in a broad valley formed by the stream terrace of the French Creek. It is bordered to the west by the elevated railroad track bed of the Erie-Lackawanna Railroad. Beyond the railroad tracks to the west lies the heavily populated area of Saegertown and the French Creek. Woodcock Creek borders the Site to the south. Rural residential and agricultural lands border the Site to the north and east, respectively. Beyond the Borough of Saegertown, the area is predominantly rural.

Ground water is the sole source of potable water in western Crawford County. The 1050 residents of the Borough of Saegertown are supplied with potable water by four wells. Three of the wells are within a one-mile radius of the Site. The fourth well is approximately two miles northwest of the Site. (See figure 2, p. 3). In addition, homes outside the municipal water supply area in the Site vicinity utilize private wells for potable water supply.

The industrial park consists of four main areas: the Lord Corporation ("Lord") property; the Saegertown Manufacturing Corporation ("SMC") property; the Spectrum Controls Incorporated ("SCI") property; and the properties that were formerly owned by the General American Transportation Corporation ("GATX"). (See figure 3, p. 4).

On the properties formerly owned by GATX, approximately 9,000 cubic yards of sludge and soil contaminated with volatile organic compounds ("VOCs") and polyaromatic hydrocarbons ("PAHs") are present in a lagoon, a sludge bed and a pond area.

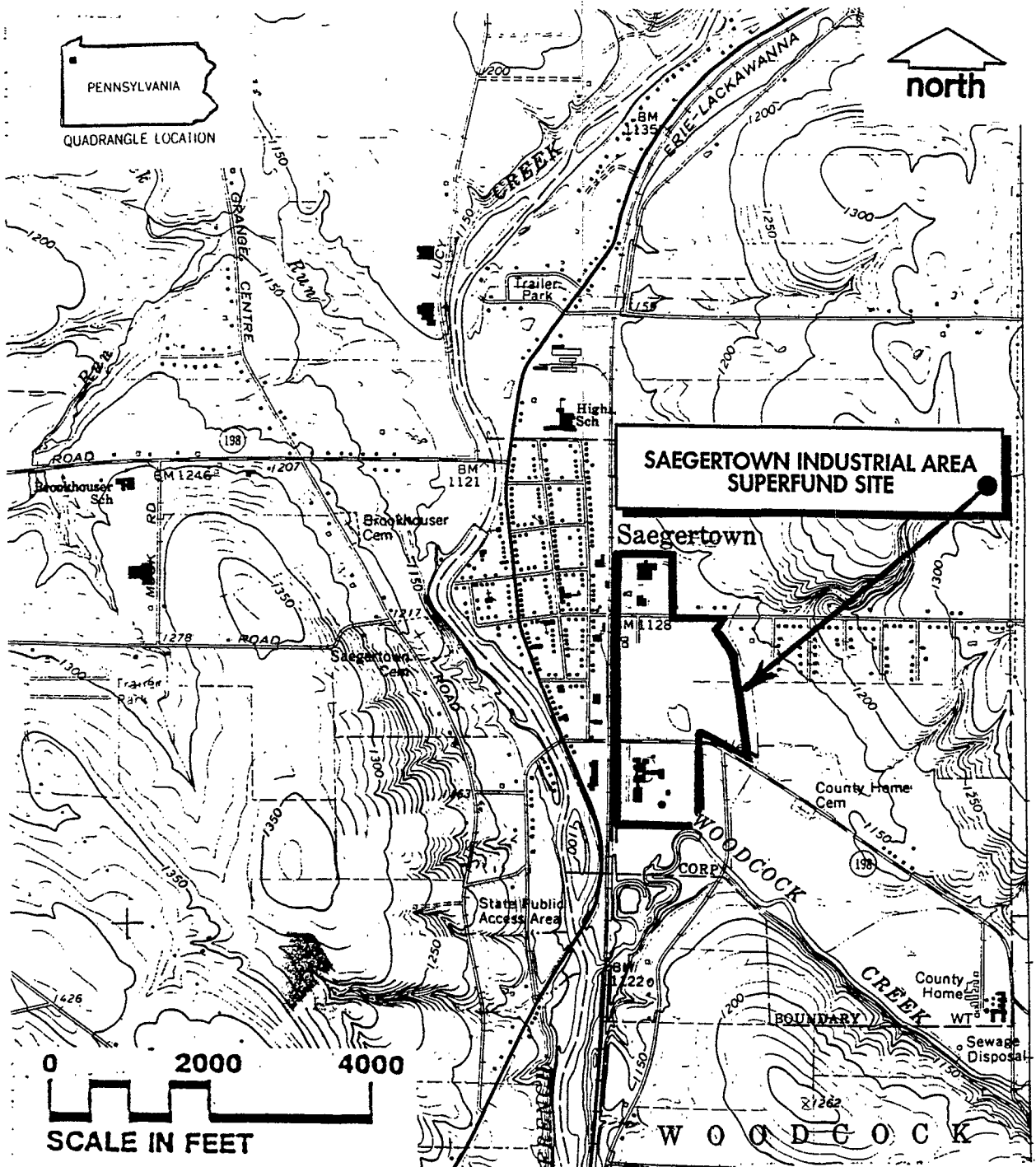
On the Lord property, an estimated 7,500 pounds of chlorinated ethenes have leaked from a sump area into the ground water. As a result, approximately 9.3 million gallons of ground water have been contaminated with tetrachloroethene, 1,2 dichloroethene, vinyl chloride and trichloroethene.

After assessing the risk of the above contaminants to human health and the environment, EPA has determined that remedial action is required at the former GATX and Lord properties.

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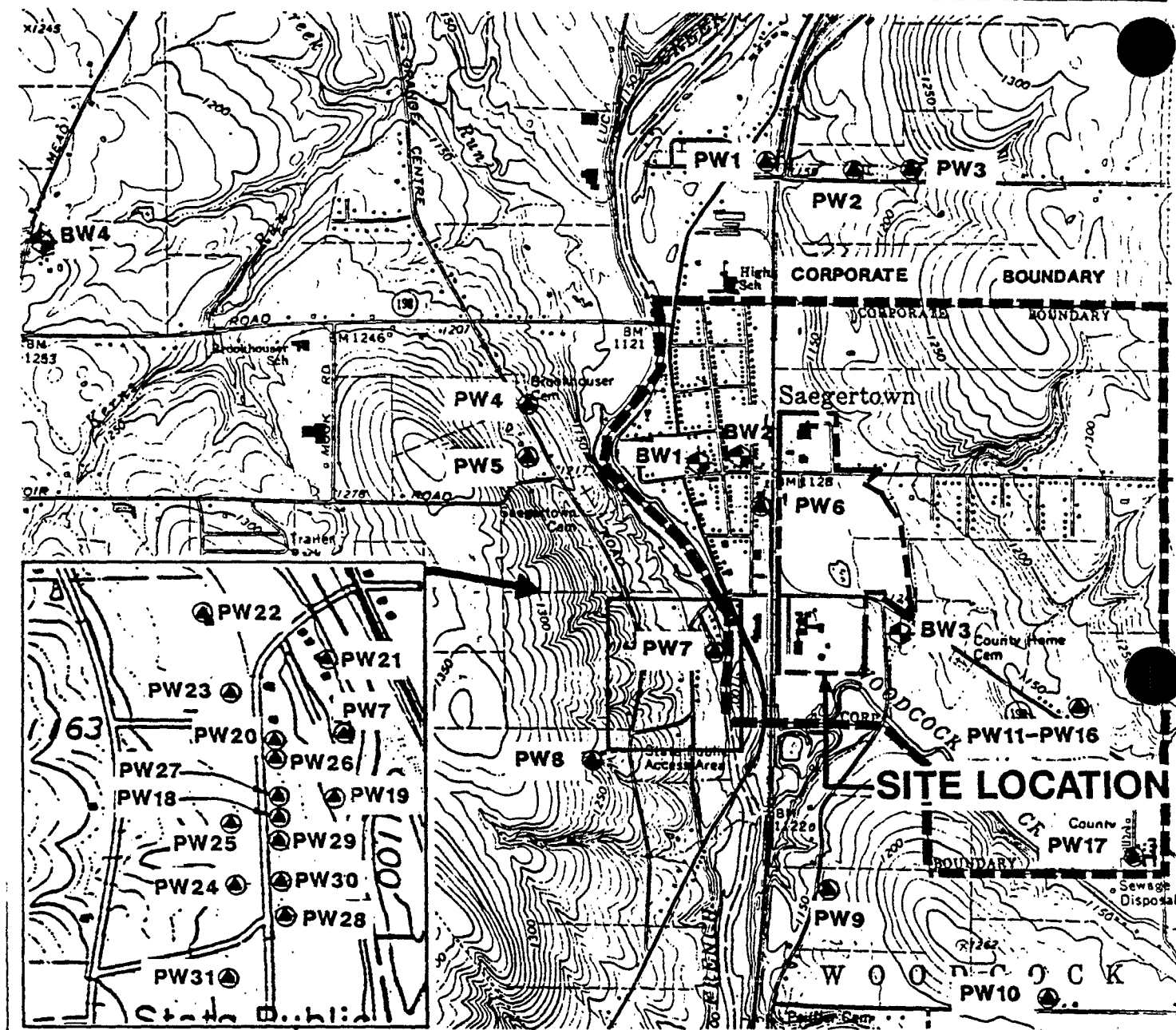
Figure 1

SITE LOCATION
and REGIONAL TOPOGRAPHIC MAP
SAEGERTOWN INDUSTRIAL AREA SITE



Source: Meadville, PA, 7.5 Minute USGS Topographic Quadrangle Map
1968, Photorevised 1973.

SAEGERTOWN INDUSTRIAL AREA SITE
WATER SUPPLY WELL LOCATION MAP



LEGEND

● PW1 PRIVATE WATER SUPPLY WELL
LOCATION AND NUMBER (APPROXIMATE)

⊕ BW2 BOROUGH WATER SUPPLY WELL
LOCATION AND NUMBER (APPROXIMATE)

NOTES

1. SITE LOCATION MAP DEVELOPED FROM THE
MEADVILLE, PENNSYLVANIA 7.5 MINUTE
USGS TOPOGRAPHIC QUADRANGLE MAP DATED
1968, PHOTOREVISED 1973.

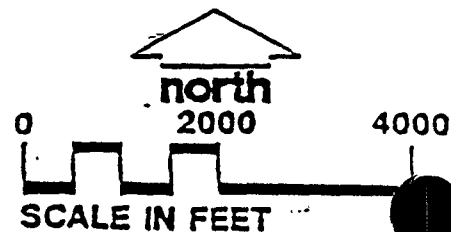
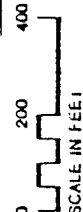


Figure 3



The SMC property contains 15-60 cubic yards of polychlorinated biphenyl ("PCB")-contaminated sediment. However, the concentration of PCBs in the sediment, .260 parts per million ("ppm"), is well below the 10-25 ppm action level for industrial areas or the 1 ppm action level for residential areas which EPA has established. (See Guidance on Remedial Action for Superfund Sites with PCB Contamination, U.S. EPA, OSWER Directive No. 9355.4-01, August 1990). Therefore, remedial action will not be taken at the SMC property.

Similarly, the SCI property contains 40-240 cubic yards of soil contaminated with low levels of VOCs and PAHs. These concentrations of PAH compounds were detected in the subsurface soils. The low levels of PAHs are comparable to concentrations found in background surface soil samples. The concentration of the VOCs (ethylbenzene, xylene and toluene) in the majority of the soil samples taken are below the required detection limits. No VOCs or PAHs were detected in the SCI area ground water. No adverse health effects are presented by the current use of the SCI property. The health effects of exposure to the SCI soil contamination under a future Site use scenario as a residential property were assessed quantitatively in the Risk Assessment performed in the Remedial Investigation. The contaminated soil was found not to present an unacceptable risk to human health or the environment under the future residential Site use scenario. Therefore, remedial action will not be taken at the SCI property.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES.

A. History of the Properties that Comprise the Site

The Former General American Transportation Corporation Property

From approximately 1951 until 1967, GATX operated a facility for the cleaning, painting and repairing of railroad tank cars on 55 acres of the Site property. During its active use, approximately two-thirds of the GATX property was covered with rail sidings. GATX operated a wastewater treatment plant onsite, and wash water and solvents used to clean the railroad cars were disposed of onsite in a sludge bed, a lagoon, and a pond. Wastes contained in the cars which were also disposed of onsite consisted of fuel oils, sludges, phenols, caustic soda, unknown solvents and degreasers, paint and tar residues, anhydrous ammonia, benzene, chlorophene and scrap iron barrels of old paint. In 1967 all of the rail sidings were removed and the GATX facility was closed. In 1970 GATX sold the property to the Meadville Area Industrial Commission. The former GATX property is currently owned by David J. and Judith S. Froess, the Borough of Saegertown, Haemer Tool and Die, Inc., Tru - Weld Corporation, C.J. Ferry, and Multi-Plastics, Inc.

The Lord Corporation Property

Since 1962, the Lord Corporation has produced adhesives, urethane coatings and rubber chemicals on approximately 30 acres of property on the Site. Lord uses solvents including trichloroethylene ("TCE"), trichloroethane ("TCA"), xylene and methyl isobutyl ketone ("MIBK") in its manufacturing processes. From 1968 until approximately 1987, Lord discharged non-contact cooling water to a shallow impoundment on its property. From 1987 until the present, Lord has been discharging non-contact cooling water via a pipeline to French Creek under National Pollutant Discharge Elimination System ("NPDES") permit No. PA0101800.

The Saegertown Manufacturing Corporation Property

In 1965, the Saegertown Manufacturing Corporation started cold metal forming and metal cutting/machining operations on approximately 15 acres of property on the Site. SMC uses a variety of oils for cooling, cutting and lubricating metal. It also uses solvents for degreasing. Cutting oil mixed with metal chips is collected and stored in a pit onsite prior to offsite disposal. Metal chips are separated from the oil and recycled. In 1985, SMC produced approximately 7 tons per year of cold forming and metal cutting sludge, which contained between 3% and 5% Varsol solvent. SMC continues to operate its business onsite.

The Spectrum Control Incorporated Property

Prior to 1974, a milk plant operated on the current Spectrum Control Incorporated property. In 1974, SCI began manufacturing ceramic capacitors and electroplating silver, nickel and tin on approximately 6 acres of property on the Site. SCI generated a silver cyanide electroplating bath waste in their electroplating operations which they sent to a recycling facility for recovery of the silver. Since 1981 SCI has had an NPDES permit for the pretreatment and discharge of waste and cooling water. In 1981 over 17,000 gallons per day of this wastewater was discharged to a storm sewer which empties into the French Creek upstream of its confluence with Woodcock Creek. SCI wastes included liquid and solid acid and caustic waste associated with the electroplating operations, and waste containing MIBK and acetone produced in the manufacturing of capacitors. SCI used TCE before 1978, and TCA after 1978, to clean the capacitors. SCI utilized acetone, MIBK, toluene, acids, and caustics from 1974 until 1989. Plating operations were discontinued in 1989. In April 1990 SCI began gasket forming operations on the property.

B. Enforcement Activities

In February 1979 a waste oil collection pit on the SMC property was flooded with surface water runoff from a heavy rain. The rainwater displaced the oil, resulting in a reported release of approximately 500 gallons of waste oil. The waste oil stained an area 150 feet by 20 feet along the SMC property line, and partially on the adjacent SCI property. In June 1979, Kebert Construction Company, on behalf of SMC, reportedly excavated an area of soil affected by the spill that was approximately 175 feet long by 25 feet wide by 13 feet deep. The Pennsylvania Department of Environmental Resources ("PADER") observed the removal of the oil-stained soil. Approximately 778 cubic yards of waste/soil was excavated from this area and taken offsite for disposal.

In April 1980, during routine sampling of the Borough of Saegertown's municipal wells, PADER discovered that Borough Well Number 2 ("BW2"), which is located approximately 400 feet west of the Saegertown Industrial Area Site, was contaminated with TCE at a level of 310 parts per billion ("ppb"). The Borough removed BW2 from service, but continued to pump the well in an attempt to flush the contaminants from the ground water. The Borough also hired Moody and Associates ("MAI"), environmental consultants, to investigate the potential sources of the contamination. Test pits dug in the vicinity of the pond on the former GATX property revealed deteriorating barrels containing sludge. Analysis of a sample from one of the deteriorating barrels showed that the sludge contained 100 ppb TCE. MAI concluded that sludge in the pond and in the former treatment area on the GATX property were the sources of the contaminants impacting BW2.

In 1980 PADER sampled Lord Corporation's non-contact cooling water, which was being discharged to an onsite impoundment. Analysis of the samples revealed that they contained trace to low levels of several volatile organic compounds, including TCE, tetrachloroethylene ("PCE"), benzene and xylene. Lord contended that the source of these contaminants was the water supplied by the Borough.

In 1980, PADER detected TCE and TCA in a monitoring well on the SMC property.

In 1981, analysis of samples obtained by PADER from cutting oil tanks on the SMC property revealed the presence of trace amounts of TCA. SMC asserted that the source of the TCA was the Borough's water supply. SMC denied that it used TCA in its manufacturing processes, except in very small quantities which were totally consumed in the process, so that no waste was created.

In 1981 samples were taken on the SCI property from a well used by the milk plant that formerly operated there. Analysis of the ground water samples revealed the presence of TCE and TCA.

On June 11, 1982, the Borough of Saegertown filed a legal action against SMC and SCI, alleging that these companies were responsible for polluting BW2. The Borough later voluntarily discontinued its action against SMC and SCI.

In July 1984, EPA began a Site Inspection of the Saegertown Industrial Area Site. Sampling confirmed the presence of TCE and TCA in ground water onsite. Soil and sludge samples from the GATX pond area revealed the presence of TCE, PCE, polyaromatic hydrocarbons ("PAHs") and 1,4-dichlorobenzene.

On November 20, 1985, EPA calculated a Hazard Ranking System score of 33.62 for the Saegertown Industrial Area Site. This score was based primarily on the presence of hazardous substances in the ground water in the vicinity of the Site.

On June 24, 1988, the Saegertown Industrial Area Site was proposed for listing on the National Priority List ("NPL") of Superfund Sites.

In late 1989, GATX, SMC, SCI and Lord signed an Administrative Order on Consent ("Consent Order") with EPA (Docket No. III-90-08-DC). Under the terms of the Consent Order, the Companies agreed to conduct a Remedial Investigation/Feasibility Study ("RI/FS") for the Site. (The RI/FS Reports for the Site have recently been completed and accepted by EPA.)

On February 21, 1990, the Saegertown Industrial Area Site was listed on the NPL.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

A public meeting was held on November 27, 1990 to discuss the start of the Remedial Investigation and Feasibility Study for the Saegertown Industrial Area Site.

The RI/FS Report and the Proposed Plan for the Saegertown Industrial Area Site were released to the public on October 21, 1992. These documents were made available to the public in both the Administrative Record located at the EPA Docket Room in Region III, and the information repository at the Saegertown Area Library in Saegertown, Pennsylvania. In accordance with Sections 113(k)(2) and 117 of CERCLA, 42 U.S.C. §§ 9613(k)(2) and 9617, on October 21, 1992, EPA placed a 1/4 page advertisement in the Meadville Tribune and the Erie Times newspapers announcing the 30-day comment period on the Proposed Plan for the remedial action at the Saegertown Industrial Area Site.

The public comment period began October 21, 1992 and ended November 20, 1992. A request for an extension to the public comment period was made. On November 27, 1992, EPA placed an advertisement in the Meadville Tribune and the Erie Times announcing that an additional 30 days had been added to the comment period, and that the comment period would end on December 20, 1992.

A public meeting was held on November 5, 1992. At this meeting representatives from EPA summarized the results of the RI/FS, explained the incineration process proposed for the contaminated soil on the former GATX property, and discussed the risk to human health and the environment posed by the Site. EPA also answered questions from citizens at the meeting about the proposed remedial alternatives for the Site. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this Record of Decision.

This Record of Decision ("ROD") presents the selected remedial action for the Saegertown Industrial Area Site, in the Borough of Saegertown, Crawford County, Pennsylvania, chosen in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan.

IV. SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

This final remedy for the Site addresses contaminated soil and sludge on the former GATX property and contaminated ground water located on, and emanating from, the Lord Corporation property.

On the former GATX property, potential ingestion or inhalation of the carcinogenic PAHs in the sludge and soil poses the principal risk to human health or the environment. Excavation and incineration of the sludge/soil will eliminate the risk. EPA has determined that there are no contaminants in the ground water requiring remediation at this time. However, the ROD specifies continued monitoring of the ground water during the implementation of the selected remedy to ensure the effectiveness of the remedial action.

On the Lord Corporation property, potential ingestion, inhalation or dermal contact with the concentrations of organic contaminants in the ground water poses a significant risk to human health or the environment. Pumping and treating the ground water and air sparging the source area of contamination will reduce the concentration of organic contaminants in the ground water to background levels and eliminate the risk.

On the SMC and SCI properties, potential ingestion, inhalation or dermal contact with contaminants in the soil would not pose an unacceptable risk to human health or the environment. Ground water under these properties is not affected by the contaminants present in the soil. Therefore, this ROD selects the No Action Alternatives for the SMC and SCI properties.

V. SUMMARY OF SITE CHARACTERISTICS

A. Land Use, Soils, Geology, Hydrogeology, Hydrology

The Site consists of industrial buildings, paved and gravel parking lots, grassy fields/lawns, woods, a public park, agricultural fields and old field vegetation. A small pond and wetland area are located on the former GATX property. A wetland area also exists south of the Site near the confluence of the Woodcock and French Creeks.

1. Soils

Surficial soils have been disturbed over much of the Site due to the construction and dismantling of structures on the former GATX property, as well as to the construction of other industries. As a result, the upper soil profile has been altered over portions of the Site.

Based on RI field investigation results, the surficial soils mainly consist of well drained organic silts and fine sand.

Varying amounts of clay and gravel exist near the surface at many locations.

2. Geology

The Site is located on a broad stream terrace (formed during glacial times) of French Creek within the glaciated section of the Appalachian Plateau Physiographic Province.

The Site is underlain by glacial material consisting of either outwash or till. The glacial deposits are generally 45 to 50 feet thick and consist mainly of sand and gravel. However, based on data collected during the RI, these deposits also contain varying percentages of clay and silt.

The heterogeneous nature of the Site's unconsolidated soil suggest that scattered discontinuous winding belts of sand and gravel exist within the valley fill material. Based on the boring logs and cross-sections, there appear to be no distinctive individual stratigraphic units within the unconsolidated deposits.

Bedrock is generally encountered between 45 and 50 feet below the ground surface. Bedrock near Saegertown is mapped as consisting of the Devonian age Conewango Group. The Riceville shale is the upper shale unit in the Group and consists mostly of interbedded light greenish gray to light bluish gray shale and siltstone. The Conewango Group is approximately 385 feet thick near the Site. The rock units dip to the south at approximately 10 to 20 feet per mile and strike generally east-west; as a result, rock thickness is generally dependent on topography.

3. Hydrogeology

Ground water is the sole source of potable water in the vicinity of the Site in Western Crawford County. Ground water flow is generally from the upland areas, through the weathered shale toward the valleys containing glacial outwash. Ground water in the outwash discharges to streams. Highly productive outwash aquifers are found in major valleys, including French and Woodcock Creeks. A northwest-southeast trending ribbon of outwash is reported to be present beneath the former GATX facility (Schiner & Gallaher, 1979). This outwash ribbon is flanked to the northeast and southwest by finer grained till. Recharge to the outwash aquifer occurs through direct infiltration and precipitation.

The Saegertown Borough water supply wells tap these granular outwash deposits. The well screen for Borough Well 1 is between 50 and 60 feet below the surface, the screen on Borough Well 2 is between 32 and 49 feet, and the screen on Borough Well 3 is between 45 and 60 feet below the surface.

The deeper shale formation yields only small quantities of water and is considered a poor aquifer. However, some private water supply wells in the area draw water from the shale.

Ground water occurs under unconfined conditions in the unconsolidated sand and gravel aquifer. No aquitards or aquicludes were discovered during the RI.

Ground water flow beneath the Site is primarily horizontal, generally from east to west and southwest beneath the Site. Well nests located in close proximity to French Creek had an upward vertical gradient, suggesting that French Creek is likely a local ground water discharge zone. The ground water flow direction in the deeper portion of the outwash aquifer is similar to the flow direction in the water table.

4. Hydrology

French Creek runs from north to south on the western side of the Borough of Saegertown. In the Saegertown area, French Creek is approximately 200 feet wide and varies in depth from 6 inches to 3 feet during the period of late summer low water. French Creek is classified as a warm water fishery by the Pennsylvania Fish Commission. Mussel species, including the northern riffleshell and clubshell, which were formally proposed for listing as endangered species under the Endangered Species Act of 1973, may inhabit French Creek. French Creek has well defined banks without distinct ripple or pool areas or much streamside wetland. The banks are approximately 2 to 10 feet high on both sides of the creek.

The French Creek stream bottom sediment in most areas appears to be a gray clay. The clay material of the stream bed provides poor habitat and poor substrate for organism colonization. Submerged grasses near the banks of the Creek are not in evidence, although some of the trees may have been wetland species. Rocks or cobbles in the stream bed are not visible.

A storm sewer outfall, the discharge point established in SCI's NPDES permit, is located on the eastern bank of French Creek, approximately 50 feet south of the South Street bridge. The stream here has a hard bottom in the stream channel, but has silty-gravelly deposits with much organic detritus in the side area that forms the mouth of the drainage culvert.

French Creek is joined by the westerly-flowing Woodcock Creek approximately 1800 feet south of the southwest corner of the Site.

South of the Site, Woodcock Creek is a meandering stream approximately 30 to 40 feet wide, and 1 to 2 feet deep. The creek is classified by the Pennsylvania Fish Commission as a cold

water stream. It contains typical coldwater fish species, such as trout species and white suckers. Near the confluence of Woodcock Creek and French Creek, the stream is slow moving, perhaps 3 feet or more deep, approximately 20 feet wide. Further upstream the Woodcock Creek narrows to approximately 6 to 8 feet in width, and approximately 1 foot in depth, with a silty sand bottom.

An intermittent stream is located adjacent to the eastern Site boundary. This intermittent stream feeds into Woodcock Creek at a point southeast of the Site and east of the Saegertown waste water treatment plant.

There is little topographic relief over the Site area. Ground surface slopes away from the northeastern topographic high gently to the south and to the west at a grade of 0 to 3 percent.

Several small drainage ditches and low spots where surface water runoff collects are present on the Site. The pond on the former GATX property and a small catchment basin on the SMC property are two areas where surface water collects following precipitation events.

Portions of the Site are located within the "100-year floodplain" of French Creek or Woodcock Creek as defined by the Federal Emergency Management Agency (FEMA).

B. Nature and Extent of Contamination

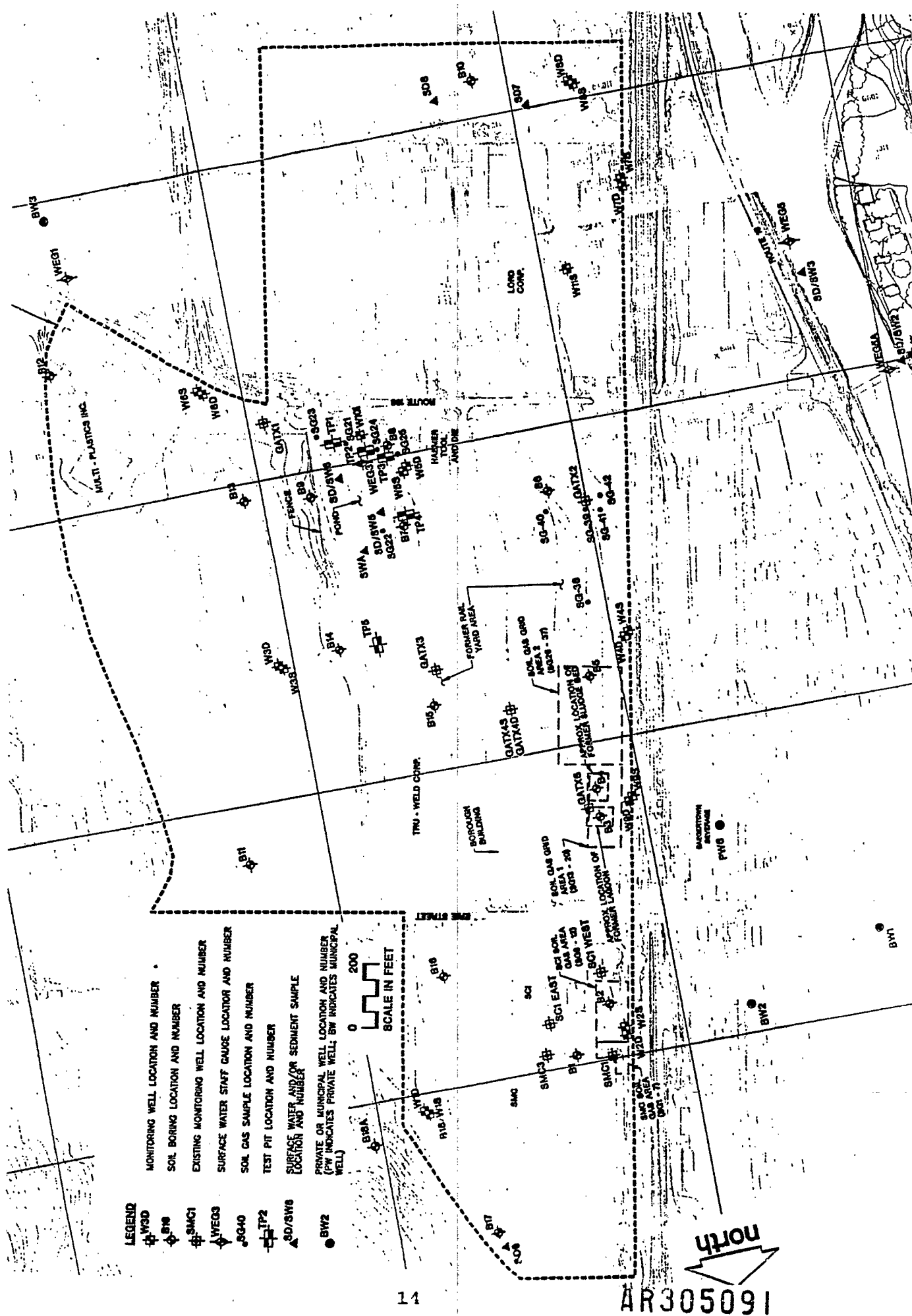
The investigation into the nature and extent of contamination at the Saegertown Industrial Area Site occurred in two phases. Phase I RI field activities occurred from September 1990 through February 1991. Phase II RI field activities occurred from August to October 1991. Onsite sample locations are shown on Figure 4 (p. 14). A summary of the results from the RI sampling program by property are shown below.

Former GATX Facility

Three distinct areas on the former GATX facility property were assessed during the RI. These areas and the locations sampled are as follows:

- Pond Area
- Former Lagoon and Sludge Bed Area
- Former Rail Siding Area

SAEGERTOWN INDUSTRIAL AREA SITE SAMPLE LOCATION MAP.



GATX Pond Area

Sampling in this area revealed buried sludge materials containing VOCs and semi-volatile compounds ("SVOCs"), including high concentrations of polyaromatic hydrocarbons. The contamination in the sludge may be from residues of a coal tar derivative coating which was, in the past, applied to the exterior of railcars. Coal tars and sludges are comprised primarily of hundreds of different PAHs and minor amounts of phenolics and aromatic hydrocarbons. The VOCs could have originated from solvent systems used in the railcar coatings, or from equipment and railcar cleaning activities.

Figure 5 (p. 16) depicts the aerial extent of the sludge in the pond area. Figure 6 (p. 17) depicts a cross section of the sludge in this area, showing the vertical extent. The thickness of the sludge layer ranges from 0.5 to 6 feet. Sludge is visible at the surface in some areas, while a soil cover approximately one foot thick is present over the majority of the area south of the pond. The sludge layer is thickest south of the pond.

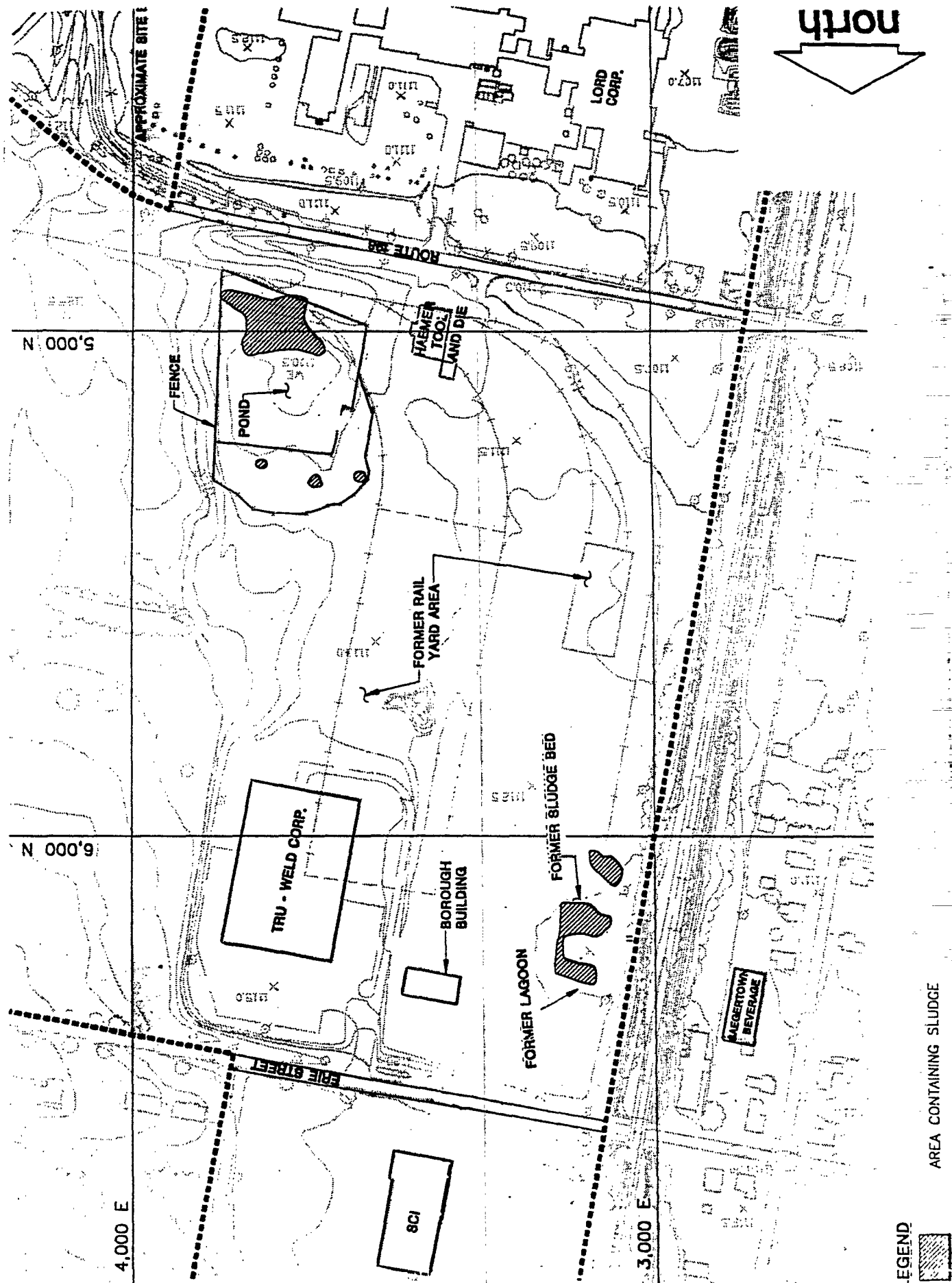
Samples of the sludge taken from this area contained high concentrations of organics and inorganics when compared to samples of the surrounding soil. Table 1 (p. 18) summarizes the contaminants and the volume of the contaminated media found in the pond area.

VOCs detected in these sludge samples include the chlorinated hydrocarbons tetrachloroethene, trichloroethene, and 1,1,1-trichloroethane at concentrations up to 39,000 micrograms per kilogram ("ug/kg"). Aromatic volatiles detected include benzene, toluene, ethylbenzene, styrene, xylenes and chlorobenzene at concentrations up to 230,000 ug/kg. SVOCs detected in sludge samples included phenols, chlorinated benzenes and PAHs, at concentrations up to 45,000,000 ug/kg.

Non-aqueous samples collected from the GATX pond area include shallow soil boring, shallow auger probe, test pit and sediment samples. Depending on the season and the weather, the pond size varies considerably, from extending throughout the entire fenced area to completely drying up. Locations sampled as sediments in January were dry and vegetated in September. Samples collected from shallow soil borings, shallow auger probes and test pits were considered sub-surface samples.

Figure 5

AERIAL EXTENT OF SLUDGE ON THE FORMER GATX PROPERTY



VERTICAL EXTENT OF SLUDGE ON THE FORMER GATX PROPERTY

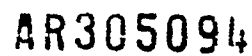


TABLE 1

SUMMARY OF SOIL AND GROUNDWATER CALCULATIONS SAEGERTOWN INDUSTRIAL AREA SITE

| Area | Impacted Medium | Volume ¹⁴ | Chemical Group ¹ | Avg. Conc. ² (ppm) | Max. Conc. ² (ppm) |
|------|---|-------------------------------|-----------------------------|----------------------------------|----------------------------------|
| Lord | Groundwater | 9,300,000 gallons | tetrachloroethene | 1.97 ³ | 100 ³ |
| | | | trichloroethene | 0.31 ³ | 9.80 ⁴ |
| | | | 1,2 dichloroethene | 0.28 ³ | 1.125 ⁴ |
| | | | 1,1,1 trichloroethane | 0.021 ³ | 0.150 ⁴ |
| | | | vinyl chloride | -- | 0.770 ⁵ |
| SCI | Soil | 40-240 cu. yds. ¹⁵ | PAHs | 18 ⁶ | 18 ⁶ |
| SMC | Sediment | 15-60 cu. yds. | PCBs | 0.260 ⁷ | 0.260 ⁷ |
| GATX | Soil (B7) Sediments (SD6) Sludge (pond) | 285 cu. yds. | PCBs | 800 ⁸ | 800 ⁸ |
| | | 260 cu. yds. | PCBs | 50 ⁹ | 50 ⁹ |
| | | 6,300 cu. yds. | PAHs | 120,000 ¹⁰ | 190,000 ¹¹ |
| | | | BETX | 17,000 ¹⁰ | 28,000 ¹¹ |
| | | | Chlorinated Ethenes | 24 ¹⁰ | 39 ¹¹ |
| | Sludge (lagoon) | 2,500 cu. yds. | Chlorinated Benzenes | 380 ¹⁰ | 950 ¹¹ |
| | | | Phenols | 1,900 ¹⁰ | 2,900 ¹¹ |
| | | | Miscellaneous | 3,500 ¹⁰ | 5,800 ¹¹ |
| | | | Metals | 1,900 ¹⁰ | 3,100 ¹¹ |
| | | | PAHs | 27,000 ¹² | 46,000 ¹³ |
| | | | BETX | 1,900 ¹² | 3,300 ¹³ |
| | | | Chlorinated Ethenes | 1.6 ¹² | 2.5 ¹³ |
| | | | Chlorinated Benzenes | 580 ¹² | 980 ¹³ |
| | | | Miscellaneous | 440 ¹² | 750 ¹³ |
| | | | Metals | 36 ¹² | 39 ¹³ |

Notes

1. Chemical groups are broken out as shown in Tables 4-1 thru 4-4.
2. Concentrations listed are for the indicated target compound or the sum of all of the target compounds within a chemical group.
3. A flow-weighted average concentration, determined using pumping rates for the aggressive pump and treat system modeled in Appendix B, was considered to be representative for this target compound. The determination of the flow-weighted average concentration for each target compound is shown in the Attachment.
4. Maximum of temporary wellpoint samples WP1 to WP6, WP12 to WP15, WP17, WP25, E-2, E-4, E-10, and monitoring wells W-3 and W-7 was considered to be representative of the maximum concentration for this target compound.
5. Data from groundwater monitoring well sample GWW11S-02 was considered to be representative of the maximum concentration for this target compound.
6. Data from subsurface soil sample B2-6 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
7. Data from sediment sample SD9 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
8. Data from subsurface soil sample B7-02 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
9. Data from sediment sample SD6 was considered to be representative of the maximum and average concentration(s) for target compound(s) in this chemical group.
10. The volume weighted average of test pit samples TP1 and TP2, where TP1 represents sludge and TP2 represents lower concentration sludge and contaminated soil present below and at the perimeter of the sludge was considered to be representative of the average concentration(s) for target compound(s) in this chemical group.
11. Data from test pit sample TP1 was considered to be representative of the maximum concentration(s) for target compound(s) in this chemical group.
12. The volume weighted average of subsurface soil samples AP83 and B4-6, where AP83 represents sludge and B4-6 represents lower concentration sludge and contaminated soil present below and at the perimeter of the sludge was considered to be representative of the average concentration(s) for target compound(s) in this chemical group.
13. Data from subsurface soil sample AP83 was considered to be representative of the maximum concentration(s) for target compound(s) in this chemical group.
14. Soil and sludge volumes represent excavated volumes, assuming 30 percent bulking upon excavation.
15. See Section 4.3.2.2, Description for assumptions used to establish the volume of potentially contaminated SCI soil

Soil samples were collected from shallow auger probe locations around the perimeter of the sludge in the pond area. These samples were collected to evaluate the quality of the soils surrounding the sludge. VOCs were not detected in samples collected from these locations. SVOCs, with the exception of naphthalene (38 ug/kg), were also not detected in the shallow auger probe samples.

The PCB compound Aroclor 1260 was detected in a soil sample at 830,000 ug/kg. Fill material is present at 0 to 1.5 feet at this boring location and the Aroclor 1260 may be related to the fill. No other pesticides or PCBs were found in either of the shallow soil borings.

Of the metals detected in the soil samples collected around the pond, aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, thallium, vanadium, zinc and cyanide were found at concentrations above background values. Elevated metals concentrations in surficial soils or sediments may be due to fugitive losses of metal dusts and particulates from former GATX operations, including metal blasting and maintenance activities.

Two sediment samples were taken at the GATX Pond. One sample on the northwestern side of the pond contained no detectable VOCs, while the sample on the eastern edge of the pond (within the sludge area) contained tetrachloroethene and trichloroethene at 1,500,000 and 610,000 ug/kg, respectively, and 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane at estimated concentrations of 27,000 and 43,000 ug/kg, respectively. In addition, this sample contained benzene, ethylbenzene, toluene, and xylene ("BETX") compounds at concentrations up to 95,000 ug/kg. Styrene and chlorobenzene were detected at 22,000 and 170,000 ug/kg.

SVOC analysis indicated that the sediment sample on the eastern edge of the pond was highly contaminated with a variety of substituted phenols and PAHs totaling 14% of the sample dry weight. The sediment sample on the northwest side of the pond contained similar SVOC compounds, but at substantially lower concentrations of 190-3900 ug/kg. Both Pond area sediment samples contained the PCB Aroclor 1260 at concentrations of 33,000 ug/kg and 340 ug/kg, respectively.

Barium, chromium, lead, mercury and zinc were present above soil background levels for both sediment samples. In addition, the northwest sediment sample contained aluminum, potassium and vanadium above soil background values, while the eastern sediment sample contained elevated levels of arsenic, cadmium, calcium, copper, iron, nickel, selenium, silver, thallium and cyanide.

Surface water samples were collected from the pond in January 1991. Trichloroethene and tetrachloroethene were both detected at low concentrations (1 to 3 micrograms per liter ("ug/l")). No SVOC, pesticide or PCB compounds were detected in the pond surface waters.

Metals results in the surface water samples from the pond were compared directly to metals results in a sample collected upstream of the Site in French Creek. The concentrations of metals were similar, with the exception of zinc, which was detected at the pond at 20 to 28 ug/l, aluminum, which was detected at 70 to 85 ug/l, and iron, which was detected at 93 to 106 ug/l. Zinc, aluminum, and iron were not detected above the reported detection limit ("RDL") in the upstream surface water sample.

Ground water samples were collected from temporary well points installed on the former GATX property in close proximity to the pond. Trichloroethene and 1,2-dichloroethene were detected, with TCE concentrations ranging from 35 to 41 ug/l in two temporary wellpoint samples (WP20, WP22). A permanent monitoring well (W10I) was installed adjacent to the temporary well point WP22.

Ground water monitoring wells were located downgradient of the sludge and pond areas. (See Figure 2, p. 3). Tetrachloroethene (1-3 ug/l) was detected in Wells W4S and W9S during both phases of sampling. Trichloroethene was detected in Well W9S (1 ug/l) in the second phase of sampling. Benzene was detected in W5S (5 ug/l) in the second phase of sampling only. Other wells showed no detected VOCs in either of the sampling phases.

SVOC and pesticide/PCB organic compounds were not detected in ground water samples, with the exception of 1,4-Dichlorobenzene at 3 ug/l and diethylphthalate at 1 ug/l, which were found in one well during the second sampling phase.

Metals analysis of these filtered samples indicated that most metals are below ground water background values, with the following exceptions. One well contained antimony at 5.3 ug/l in Phase 1 and cyanide at 12 and 5 ug/l in Phases 1 and 2, respectively. Another well contained zinc (17 ug/l in phase 2), iron (3330 and 3250 ug/l in Phases 1 and 2), and manganese (3230 and 4120 ug/l in Phases 1 and 2) at levels above ground water background values. Antimony and total cyanides were detected in excess of background levels downgradient from the former lagoon/sludge bed area, while iron, manganese, and zinc were detected in excess of background levels downgradient from the pond area.

Total cyanide was the only inorganic compound which has a primary Safe Drinking Water Act ("SDWA") Maximum Contaminant Level ("MCL") and which was detected above background levels. The

measured concentrations of 12 and 5 ug/l are well below its proposed MCL of 200 ug/l. The source of the total cyanides is believed to be wastewater discharges which occurred during the operation of the railcar cleaning and repair facility.

The potential for contamination from air emissions related to the pond was evaluated by estimating contaminant emissions from the pond and then assessing downwind contaminant concentrations using dispersion modeling. The results of this modeling are discussed in the Summary of Site Risks section of this ROD.

GATX Lagoon and Sludge Bed Area

The lagoon and sludge bed area on the former GATX property also contains buried sludge. Figure 5 (p. 16) depicts the aerial extent of the sludge in this area. Figure 6 (p. 17) depicts a cross section of the sludge, showing the vertical extent. Samples of sludge from this area contained high concentrations of organics and inorganics when compared to samples of the surrounding soil. Table 1 (p. 18) summarizes the contaminants and the volume of contaminated media found in this area.

VOCs detected in shallow soil boring and shallow auger probe samples include tetrachloroethene, trichloroethene, 1,2-dichloroethene, 1,2-dichloropropane, 2-butanone (methyl ethyl ketone or MEK), and 4-methyl-2-pentanone (methyl isobutyl ketone or MIBK). Concentrations ranged up to 1500 ug/kg. Aromatic VOCs detected include xylenes, styrene, ethylbenzene, toluene, benzene and chlorobenzene. Concentrations ranged up to 44,000 ug/kg. The highest concentrations were found in the former sludge bed area. SVOCs detected in samples included dichlorobenzenes and other chlorinated benzenes, and a wide range of PAHs at concentrations up to 770,000 ug/kg.

Soil samples were collected from shallow auger probe locations around the perimeter of the area containing sludge in order to evaluate the quality of the soil surrounding the sludge. VOCs were not detected in samples collected from these locations. SVOCs, naphthalene (up to 580 ug/kg) and 2-methylnaphthalene (39 ug/kg) were detected in soil samples. The PCB Aroclor 1260 was detected in soil boring 3 at a depth of six feet at 1100 ug/kg. Of the metals detected in these samples, arsenic, calcium, chromium, copper, lead, magnesium, manganese, mercury, nickel, sodium, zinc and cyanide were detected at concentrations greater than soil background concentrations.

In addition to the shallow soil boring and shallow auger probe samples collected in the sludge bed/lagoon area, two surface soil samples were also collected. No volatiles were detected in these samples. PAHs similar to those found at depth were detected at concentrations ranging up to 4400 ug/kg. Pesticide and PCB compounds were not detected in the surface soils. Barium,

calcium, chromium, lead, magnesium, mercury and zinc were found at concentrations greater than background concentrations.

GATX Soil Gas Sampling

Soil gas samples were collected from two grid areas on the former GATX property: one near the lagoon, and one near the sludge bed. Figure 4 (p. 14) shows the location of the soil gas grids. In addition, soil gas samples were obtained from the area south of the two grids and from the pond area. VOCs were not detected in any of the soil gas samples from these areas.

GATX Rail Siding Area

Two surface soil samples taken from the former GATX rail siding area both contained toluene (28 to 46 ug/kg). One of the samples also contained benzoic acid (76 ug/kg). No other VOCs, SVOCs, pesticide or PCB compounds were detected. The presence of toluene in shallow soil boring samples collected from this area could be sample contamination resulting from the use of electrical tape to seal the sample bottles. Of the metals detected, only lead was present in excess of two times background values. Aluminum, barium, chromium, lead, vanadium and zinc were found above soil background concentrations.

Subsurface soil samples also contained toluene (1.0 to 49 ug/kg) but no other VOCs. As indicated above, the presence of toluene in subsurface soil samples could be sample contamination resulting from the use of electrical tape to seal the sample bottles. Several PAHs were detected at levels below their reported detection limits. No pesticide/PCB compounds were detected. Of the metals detected in the sub-surface soil samples from this area, aluminum, arsenic, barium, calcium, chromium, copper, lead and vanadium concentrations were all above soil background concentrations.

Lord Facility

Samples of soil, sediments, and ground water were collected from the Lord Corporation property during the RI. Figure 4 (p. 14) shows the sample locations.

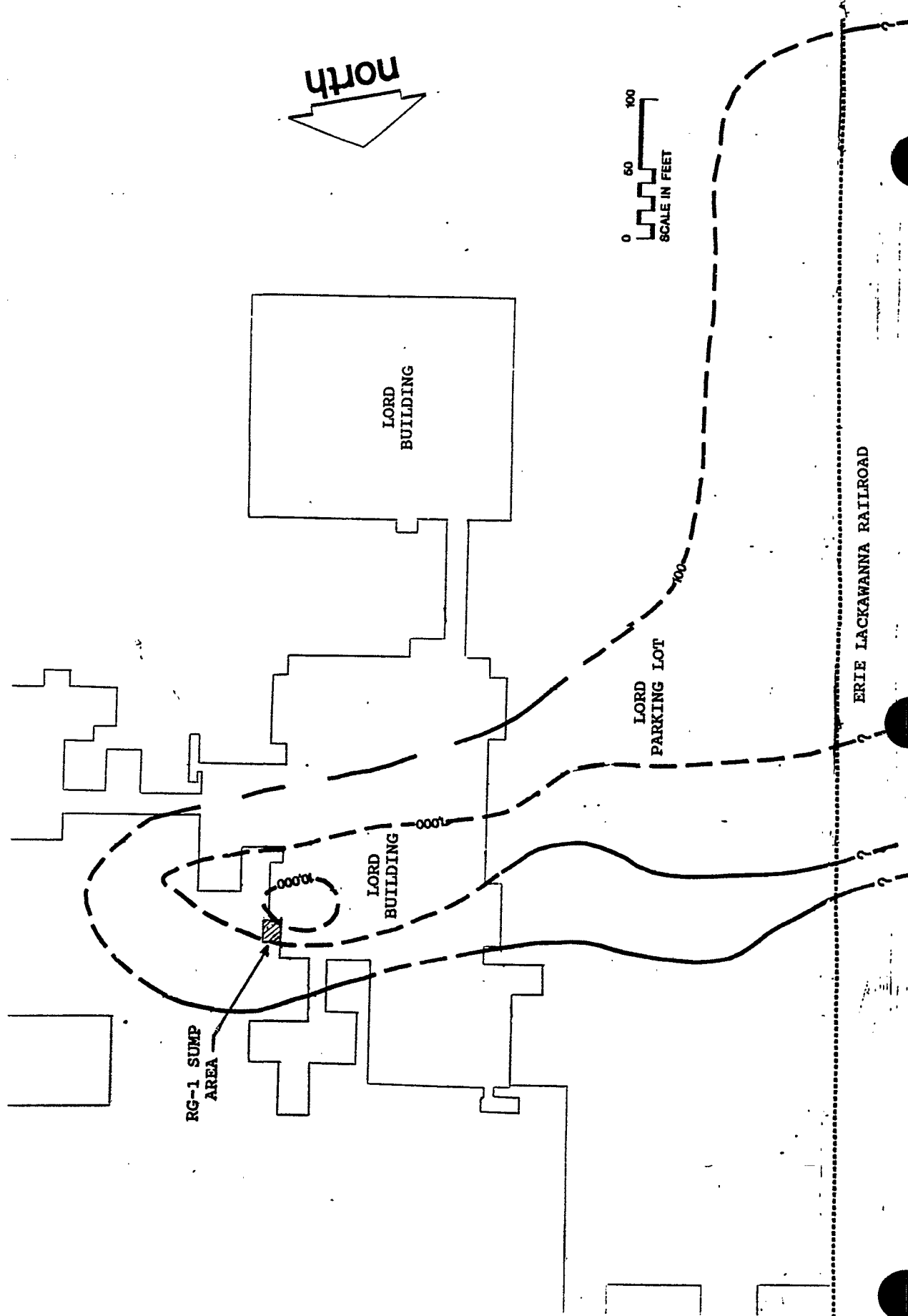
Lord Ground Water

Ground water contamination was discovered on the Lord Corporation property during the RI. Figure 7 (p. 23) depicts the aerial extent of the contamination. Figure 8 (p. 24) depicts a cross section of the ground water contamination, showing the vertical extent. The ground water plume was not fully delineated during the RI. Table 1 (p. 18) summarizes the contaminants and the volume of contaminated media found on the Lord property.

Figure 7

AERIAL EXTENT OF GROUNDWATER PLUME ON THE LORD PROPERTY

Total Ethene Contours in PPB




VERTICAL EXTENT OF GROUNDWATER PLUME ON THE LORD PROPERTY



1. SAMPLING WAS CONDUCTED BY WARZYN DURING THE PERIOD AUGUST 26 THROUGH AUGUST 30, 1991, AND BY REMCOR(E2, E4, W3, AND W7) DURING THE PERIOD OF OCTOBER 3 THROUGH OCTOBER 6, 1991. SAMPLES WERE ANALYZED IN THE FIELD USING A GAS CHROMATOGRAPH.
2. TOTAL ETHENES ARE THE SUM OF THE CONCENTRATION OF TETRACHLOROETHENE, TRICHLOROETHENE, AND TOTAL 1,2-DICHLOROETHENE.
3. LOCATION OF PROFILE SHOWN ON DRAWING 60882-F
4. THE CONTAMINANT PROFILE ALONG THE WESTERN PROFILE LINE IS ILLUSTRATED ON FIGURE 9. FIGURE 9 SHOWS THAT CONTAMINANTS WERE NOT DETECTED AT DEPTH AT WELL W7D.

LEGEND

| | |
|---|---|
| 100 | TOTAL ETHENE CONTOUR (ug/L) |
| 277 | TEMPORARY WELL POINT SAMPLING DEPTH AND TOTAL ETHENE CONCENTRATION (ug/L) |
|  | WATER TABLE |
| ND | NO ETHENES DETECTED |

ION: TEN TIMES
AR303227

Two phases of samples were collected from most of the wells on the Lord property. VOC analysis of samples during the first phase detected chlorinated alkenes (tetrachloroethene, trichloroethene and 1,2-dichloroethene) at individual concentrations ranging from 220 to 860 ug/l. In the second phase of sampling the same contaminants were detected, but at lower concentrations.

An additional well was installed after the first phase of ground water sampling. Analysis of a ground water sample from this well detected 1,1-dichloroethene and vinyl chloride (2 ug/l and 770 ug/l, respectively), and 1,1,1-trichloroethane and 1,1-dichloroethane (7 ug/l and 3 ug/l, respectively), in addition to the chlorinated alkenes detected in prior sampling of the ground water.

No SVOCs were detected in ground water samples from the Lord facility, with the exception of phenol (1 to 3 ug/l) and diethylphthalate, di-n-butylphthalate, bis(2-ethylhexyl)phthalate (1 to 6 ug/l). Phenol was also found in a background ground water well at 2 ug/l.

Pesticide and PCB compounds were not detected in the ground water samples from the Lord monitoring wells, with the exception of heptachlor epoxide at 0.006 ug/l in a second phase sample from one well.

Aluminum, antimony, barium, cobalt, lead, manganese, mercury and potassium were detected in the filtered ground water samples at levels above ground water background values.

Ground water samples were also collected from temporary well points installed on the Lord property. Tetrachloroethene, trichloroethene, 1,2-dichloroethene, 1,1,1-trichloroethane and ethylbenzene were detected. Total ethene concentrations were detected at concentrations ranging from 16 to 1,406 ug/l. Sampling of temporary well points was also conducted by a consultant to Lord in a study outside the scope of the RI. VOCs were detected during this investigation in the vicinity of the Lord RG-1 Sump. This study has been included as an appendix to the RI.

Lord Soils

One shallow soil boring sample was collected from the Lord facility property. VOCs were not detected, with the exception of toluene at 3 ug/kg. As discussed earlier, this could be due to sample contamination resulting from the use of electrical tape to seal the sample bottles. SVOCs were not detected. Dichlorodiphenyldichloroethylene ("DDE") and dichlorodiphenyl-trichloroethane ("DDT") were both detected in the sample at 69 and 70 ug/kg, respectively, possibly as a result of past

pesticide use or the accumulation of surface water runoff.

Copper and lead were detected at concentrations greater than background concentrations in the shallow soil boring. All other metals detected were below background concentrations.

Lord Sediments

Two sediment samples were taken from the Lord property. VOCs were not detected. The SVOC benzoic acid was detected in both samples (8,700 to 46,000 ug/kg), as were small amounts of fluoranthene (59 ug/kg in one sample). Bis(2ethylhexyl)phthalate, a common laboratory contaminant, was detected at 59 to 110 ug/kg. Aroclor 1254, at 340 ug/kg, was found in the field duplicate of a sample taken from the former impoundment area, but not in the primary sample. One sediment sample taken from the Lord property also contained DDE at 80 ug/kg.

Metals analysis of the sediments from the Lord property area detected aluminum, barium, chromium, copper, lead, mercury, vanadium and zinc at concentrations greater than soil background concentrations. Several metals levels exceeded two times the soil background levels. Soil background concentrations were used for comparison at these locations since they were considered more representative of the sediment matrix from this location than were the background sediments of French Creek. Potential sources of metals in the sediments include an accumulation of metal-laden sediments in surface water runoff, or deposits of metal grit from plant water pipes that may have been present in the past discharge of non-contact cooling water to that area.

SMC Facility

The SMC property was used as the location for one of the background shallow soil samples (B17) and one of the background ground water monitoring wells (W1S, W1D), since it is topographically upgradient from most of the Site.

Soil gas sampling and shallow soil borings were also collected from the SMC property to investigate possible contamination there. Figure 4 (p. 14) shows the sample locations.

Toluene was the only Target Compound List ("TCL") VOC detected in the soil boring samples collected in the SMC area. The presence of toluene is believed to be the result of sealing sampling jars with electrical tape. SVOC and pesticide/PCB compounds were not detected in the soils. Concentrations of metals were less than the background concentrations.

One sediment sample, collected from a drainage ditch near the northern boundary of the SMC facility, was found to contain

benzoic acid at 130 ug/kg, bis(2-ethylhexyl)phthalate at 65 ug/kg and Aroclor 1254 at 260 ug/kg. The concentration of each metal detected in sediment samples was less than its respective background soil concentration, with the exception of vanadium, which was found in one sample at 15.4 mg/kg but was not found in the background samples. Concentrations of metals in sediments were compared to background soil concentrations, instead of background sediment concentrations in French Creek, because the matrix characteristics of the SMC property sediments more closely resemble the soil boring samples at the Site than the sediment matrix of French Creek.

SCI Facility

Soil gas samples were collected from the area located west of the SCI building and analyzed for VOCs. Figure 4 (p. 14) shows the sample locations on the SCI property. VOCs were not detected in any of these samples.

Samples of shallow soil borings were collected from two locations to the west of the SCI facility. Location B2 yielded one detection of ethylbenzene at 1 ug/kg, and two detections of xylene at 2 and 7 ug/kg. These concentrations are below or slightly above the sample's reported detection limit (RDL) of 5.5 ug/kg. Shallow soil boring samples from B2 at two depths also contained PAHs at concentrations ranging from 47 to 3500 ug/kg. No other SVOCs were detected. Concentrations appeared highest at the shallow 6-foot depth. Fewer compounds at lower concentrations were present at 18 feet.

Toluene was detected in the B2 and B16 borings at concentrations from 3 to 25 ug/kg. It is believed that the toluene contamination resulted from the electrical tape used to seal the sample jars. No SVOCs were detected in soil boring B16.

No pesticides/PCBs were detected in any soil samples from the SCI area. Metals were not detected above background concentrations in these soil samples.

Ground water samples were collected from a deep and a shallow well on the western border of the SCI facility. VOC, SVOC, and pesticide/PCB TCL compounds were not detected in these samples. Metals were not detected above the background concentrations in the filtered ground water samples.

French Creek

Surface water and sediment samples were collected at four locations in French Creek: one upstream, two midstream, and one downstream location. The upstream sample location was considered a background sample.

Analysis of the surface water samples detected no VOC, SVOC, or pesticide/PCB target compounds. Metals concentrations were generally similar for surface waters collected both downstream and upstream of the Site. Antimony, chromium and silver were the exceptions, appearing downstream at concentrations slightly greater than two times surface water background concentrations.

VOCs were not detected in the sediment samples from French Creek, with the exception of chloroform at 80 ug/l in one midstream sample location. Chloroform at lower concentrations was present in other sediment samples as a laboratory contaminant from the sample dilution water.

Low concentrations of PAHs (51-107 ug/kg) were found in sediments both upstream and downstream of the Site and are therefore not likely to be related to contaminant migration from the Site. Pesticide/PCB compounds were not detected in the sediments from the Creek.

Concentrations of nickel, thallium, arsenic and lead in samples taken adjacent to or downstream from the Site were greater than two times their concentrations in samples taken upstream. Calcium levels were also elevated downstream of the Site compared to levels at the upstream location. Downstream concentrations of aluminum, copper, iron, magnesium and zinc were greater than upstream concentrations, but less than two times greater.

Drinking Water Analysis

Water samples were collected from Borough of Saegertown wells BW1, BW2, and BW3, the Saegertown Beverage Company well (well PW6) and private well PW18. Figure 2 (p. 3) shows the location of the drinking water wells in relation to the Site. 1,1,1-trichloroethane was detected in well BW1 at 1 ug/l in Phase 1 only. Well BW3 contained 1,1,1-trichloroethane at 2 to 3 ug/l in both phases of sampling. These concentrations are below the SDWA MCL of 200 ug/l for this compound. No contaminants were detected in the Saegertown Beverage Company well or the other private wells.

C. Contaminant Fate and Transport

The following discussions of contaminant fate and transport mechanisms are organized by potential source areas for each property.

Former GATX Facility

GATX Pond Area

The presence of the contaminants in the GATX pond area can be correlated to the visual observation of a black oil or tar-like sludge. This relationship is evident in a comparison of analytical results for sediment samples collected from an area where the black sludge was observed to be present, where high levels of VOCs and SVOCs were detected, with a sample collected from an area with no black sludge present, which had no detectable VOCs and very low levels of SVOCs.

It appears that the organic contaminants exist in a non-aqueous oil phase (i.e., the coal tar residuals were deposited or released in sufficient volumes to remain as a non-aqueous phase in the soil environment). Case studies where coal tar migrates as a separate, insoluble fluid phase in soil and ground water have been observed at a number of former gas plant sites. Coal tar has a density greater than water and has the potential to form a dense non-aqueous phase liquid below the water table. However, in this case, black sludge was not observed below the depth of the water table (approximately 5 feet) in the pond area based on the Phase 2 RI shallow auger probe sampling. The black sludge did extend to the approximate depth of the water table in shallow auger probe locations south of the pond. Figure 6 (p. 17) depicts a cross section of the depth of sludge observed during the RI. Photoionization detector (PID) readings exceeded background levels in some of the soil samples collected at depths corresponding to the approximate surface of the water table. Coal tar's high viscosity, hydrophobic nature, and strong adsorption to soils, should severely limit its rate and extent of downward migration.

Numerous constituents of coal tar exist in the solid state at subsurface temperatures. Visual observations of the test pit excavations show a significant portion of the black sludge to be in a solidified state. Contaminants which are bound up in the solidified materials would not be subject to downward migration.

The strongly hydrophobic nature of coal tar materials would be expected to minimize the contact of organics in the sludge zone intervals with infiltrating precipitation and ground water. VOCs, such as benzene and the chlorinated solvents, would be expected to be present in the ground water if a soil/water equilibrium partitioning relationship existed in the subsurface. These VOCs are relatively soluble in water. Their absence in downgradient ground water samples from wells in close proximity to the sludge during Phase 1, and the low level (5 ug/l) presence of benzene in Phase 2 sampling, suggests that the VOCs have remained preferentially dissolved in the non-aqueous oil phase or are bound up in the solidified state.

The VOCs and SVOCs would be expected to persist over a long period of time since they are slow to biodegrade under natural soil conditions. The two and three-ring PAHs are more prone to biodegradation than the larger PAH compounds. The concentrated nature of the sludge zones would not be expected to be conducive to natural biodegradation.

PCBs detected in the pond area are strongly adsorbed to soils and have a very low water solubility. PCBs would not be expected to migrate to further depths or into ground water, but would be expected to persist in the environment over a long period of time since they do not biodegrade under natural soil conditions.

Several metals were detected at concentrations above background levels in soil and sludge samples. Metals levels did not significantly exceed background concentrations in the downgradient ground water samples.

GATX Lagoon and Sludge Bed Area

VOCs and SVOCs were detected in sludge samples taken from both the former lagoon and the sludge bed areas. The total concentrations detected in the former sludge bed area were at least one order of magnitude lower than the concentrations in the pond area, while total concentrations detected in the former lagoon area were several orders of magnitude lower. Contaminants were detected only in the 4 to 6-foot deep sample interval in the former lagoon area; they extended from the 4 to 6-foot deep interval down to the water table in the former sludge bed area. As was the case in the pond area, there was a direct correlation between the presence of VOCs and SVOCs and the presence of a black oil or tar-like sludge. Figures 5 and 6 (pp. 16-17) show the extent of the black sludge, as determined by shallow auger probe sampling and visual observations during the RI.

The source of the VOCs and the SVOCs is believed to be coal tar derivative coating residuals generated during onsite painting operations. These residuals were part of the wastewater effluent which was discharged to the lagoon area. Since coal tar has a density greater than water, it settled to the bottom of the lagoon. It is believed that the sludge was then dredged from the bottom of the lagoon and placed in the sludge bed area.

It also appears that the organic contaminants exist in a non-aqueous oil phase or solidified state in the former lagoon/sludge bed areas. The black sludge was not observed to extend to the depth of the water table (approximately 8 feet) in the former lagoon/sludge bed area, based on the shallow auger sampling. Boring B4 in the sludge bed area, however, did extend into the water table and black fine to coarse sand and gravel was intermixed and/or coated with black sludge.

It is believed that there is a direct correlation between observed black sludge or sand and gravel coated and/or intermixed with black sludge and the detected VOC/SVOC contamination. VOCs and SVOCs were detected in the samples of these coated sands and gravels. VOCs and SVOCs were not detected in downgradient ground water samples.

The high bacterial plate count and high Tentatively Identified Compound ("TIC") concentrations in sludge from this area may also be indicative of biological activity and the degradation products attributable to this activity. The occurrence of enhanced biological activity in the sludge zones is consistent with the past use of the lagoon for treatment of wastewaters. Naturally-occurring bacteria could have become acclimated to the sludge during the period of wastewater (i.e., moisture) presence and continuous aeration. The lower concentrations of VOCs and SVOCs, as well as the proximity of the sludge layer to the water table, would also provide more suitable conditions for enhanced biological activity in the former lagoon/sludge bed area than in the pond area. The larger PAH compounds (greater than three benzene rings) would not be expected to biodegrade under natural soil conditions.

GATX Rail Siding Area

The PAHs and lead which were detected in the former GATX rail siding area are strongly adsorbed to soils and have low water solubilities. Consequently, the presence of these substances should not represent a contamination threat to drinking water wells.

GATX Ground Water

Figure 4 (p. 14) shows the location of the monitoring wells on the former GATX property in relation to the sludge bed, lagoon and pond areas.

Despite the presence of approximately 3 million pounds of contaminants in the soil, and the close proximity of the monitoring wells to the areas of contamination, only three VOCs were detected in ground water samples. All three were present in concentrations at or below their respective SDWA MCLs of 5 ug/l. Tetrachloroethene (1-3 ug/l) was detected in Wells W4S and W9S during both phases of sampling. Trichloroethene was detected in Well W9S (1 ug/l) in the second phase of sampling. Well W5S is located less than 100 feet from the pond area sludge. No organic compounds were detected in the first phase sampling of this well. Benzene was detected in W5S (5 ug/l) only in the second phase. Well W10I is located less than 50 feet from the pond area sludge. No organic compounds were detected in samples taken from this well.

No ground water plume that could affect the Borough or private wells was identified as being present on the former GATX property. Furthermore, no VOCs were present in the contaminated soil surrounding the sludge areas. Since the GATX facility operated from approximately 1951 until 1967, some of the contaminants on the property may have been present for more than thirty years. VOCs may never have been present in the soil surrounding the sludge matrix, or they may already have leached from the soil.

Lord Facility

Lord Ground Water

The chlorinated solvents tetrachloroethene, trichloroethene, 1,1-dichloroethene, 1,2-dichloroethene, 1,1,1-trichloroethane and vinyl chloride were detected in excess of the SDWA MCLs for each of these substances in both ground water monitoring well samples and temporary well point samples collected during the RI from the Lord property. 1,1-Dichloroethene, 1,2-dichloroethene and vinyl chloride are believed to be the degradation products of the parent compounds tetrachloroethene and trichloroethene, resulting from reductive dehalogenation mechanisms under anaerobic conditions in ground water. These degradation products are present at higher concentrations towards the more distant downgradient locations. This is indicative of ongoing anaerobic degradation as the contaminant plume ages and moves downgradient. The aerial and vertical extent of the chlorinated solvent-containing ground water plume is shown on Figures 7 and 8 (pp. 23-24). Additional investigation necessary to determine both the downgradient extent of the plume to the west of the Lord Corporation property and the vertical extent of the ground water contamination will be conducted during the remedial design.

All of the chlorinated solvents in the ground water are considered to be relatively mobile to mobile, except for tetrachloroethene, which is considered to be relatively immobile. Estimated contaminant velocities are very low, ranging from 0.54 to 2.52 feet per year, because of the low ground water velocity, which was calculated from measurements of hydraulic gradient and permeability.

The plume pattern indicates that the contamination originates from the main manufacturing buildings on the Lord property and has migrated downgradient to the west and southwest. On April 26, 1991, Lord Corporation discovered that the walls of a plastic/fiberglass RG-1 sump tank had softened. The sump tank, located east of the main manufacturing buildings, had a capacity of approximately 300 gallons and was used to collect and store hazardous wastes. The RG-1 sump tank and visibly contaminated soil were removed by Lord on May 21, 1991.

The plume pattern suggests that the RG-1 sump area is a potential source of the ground water contamination. However, based on the low groundwater velocities that were estimated, it appears that the furthest downgradient chlorinated solvent concentrations cannot be attributed to this recent sump tank release. Other possible sources could be past releases in the vicinity of the Lord building, tank farm and unloading areas, or past releases from the identified sump area that has been in use for over ten years.

The vertical extent of the chlorinated solvents detected in ground water beneath the RG-1 sump area has not been defined. Sampling was not performed below a 20-foot depth in the vicinity of the RG-1 sump area, the suspected ground water contamination source. The volume of chlorinated solvents which were released from the RG-1 sump is also unknown.

Several metals were present above background levels in the ground water in the vicinity of the Lord property. The increase in metals concentrations in ground water may be a result of the chlorinated solvent plume. A reduced chemical state would exist within the chlorinated plume which could cause metals that occur naturally in soil to be more soluble in the ground water.

Lord Soil and Sediment

DDE and DDT were both detected in the Lord soil sample. This is believed to have resulted from either the use of pesticides during past land uses, or the accumulation of surface water runoff. DDE and DDT are strongly adsorbed to soils and do not pose a contamination threat to nearby drinking water wells.

Analysis of the sediments from the Lord facility area for metals revealed aluminum, barium, chromium, copper, lead, mercury, vanadium and zinc at concentrations greater than soil background concentrations. Several metals levels exceeded two times the soil background levels. Metals incorporated in steel or metal alloy particulates with relatively large particle diameters are typically not subject to leaching due to precipitation infiltration. Metals also tend to be immobilized by fixation into the soil matrix or adsorption onto the surface of the soil matrix.

SMC Facility

One sediment sample from a drainage ditch on the SMC facility property contained Aroclor 1254 at 260 ug/kg or .260 ppm. The source of the PCB is not known. The drainage ditch could act as a collection point where the surface runoff of soils with adsorbed PCBs could accumulate. PCBs are strongly adsorbed to soils and have very low water solubilities; thus, they would not be expected to migrate from the drainage ditch sediments. The PCB concentration which was detected is below U.S. EPA action levels of 1 ppm for expected residential areas and over an order of magnitude below the 10 to 25 ppm PCB action levels for expected non-residential areas. (See Guidance on Remedial Action for Superfund Sites with PCB Contamination, U.S. EPA, OSWER Directive No. 9355.4-01, August 1990).

SCI Facility

VOCs and PAHs were detected in both the 4 to 6 foot deep soil sample and the 16 to 18 foot deep soil sample from boring B2 on the SCI property. The VOCs were detected at low levels in both the shallow and deeper samples. The concentrations of PAH compounds were generally an order of magnitude higher in the shallow sample than in the deeper sample. Some of the PAHs detected in the shallow sample were not detected in the deeper sample. The presence of PAHs at the lower depth could have resulted from their adsorption to the aquifer soil matrix originating from either fluctuating water table conditions or unsaturated zone infiltration.

The Summers Model was run in order to estimate ground water concentrations which could result from the leaching of PAHs detected in the soil on the SCI property. The Summers Model predicted that ground water concentrations for several individual PAHs would exceed Contract Lab Program ("CLP") low-level analytical detection limits, based on the most conservative input parameters. The Summers Model also estimated that total PAH concentrations would exceed the proposed MCL of 0.2 ug/l for PAHs, based on the most conservative input parameters.

Ground water monitoring wells W2S and W2D are located less than 100 feet from the B2 boring where the soil contamination was detected on the SCI property. Figure 4 (p. 14) shows the relative locations of wells W2S and W2D to boring B2. No VOCs or PAHs were detected in ground water samples collected from wells W2S and W2D in Phase 1 and Phase 2 of the RI. Additional ground water samples were obtained from these wells in July 1992 and analyzed for carcinogenic PAHs using detection limits of one half the ground water MCLs for these compounds. No PAHs were detected in the ground water samples obtained in July 1992.

D. Principal Conclusions

Former GATX Facility

The estimated volume of sludge and contaminated soil on the former GATX property is 9,000 cubic yards. The delineation of the horizontal extent of sludge and soil included in the volume calculations is based on the visual observations of the sludge made during the RI (Figures 5 and 6, pp. 16-17). Sludge was defined in the RI/FS to be the presence of total PAHs in excess of 1% by weight. Soil on the periphery of the observed sludge with detectable PAH concentrations in excess of 1 ppm are also included in the delineation of horizontal extent of the sludge. The vertical extent (i.e., depth) used in the volume calculations includes an additional two feet of soil below the lowest depth of observed sludge presence in each area.

Limited areas of superficial sludge were also observed north of the pond. It was estimated that the sludge and residual soil thickness is one foot in this area, yielding an additional 150 cubic yards of volume.

The total mass of VOCs and SVOCs in the lagoon/sludge bed and pond areas is estimated to be three million pounds. This is based on a weighted average total VOC and SVOC concentration of 11% (i.e., 110,000 ppm) for the pond and former lagoon/sludge bed areas.

Surface soil above the observed sludge was not included in the sludge and soil volume calculations. VOCs were not detected in surface soil samples collected from the former lagoon/sludge bed area. SVOCs were either not detected or present in the low parts per billion for most of the samples taken from these areas. It is believed that the surface soil is fill material placed in the pond and former lagoon/sludge bed areas when use of these areas ceased.

The total estimated volume of PCB-contaminated soil and sediment is 550 cubic yards. The volume of PCB-contaminated soil and sediment was estimated separately because PCBs were detected in only one soil sample and one sediment sample in the pond area, and one subsoil sample from the lagoon/sludge bed area. SVOCs were also detected in these samples. A soil sample collected at a depth of 0 to 2 feet immediately northwest of the pond, where surficial staining was observed, had the highest level of PCBs detected onsite (830 ppm). A sediment sample collected from the southern half of the pond, where a 6-inch sludge layer was observed, had a PCB level of 33 ppm. PCBs were detected in one subsoil sample (1.1 ppm) taken at a depth of 6 feet from a location in the former lagoon area.

The horizontal extent of PCB-contaminated soil northwest of the pond has been estimated, based on visual observations of surficial staining and assuming a conservative radius centered around the sample location where it was detected in the pond area. A vertical depth of 4 feet was used since no PCB was detected in the 2 to 4 foot deep sample from this boring location. The horizontal extent of PCB-contaminated sediment in the pond itself is assumed to include only the southern half, since PCBs were not detected in sediment sample SD05 taken from the northern half of the pond. A 1 foot vertical depth was used to estimate the volume of PCB-contaminated sediment in the pond. This depth includes an additional six inches below the observed depth of the sludge thickness.

Lord Facility

Sampling conducted during the RI confirmed the presence of ground water contamination beneath the Lord corporation property. VOCs including vinyl chloride, TCE, TCEA, PCE and 1,2 dichloroethene ("chlorinated ethenes") were found in the ground water. The RI estimates that 9.3 million gallons of ground water onsite has been impacted by the plume. This estimate does not include the volume of ground water outside the Lord property boundaries because the full extent of the plume is not known. The chlorinated ethenes in the ground water are estimated to be moving at 0.54 to 2.52 feet per year. The total onsite chlorinated ethene mass on the Lord property is estimated to be 7,500 pounds, with 800 pounds being present in the dissolved phase. This is based on a flow-weighted average total chlorinated ethene concentration of 10 mg/l, and appropriate equilibrium partitioning relationships for soil and ground water.

The RG-1 sump is believed to be the source of ground water contamination on the Lord property. Depth to ground water is approximately five to ten feet in the vicinity of the sump. When the sump was removed, Lord excavated soil down to the water table.

The horizontal and vertical extent of the chlorinated ethene ground water plume which encompasses concentrations in excess of analytical detection limits, is depicted in Figures 7 and 8 (pp. 23-24). It is assumed that the vertical extent of the chlorinated ethene plume includes most of the depth of the upper aquifer in the area of the RG-1 sump, an average of approximately 35 feet. Field geoprobe well point sampling during the RI detected chlorinated ethenes up to 15 feet into the aquifer. A separate investigation conducted by Lord in 1991 ("Remcor Study") detected chlorinated ethenes 10 feet into the aquifer. The Remcor Study information was included in the RI Report. The vertical extent of the chlorinated ethene plume in the RG-1 sump area will be more clearly defined during the design phase. The

investigation of the potential presence of an identifiable non-aqueous phase will also be included in the additional subsurface investigation conducted during the remedial design.

The extent of the ground water plume to the west of the Lord property was not fully delineated during the RI due to the inability to gain access to these properties. However, EPA believes that sufficient information regarding ground water movement and contamination was collected during the RI to prepare the ROD for the Site at this time. The full extent of the ground water plume will be determined during remedy design.

VI. SUMMARY OF SITE RISKS

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

A. Human Health Risks

Identification of Contaminants of Concern

The SMC, SCI, Lord and the former GATX properties were each evaluated during the Baseline Risk Assessment ("BRA") and chemical contaminants of concern were identified by media for each property. Table 2 lists the contaminants of concern. The BRA provides the rationale for the selection of the contaminants of concern for each area of the Site.

The PCB Aroclor 1254, found in soil, is the only contaminant of concern identified on the SMC property.

PAH compounds are the contaminants of concern identified in SCI property soils. No other media are impacted on the SCI property.

VOCs, including PCE, TCE, 1,2 dichloroethene and vinyl chloride, are the contaminants of concern identified in the ground water in the vicinity of the Lord property. Lord property sediment contains several metals in concentrations that exceed two times their background concentrations.

PAH and PCB compounds and metals are the contaminants of concern identified in the former GATX property soils. Contaminants of concern in the sludge include VOCs, PAHs, PCBs and metals. Ground water in the former GATX property area contains benzene, TCE and PCE at levels below SDWA MCL.

**Saegertown Industrial Area Site RI
Saegertown, Pennsylvania**

AR305115

TABLE 2

EXPOSURE POINT CONCENTRATIONS

Saegertown Industrial Area Site RI
Saegertown, Pennsylvania

| Parameter | GATX GW (mg/L) | LORD GW (mg/L) | GATX SLUDGE AREA SURF. SOILS (mg/kg) | GATX SLUDGE AREA ALL SOILS (mg/kg) | GATX RAIL SIDING SURF. SOILS (mg/kg) | GATX RAIL SIDING ALL SOILS (mg/kg) | GATX POND SURF. SOILS (mg/kg) | GATX POND ALL SOILS (mg/kg) | LORD SURF. SED (mg/kg) | LORD ALL SOILS (mg/kg) | SCI ALL SOILS (mg/kg) | GATX AMBIENT A (mg/m3) |
|----------------------------|----------------------|----------------------|---|---|---|---|--|--------------------------------------|------------------------------|------------------------------|-----------------------------|------------------------------|
| Dl-n-butylphthalate | | | | | | | | | | | | |
| Fluoranthene | | | 4.4e+00 | 6.4e+02 | 1.6e-01 | 1.9e+02 | 2.3e+01 | 2.3e+01 | | | 3.3e+00 | 1.8e-11 |
| Pyrene | | | 3.0e+00 | 5.1e+02 | 1.1e-01 | 4.1e+03 | 8.2e+03 | 8.2e+03 | | | 3.0e+00 | 3.4e-09 |
| Butylbenzylphthalate | | | 1.2e-01 | 1.2e-01 | | | | | | | | 1.7e-09 |
| Benzo(a)anthracene (c) | | | 2.3e+00 | 1.7e+02 | 5.5e-02 | 2.2e+03 | 3.1e+03 | 3.1e+03 | | | 1.1e+00 | 5.3e-11 |
| Chrysene (c) | | | 1.8e+00 | 2.1e+02 | 6.8e-02 | 1.8e+02 | 5.3e+01 | 5.3e+01 | | | 1.0e+00 | 6.4e-12 |
| bis(2-ethylhexyl)phthalate | | | | 2.7e+00 | | 1.0e+02 | 1.1e+01 | 1.1e+01 | | | | 5.7e-12 |
| Di-n-octyl Phthalate | | | | 1.3e+02 | 1.2e-01 | 1.5e+03 | 4.0e+03 | 4.0e+03 | | | 1.3e+00 | 1.5e-10 |
| Benzo(b)fluoranthene (c) | | | 3.8e+00 | 1.3e+02 | 1.2e-01 | 7.3e+02 | 4.0e+03 | 4.0e+03 | | | 4.3e-01 | 1.5e-10 |
| Benzo(k)fluoranthene (c) | | | 2.0e+00 | 2.1e+02 | 1.1e+03 | 1.1e+03 | 1.9e+03 | 1.9e+03 | | | 1.1e+00 | 7.9e-13 |
| Benzo(a)pyrene (c) | | | 1.0e+00 | 4.6e+01 | 4.0e+02 | 4.0e+02 | 7.7e+02 | 7.7e+02 | | | 5.1e-01 | 5.4e-15 |
| Indeno(1,2,3-cd)pyrene (c) | | | 3.8e-01 | 3.1e-01 | 3.1e-01 | 1.4e+02 | 3.0e+02 | 3.0e+02 | | | 5.4e-02 | 2.1e-15 |
| Dibenz(a,h)anthracene (c) | | | 1.0e+00 | 7.1e+01 | | 3.6e+02 | 7.8e+02 | 7.8e+02 | | | 5.0e-01 | 5.7e-15 |
| Benzo(g,h,i)perylene (c) | | | 1.8e-01 | 1.3e+03 | 3.6e-01 | 9.7e+03 | 1.3e+04 | 1.3e+04 | | | 6.0e+00 | 8.8e-07 |
| Carbazole | | | 1.6e+01 | 9.7e+02 | | | 2.8e+04 | 2.8e+04 | | | | 5.7e-09 |
| Total Carcinogenic PAHs | | | | | | | | | | | | |
| Heptachlor epoxide | | 6.0e-06 | | | | | | | 8.0e-02 | 8.0e-02 | | |
| 4,4'-DDE | | | | | | | | | | 7.0e-02 | | |
| 4,4'-DDT | | | | | | | | | | | | |
| Total PCBs | | | | 1.1e+00 | | 3.3e+01 | 8.3e+02 | 8.3e+02 | | | | 3.1e-05 |
| Aluminum | | | | | | | | | | | | |
| Antimony | 5.3e-03 | 5.1e-03 | | | | | | | | | | |
| Arsenic | | | | | | | | | | | | |
| Barium | | 2.7e-01 | 9.1e+01 | 1.7e+01 | 1.1e+02 | 8.3e+02 | 6.9e+02 | 3.3e+02 | 1.2e+02 | 1.2e+02 | | |
| Cadmium (food/soil) | | | | | | | | | | | | |
| Calcium | | | 1.6e+01 | 1.0e+02 | 1.6e+01 | 5.8e+02 | 1.5e+02 | 1.5e+02 | 2.2e+01 | 2.2e+01 | | |
| Chromium VI | | 1.0e-02 | | 3.6e+01 | | 3.1e+00 | 1.7e+01 | 1.7e+01 | 7.0e+01 | 7.0e+01 | | |
| Cobalt | | | | | | 3.2e+02 | 3.1e+02 | 3.1e+02 | | | | |
| Copper | | | | | | 3.4e+03 | 3.4e+03 | 3.4e+03 | 3.3e+01 | 3.3e+01 | | |
| Iron | | 3.5e-03 | 1.5e+02 | 1.5e+02 | 2.5e+01 | | | | | | | |
| Lead | | | | | | | | | | | | |
| Magnesium | | | | | | | | | | | | |
| Manganese | | 2.4e+00 | | 1.2e+03 | | 3.1e+02 | 8.8e+02 | 3.1e+02 | 2.2e-01 | 2.2e-01 | | |
| Mercury | 4.1e+00 | 2.9e-04 | 2.6e-01 | 1.5e+00 | 1.5e+02 | 1.5e+02 | 5.0e+01 | 5.0e+01 | | | | |
| Nickel | | | | 2.0e+01 | | | | | | | | |
| Potassium | | | | | | 2.5e+01 | 1.1e+01 | 1.1e+01 | | | | |
| Selenium | | | | | | 4.0e+00 | 1.8e+00 | 1.8e+00 | | | | |
| Silver | | | | | | | | | | | | |
| Sodium | | | | | | | | | | | | |

TABLE 2

EXPOSURE POINT CONCENTRATIONS

Saegertown Industrial Area Site RI
Saegertown, Pennsylvania

| Parameter | GATX GW (mg/L) | LORD GW (mg/L) | GATX SLUDGE AREA SURF. SOILS (mg/kg) | GATX SLUDGE AREA SURF. SOILS (mg/kg) | GATX RAIL SIDING SURF. SOILS (mg/kg) | GATX RAIL SIDING ALL SOILS (mg/kg) | GATX POND SURF. SOILS (mg/kg) | GATX POND ALL SOILS (mg/kg) | LORD SURF. SED (mg/kg) | LORD ALL SOILS (mg/kg) | SCI ALL SOILS (mg/kg) | GATX AMBIENT AIR (mg/m3) |
|-----------|----------------------|----------------------|---|---|---|---|--|--------------------------------------|------------------------------|------------------------------|-----------------------------|--------------------------------|
| Thallium | | | | | | | | | | | | |
| Vanadium | 1.7e-02 | | | | 1.8e+01 | 1.5e+01 | 5.9e+00 | 9.0e+00 | 2.1e+01 | 2.1e+01 | | |
| Zinc | 1.2e-02 | | 2.5e+02 | 6.2e+02 | 8.6e+01 | 7.7e+01 | 2.9e+01 | 1.7e+01 | 2.5e+02 | 2.5e+02 | | |
| Cyanide | | | | 1.5e+01 | | | 6.3e+03 | 6.3e+03 | | | | |
| | | | | | | | 5.8e+00 | 1.2e+01 | | | | |

Note:

This table presents a summary of exposure point concentrations for chemicals of potential concern for each operable unit and medium. See Appendix U for an explanation of the selection and calculation process used to derive these values.

GW = Groundwater

BW = Borrowed Well

Surf. Soils = Surface Soils

Surf. Sed. = Surficial Sediments

All Soils = A combination of surface soils, sediments, soil borings, auger probes and test pits

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Exposure Assessment Summary

The exposure assessment identifies actual or potential pathways for human exposure to the contaminants of concern present in the different impacted media at the Site. Exposure pathways are assessed based on two scenarios: current land use and future land use. The majority of the property comprising the Site is currently zoned industrial. Permitted land use under this zoning includes light manufacturing, research laboratories, offices, warehousing, truck terminals, public buildings, agriculture and open land recreation. The northeastern corner of the Site is zoned for single family homes, although this area is currently used as a park and open space. In addition, current zoning permits the owner of a facility in the industrial zoned portion of the Site to dwell in a single family residence adjacent to his/her facility.

1. Potentially Exposed Human Populations

Based on the current and potential future land use of the Site, the following reasonable maximally exposed ("RME") subpopulations were identified:

Current Land Use - onsite workers
- offsite residents
- older children trespassing onsite

Future Land Use - onsite residents

2. Chemical Exposure Pathways

In order for one of the subpopulations identified above to be exposed to the chemicals of concern at the Site a chemical exposure pathway must be present. A pathway is the route taken by a chemical from its source in the environment until it contacts a receptor. Each exposure pathway must include the following elements:

- a source and mechanism of chemical release to the environment;
- an environmental transport medium (e.g., air, ground water) for the released chemical;
- a point of potential human contact with the contaminated medium (referred to as the exposure point); and
- receptor contact (e.g., ingestion of contaminated ground water).

Exposure may occur when contaminants migrate from the Site to an exposure point (i.e., a location where receptors can come into contact with contaminants) or when a receptor comes into direct contact with waste or contaminated media at the Site. An exposure pathway is complete (i.e., exposure occurs) if there is a way for the receptor to take in contaminants through ingestion, inhalation, or dermal absorption of contaminated media. Table 3 (pp. 43-44) is a summary of the exposure pathways considered to be complete by the BRA, and the routes of exposure that were quantitatively assessed.

3. Exposure Point Concentrations

The concentration of contaminants in a given medium (e.g., soil, surface water, etc.) used to represent the exposure point concentration were derived by calculating the 95% upper confidence limit (95% UCLM) on the mean of sample concentrations. If this value exceeded the maximum value identified, the maximum measured value was used as the exposure point concentration. Exposure point concentrations calculated for each area are summarized in Table 2 (pp. 38-40).

4. Routes of Exposure

The following routes of exposure were assessed in the BRA: ground water/surface water contact; sediment/soil contact; and air exposure. Table 4 (pp. 45-47) presents a summary of exposure factors assumed or calculated for risk estimation. Exposure to contaminants through the use of contaminated ground water as a water supply source was assumed to occur through ingestion, dermal absorption, and inhalation. Exposure to contaminants in soils and sediments was assumed to occur through dermal absorption and incidental ingestion. Based on current and future land-use conditions, and the fact that there is a vegetative cover onsite, it was assumed that fugitive dust emissions due to wind erosion would probably not result in a substantial pathway of human exposure. However, VOC Air Modeling results indicate that contaminants are being released to ambient air from the pond area through volatilization.

TABLE 3

Summary of Exposure Pathways and Routes
to be Quantitatively Assessed
Saegertown Industrial Area Site RI

| Area | Receptor | Source Area | Exposure Pathway | Exposure Routes | | |
|---------------------------------------|--------------------|-------------------------|----------------------|-----------------|-----------|--------|
| | | | | Inhalation | Ingestion | Dermal |
| -----Current Land Use Conditions----- | | | | | | |
| GATA | Trespasser | Former Sludge Area | Surface Soils | --- | X | --- |
| GATX | Trespasser | Former Rail Siding Area | Surface Soils | --- | X | --- |
| GATX | Trespasser | Pond | Surface Sediment | --- | X | --- |
| GATX | Trespasser | Pond | Surface Water | --- | X | X |
| GATX | Trespasser | Pond | Air | X | --- | --- |
| GATX | On-Site Workers | Pond | Air | X | --- | --- |
| GATX | Off-Site Residents | Pond | Air | X | --- | --- |
| Lord | Trespasser | Former Impoundment | Surface Sediments | --- | X | --- |
| -----Future Land Use Conditions----- | | | | | | |
| Residential Use | | | | | | |
| SCI | On-Site Resident | General ⁽²⁾ | Soils ⁽¹⁾ | --- | X | --- |

TABLE 3

| <u>Area</u> | <u>Receptor</u> | <u>Source Area</u> | <u>Pathway</u> | <u>Exposure Routes</u> | | |
|-------------|------------------|-------------------------|----------------------|------------------------|------------------|---------------|
| | | | | <u>Inhalation</u> | <u>Ingestion</u> | <u>Dermal</u> |
| GATX | On-Site Resident | Sludge Area | Soils ⁽¹⁾ | --- | X | --- |
| GATX | On-Site Resident | Former Rail Siding Area | Soils ⁽¹⁾ | --- | X | --- |
| GATX | On-Site Resident | Pond | Soils ⁽¹⁾ | --- | X | --- |
| GATX | On-Site Resident | Pond | Air | X | --- | --- |
| GATX | On-Site Resident | Pond | Groundwater | X | X | X |
| Lord | On-Site Resident | Former Impoundment | Soil ⁽¹⁾ | --- | X | --- |
| Lord | On-Site Resident | Sump | Groundwater | X | X | X |

FOOTNOTES:

1. Both surface soil/sediment and subsurface soil data are used in combination to represent potential levels of contaminant exposure.

TABLE 4

Summary of Exposure Factors for Risk Estimation
Sagertown Industrial Area Site RI

| | <u>Trespasser</u> | <u>On-Site Worker</u> | <u>Off-Site Resident</u> | <u>On-Site Resident</u> |
|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| <u>Receptor Characteristics</u> | | | | |
| Age Bracket (years) | 7 to 16 | >18 | birth to 30 | birth to 30 |
| Body Weight (kg) | 40(a) | 70(f) | 59(c) | 59(c) |
| Exposure Duration (years) | 10(b) | 25(f) | 30(d) | 30(d) |
| Averaging Time (days) | | | | |
| Noncancer Type Effects | 3,650 | 9,125 | 10,950 | 10,950 |
| Cancer Type Effects | 25,550 | 25,550 | 25,550 | 25,550 |
| <u>Chemical Characteristics</u> | | | | |
| Dermal Permeability Factor (cm/hr) | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 |
| Dermal Absorption Estimates (unitless) | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 | --- | --- |
| Inhalation Absorption Estimates (unitless) | 100% | 100% | 100% | 100% |
| Oral Absorption Estimates (unitless) | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 | Chem. specific see Table 7-8 |
| <u>Medium Specific Characteristics</u> | | | | |
| <u>Air</u> | | | | |
| Air Inhalation Rate | <u>GATX</u> | <u>GATX</u> | <u>GATX</u> | <u>GATX</u> |
| Exposure Time (hrs/day) | 1.2m ³ /hr(c) | 20m ³ /day(f) | 20m ³ /day (f) | 20m ³ /day (f) |
| Exposure Frequency (days/year) | 4(b) 52(h) | 9(s) 250(f) | 24(b) 350(f) | 24(b) 350(f) |
| <u>Soil/Sediment</u> | | | | |
| Skin surface area available for contact (cm ²) | <u>GATX, LORD, SMC</u> | --- | --- | SCI, GATX, LORD, SMC |
| Soil/Sediment Ingestion Rate (mg/day) | 1,490(g) | --- | --- | 7,900 cm ² (p) |
| Soil/Sediment to Skin Adherence Factor (mg/cm ²) | 100(f) | --- | --- | 120(q) |
| Fraction Ingested from Contaminated source (unitless) | 1.45(i) | --- | --- | 1.45(i) |
| Exposure Frequency (days/year) | 1/40(i) 52 (h) | --- | --- | 1 350(f) |

TABLE 4

| | <u>Trespasser</u> | <u>On-Site Worker</u> | <u>Off-Site Resident</u> | <u>On-site Resident</u> |
|--|-------------------|-----------------------|--------------------------|-------------------------|
| <u>Groundwater(m)</u> | | | | |
| Source Area(s) | --- | | | |
| Ingestion Rate (L/day) | --- | | | |
| Skin surface area available for contact (cm ²) | --- | 1(f) | 2(f) | 2(f) |
| Exposure Time (i.e., while bathing) (hours/day) | --- | --- | 18,150(n) | 18,150(n) |
| Exposure Frequency (days/year) | --- | 250(f) | 0.2(o) 350(f) | 0.2(o) 350(f) |
| <u>Surface Water</u> | | | | |
| Source Area(s) | <u>Pond</u> | | | |
| Contact Rate (L/hour) | 0.05 (i) | --- | --- | --- |
| Exposure Time (hours/day) | 1.0 (k) | --- | --- | --- |
| Skin Surface Area available for contact (cm ²) | 7,940 (l) | --- | --- | --- |
| Exposure Frequency (days/year) | 52(h) | --- | --- | --- |

Footnote:

- a. 50th percentile time weighted average body weight for older children ages 7 to 16 years old (U.S. EPA, 1989).
- b. Professional judgement
- c. 50th percentile time weighted average body weight from birth to 30 years old (i.e., 6 of 30 years at 15 kg + 24 of 30 years at 70 kg (U.S. EPA, 1991a)).
- d. National upper-bound time at one residence (U.S. EPA, 1991a).
- e. It was assumed that while on-Site 50% heavy activity and 50% light activity was performed. Therefore, the average of these two activity specific inhalation rates (U.S. EPA 1989) were used.
- f. RAGS supplemental guidance (U.S. EPA, 1991).
- g. 50th percentile surface area for childrens hands and feet (U.S. EPA, 1989), time weighted value for ages 7 to 16 years old.
- h. Assumed 2 days per week during six months (i.e., 26 weeks) of the year when weather is conducive for on-Site recreational activities (i.e., 2 days/week x 26 weeks/year = 52 days/year).
- i. Assumed that child spent 1/4 of their waking hours (16) on-Site, and that they spent 1/10 of there time on-Site in a specific area where soil or sediment was contaminated (i.e., 1/4 x 1/10 = 1/40). The 1/10 value was assumed to be a reasonable worst case estimate based on the small area of soil/sediment contamination detected within an area compared to the total area of the Site.
- j. Value provided for swimming (U.S. EPA, 1989).
- k. Assumed based on professional judgement and information on activity patterns for children provided in the Exposure Factor Handbook (U.S. EPA, 1989).

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TABLE 4

- l. 50th percentile surface area for childrens hands, legs and feet (U.S. EPA 1989); time weighted value for ages 7 to 16 years old.
- m. Inhalation of volatile contaminants while showering with contaminated groundwater was assessed utilizing a predictive model. Refer to Appendix W for the specific exposure assumptions used for estimating the intake of chemicals while showering.
- n. 50th percentile total surface area for persons (U.S. EPA, 1989) time weighted from birth to 30 years old.
- o. 90th percentile value for length of shower (U.S. EPA, 1989).
- p. 50th percentile surface area for hands, arms, feet and legs (U.S. EPA, 1989); time weighted value for persons from birth to 30 years old.
- q. Time weighted soil ingestion rate for person from birth to 30 years old (U.S. EPA, 1991).
- r. Average adult inhalation rate for light activity level (e.g., most domestic work, and conducting minor indoor repairs); (U.S. EPA, 1989).
- s. Assumed that work day would be 9 hours long (8 hours work + 1 hour lunch).
- t. Soil to skin adherence factor for potting soil to hands (U.S. EPA, 1989).

Toxicity Assessment Summary

The risk assessment addresses two general types of toxicities which may result from chemical exposure: carcinogenic and noncarcinogenic effects.

Noncarcinogenic effects of chemicals are assumed to display a threshold phenomenon; i.e., effects are not observed below a given chemical concentration (threshold dose). Therefore, a health risk is thought to exist only if established threshold doses are exceeded. Noncarcinogenic health effects include a variety of toxic effects on body systems, such as renal toxicity (toxicity to the kidneys), teratogenicity (damage to the developing fetus), and central nervous system disorders.

Reference doses ("RfDs") have been developed by EPA for indicating the potential for adverse health effects from exposure to contaminant(s) of concern exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimates of intakes of contaminant(s) from environmental media (e.g., the amount of a contaminant(s) of concern ingested from contaminated drinking water, etc.) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans).

Carcinogenic effects are considered to have a dose-response relationship with no threshold. Thus, the BRA considers that any exposure to a carcinogen is associated with some degree of risk. The U.S. EPA has developed a scheme for the review of information and the classification of chemicals as to their likelihood of causing cancer. This classification scheme distinguishes between chemicals which are known human carcinogens (Group A) and chemicals which are probable human carcinogens (Group B), based on their cancer-causing properties in animal studies. The dose-response relationship for an established or potential carcinogen is incorporated into the slope factor ("SF"), a value expressed in $(\text{mg/kg-day})^{-1}$, which is directly proportional to the cancer potency of the chemical.

Slope factors have been developed by EPA's Carcinogenic Assessment Group as a means of estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic contaminant(s) of concern. SFs are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Slope factors are derived

from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans).

The critical toxicity values (RfDs and Sfs) used in the present risk assessment are shown in Table 5 (pp. 50-53). For each chemical, with the exception of PAHs, a chemical toxicity value (either noncancer or cancer) was derived based on toxicity data specific to the chemical. The carcinogenicity of benzo(a)pyrene ("B(a)P") was used to represent the PAHs.

Risk Characterization Summary

The National Contingency Plan ("NCP") establishes acceptable levels of carcinogenic risk for Superfund sites at between one in 10,000 and one in 1 million additional cancer cases if no cleanup actions are taken at a site. Expressed in scientific notation, this translates to an acceptable risk range of between 1×10^{-4} and 1×10^{-6} over a defined period of exposure to contaminants at a site. This means that one additional person in ten thousand or one additional person in a million, respectively, could develop cancer over a defined period of exposure to contaminants at the Site.

The baseline Risk Assessment calculates risk to humans of contracting other, non-carcinogenic health effects from exposure to substances associated with the Site by dividing the reasonable maximum exposure associated with the Site by doses that are determined by EPA to be without deleterious health effects. The ratios are added to represent exposure to multiple contaminants. Any result of this calculation (known as the Hazard Index) which is greater than one (1.0) is considered to present an unacceptable risk.

When reviewing the quantitative information presented in this section, values greater than 1×10^{-4} to 1×10^{-6} for carcinogenic risk, and chronic Hazard Index values greater than 1.0 for noncarcinogenic risk, indicate the potential for adverse health impacts.

1. Noncarcinogenic Risk

The Hazard Index ("HI") Method is used for assessing the overall potential for noncarcinogenic effects posed by the indicator compounds. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient ("HQ") (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the HI can be generated.

TABLE 5

CHEMICAL TOXICITY VALUES AND ABSORPTION ESTIMATES USED FOR RISK QUANTIFICATION

Saegertown Industrial Area Site RI

| Chemical | Chronic Reference Dose (mg/kg-d) | | | Slope Factor (mg/kg-d) ⁻¹ | | | Chemical Absorption Estimate (unitless) | | Dermal Permeability Constant (cm/hr) |
|----------------------------|----------------------------------|---------|---------|--------------------------------------|---------|---------|---|--------|--------------------------------------|
| | Inhalation | Oral | Dermal | Inhalation | Oral | Dermal | Oral | Dermal | |
| Vinyl chloride | ND | ND | ND | 3.0e-01 | 1.9e+00 | 1.9e+00 | 0.91 | 0.30 | 7.0e-03 |
| 1,1-Dichloroethene | ND | 9.0e-03 | 9.0e-03 | 1.2e+00 | 6.0e-01 | 6.0e-01 | 1.00 | 0.30 | 9.9e-03 |
| 1,1-Dichloroethane | 1.0e-01 | 1.0e-01 | 1.0e-01 | ND | ND | ND | 1.00 | 0.30 | 8.9e-03 |
| 1,2-Dichloroethene (trans) | ND | 2.0e-02 | 1.9e-02 | ND | ND | ND | 1.00 | 0.30 | 1.0e-02 |
| Chloroform | 9.0e-02 | 1.0e-02 | 1.0e-02 | 8.1e-02 | 6.1e-03 | 6.1e-03 | 1.00 | 0.30 | 9.0e-03 |
| 2-Butanone | 3.0e-01 | 5.0e-02 | 2.5e-02 | ND | ND | ND | 0.50 | 0.30 | 5.0e-03 |
| 1,1,1-Trichloroethane | 3.0e-01 | 9.0e-02 | 9.0e-02 | ND | ND | ND | 1.00 | 0.30 | 1.8e-02 |
| 1,2-Dichloropropane | ND | ND | ND | ND | ND | ND | 0.50 | 0.30 | 1.0e-02 |
| 1,1,2-Trichloroethane | ND | 4.0e-03 | 2.0e-03 | 1.7e-02 | 6.8e-02 | 1.4e-01 | 1.00 | 0.30 | 1.5e-02 |
| Benzene | ND | 5.0e-02 | 2.5e-02 | 5.7e-02 | 3.7e-02 | 1.1e-01 | 0.50 | 0.30 | 1.7e-02 |
| 4-Methyl-2-pentanol | 2.0e-02 | 5.0e-02 | 2.5e-02 | 2.9e-02 | 2.9e-02 | 5.8e-02 | 0.90 | 0.30 | 1.1e-01 |
| 1,2,2,2-Tetrachloroethane | ND | 1.0e-02 | 1.0e-02 | 3.3e-03 | 5.1e-02 | 5.1e-02 | 0.50 | 0.30 | 2.0e-03 |
| Toluene | 2.0e+00 | 2.0e-01 | 2.0e-01 | 2.0e-01 | 2.0e-01 | 2.1e-01 | 1.00 | 0.30 | 9.0e-03 |
| Chlorobenzene | 5.0e-03 | 2.0e-02 | 6.0e-03 | ND | ND | ND | 0.99 | 0.30 | 1.0e+00 |
| Ethylbenzene | 2.9e-01 | 1.0e-01 | 5.0e-02 | ND | ND | ND | 0.33 | 0.30 | 4.0e-02 |
| Styrene | ND | 2.0e-01 | 1.8e-01 | ND | ND | ND | 0.92 | 0.30 | 1.4e+00 |
| Xylenes (mixed) | 8.6e-02 | 2.0e+00 | 1.0e+00 | 2.0e-03 | 3.0e-02 | 3.3e-02 | 0.90 | 0.30 | 6.7e-01 |
| | | | | ND | ND | ND | 0.92 | 0.30 | 8.0e-02 |
| SEMIVOLATILES | | | | | | | | | |
| Phenol | ND | 6.0e-01 | 5.4e-01 | ND | ND | ND | 0.98 | 0.30 | 8.2e-03 |
| 1,3-Dichlorobenzene | ND | ND | ND | ND | ND | ND | 0.50 | 0.30 | 6.0e-02 |
| 1,4-Dichlorobenzene | 2.0e-01 | ND | ND | ND | 2.4e-02 | 2.4e-02 | 1.00 | 0.30 | 6.0e-02 |
| 1,2-Dichlorobenzene | 4.0e-02 | 9.0e-02 | 4.5e-02 | ND | ND | ND | 0.50 | 0.30 | 6.0e-02 |
| 2-Methylphenol | ND | 5.1e-02 | 4.1e-02 | ND | ND | ND | 0.80 | 0.30 | 1.6e-02 |
| 4-Methylphenol | ND | ND | 4.0e-02 | ND | ND | ND | 0.80 | 0.30 | 1.8e-02 |
| 2,4-Dimethylphenol | ND | 2.0e-02 | 1.0e-02 | ND | ND | ND | 0.50 | 0.30 | 1.1e-01 |
| Benzoic Acid | ND | 4.0e+00 | 3.0e+00 | ND | ND | ND | 0.95 | 0.30 | 7.0e-03 |
| 1,2,4-Trichlorobenzene | 3.0e-03 | 1.3e-03 | 6.6e-04 | ND | ND | ND | 0.50 | 0.30 | 1.7e-01 |
| Naphthalene | ND | 4.0e-03 | 3.4e-03 | ND | ND | ND | 0.84 | 0.30 | 7.0e-02 |
| Hexachlorobutadiene | ND | 2.0e-03 | 1.0e-03 | 7.8e-02 | 7.8e-02 | 1.6e-01 | 0.50 | 0.30 | 1.2e-01 |
| 2-Methylnaphthalene | ND | ND | ND | ND | ND | ND | 0.50 | 0.30 | 7.0e-02 |
| Acenaphthylene | ND | 6.0e-02 | 3.0e-02 | ND | ND | ND | 0.50 | 0.30 | 9.5e-02 |
| Acenaphthene | ND | ND | ND | ND | ND | ND | 0.50 | 0.30 | 1.5e-01 |
| Dibenzofuran | ND | ND | ND | ND | ND | ND | 0.50 | 0.30 | 5.4e-02 |
| 2,4-Dinitrotoluene | ND | ND | ND | ND | 6.8e-01 | 1.4e+00 | 0.50 | 0.30 | 3.9e-03 |
| Diethylphthalate | ND | 8.0e-01 | 4.0e-01 | ND | ND | ND | 0.50 | 0.30 | 1.1e-05 |

TABLE 5

CHEMICAL TOXICITY VALUES AND ABSORPTION ESTIMATES USED FOR RISK QUANTIFICATION

Saegertown Industrial Area Site RI

| Chemical | Chronic Reference Dose (mg/kg-d) | | | | Slope Factor (mg/kg-d) ⁻¹ | | | | Chemical Absorption Estimate (unitless) | | Dermal Permeability Constant (cm/hr) |
|----------------------------|----------------------------------|----|---------|---|--------------------------------------|---------|---------|---------|---|--------|--------------------------------------|
| | Inhalation | | Oral | | Inhalation | | Oral | | Oral | Dermal | |
| | | | | | | | | | | | |
| Fluorene | ND | | 4.0e-02 | I | 2.0e-02 | ND | ND | ND | 0.50 | 0.30 | 3.6e-01 |
| Hexachlorobenzene | ND | | 8.0e-04 | I | 4.0e-04 | 1.6e+00 | H | 3.2e+00 | 0.50 | 0.30 | 1.6e-04 |
| Phenanthrene | ND | D | ND | I | ND | ND | ND | ND | 0.50 | 0.30 | 2.3e-01 |
| Anthracene | ND | | 3.0e-01 | I | 1.5e-01 | ND | ND | ND | 0.50 | 0.30 | 2.3e-01 |
| Di-n-butylphthalate | ND | 1 | 1.0e-01 | I | 9.0e-02 | ND | ND | ND | 0.90 | 14 | 2.3e-06 |
| Fluoranthene | ND | | 4.0e-02 | I | 2.0e-02 | ND | ND | ND | 0.50 | 0.30 | 4.0e-01 |
| Pyrene | ND | | 3.0e-02 | I | 1.5e-02 | ND | ND | ND | 0.50 | 0.30 | 3.3e-01 |
| Butylbenzylphthalate | ND | | 2.0e-01 | I | 1.8e-01 | ND | ND | ND | 0.90 | 21 | 2.1e-02 |
| Benzo(a)anthracene | ND | | ND | | ND | ND | ND | ND | 0.50 | 0.30 | 7.3e-01 |
| Chrysene | ND | D | 2.0e-02 | I | 5.0e-03 | ND | ND | ND | 0.50 | 0.30 | 7.5e-01 |
| bis(2-ethylhexyl)phthalate | ND | | 2.0e-02 | I | 1.0e-02 | ND | 1.4e-02 | 1 | 0.25 | 19 | 5.7e-06 |
| Di-n-octyl Phthalate | ND | | 2.0e-02 | H | 1.0e-02 | ND | ND | ND | 0.50 | 0.30 | 2.4e-02 |
| Benzo(b)fluoranthene | ND | | ND | | ND | ND | ND | ND | 0.50 | 0.30 | 1.1e+00 |
| Benzo(k)fluoranthene | ND | | ND | | ND | ND | ND | ND | 0.50 | 0.30 | 1.1e+00 |
| Benzo(a)pyrene | ND | | ND | | ND | ND | ND | H6 | 0.50 | 0.30 | 1.1e+00 |
| Indeno(1,2,3-cd)pyrene | ND | | ND | | ND | ND | ND | ND | 0.50 | 0.30 | 1.6e+00 |
| Dibenz(a,h)anthracene | ND | | ND | | ND | ND | ND | ND | 0.50 | 0.30 | 2.6e+00 |
| Benzo(g,h,i)perylene | ND | | ND | | ND | ND | ND | ND | 0.50 | 0.30 | 1.7e+00 |
| Carbazole | ND | | ND | | ND | ND | 2.0e-02 | ND | 0.50 | 0.30 | 4.0e-02 |
| Total Carcinogenic PAHs | ND | | ND | | ND | 6.1e+00 | 3 | 2.3e+01 | 0.50 | 0.30 | 1.1e+00 |
| PESTICIDE/PCB | | | | | | | | | | | |
| Heptachlor epoxide | ND | | 1.3e-05 | I | 6.5e-06 | 9.1e+00 | H | 1.8e+01 | 0.70 | 19* | 1.5e-03 |
| 4,4'-DDE | ND | | ND | | ND | ND | ND | 3.8e-01 | 0.90 | 19 | 1.8e-01 |
| 4,4'-DDT | ND | | 5.0e-04 | I | 2.5e-04 | 3.4e-01 | H | 6.8e-01 | 0.50 | 12 | 3.0e-01 |
| PCB | ND | | ND | | ND | ND | ND | 2.6e+01 | 0.30 | 22 | 5.3e-01 |
| METALS | | | | | | | | | | | |
| Aluminum | ND | | ND | | ND | ND | ND | ND | 0.05 | 0.01 | 1.0e-03 |
| Antimony | ND | | 4.0e-04 | I | 2.0e-05 | ND | ND | ND | 0.01 | 6 | 1.0e-03 |
| Arsenic | ND | | 3.0e-04 | I | 9.5e-04 | 5.0e+01 | H | 1.9e+00 | 1.00 | 6 | 1.0e-03 |
| Barium | 1.0e-04 | H | 7.0e-02 | I | 3.5e-03 | ND | ND | ND | 0.05 | 0.01 | 1.0e-03 |
| Cadmium (water) | ND | 2 | 5.0e-04 | I | 3.5e-05 | 6.1e+00 | H1 | ND | 0.07 | 19 | 1.0e-03 |
| Cadmium (food/soil) | ND | 2 | 1.0e-03 | I | 7.0e-05 | 6.1e+00 | H1 | ND | 0.07 | 19 | 1.0e-03 |
| Calcium | ND | | ND | | ND | ND | ND | ND | 0.05 | 0.01 | 1.0e-03 |
| Chromium III | 2.0e-06 | H | 1.0e+00 | H | 5.0e-01 | ND | ND | ND | 0.04 | 19 | 2.1e-03 |
| Chromium VI | 2.0e-06 | H2 | 5.0e-03 | I | 2.5e-03 | 4.1e+01 | H1 | ND | 0.11 | 19 | 2.1e-03 |
| Cobalt | ND | | ND | | ND | ND | ND | ND | 0.97 | 19 | 4.0e-04 |
| Copper | ND | | ND | | ND | ND | ND | ND | 0.97 | 19 | 1.0e-03 |

TABLE 5

CHEMICAL TOXICITY VALUES AND ABSORPTION ESTIMATES USED FOR RISK QUANTIFICATION

Saejertown Industrial Area Site R1

| Chemical | Chronic Reference Dose (mg/kg-d) | | | Slope Factor (mg/kg-d) ⁻¹ | | | Chemical Absorption Estimate (unitless) | | Dermal Permeability Constant (cm/hr) |
|-----------|----------------------------------|---------|---------|--------------------------------------|------|--------|---|--------|--------------------------------------|
| | | | | | | | | | |
| | Inhalation | Oral | Dermal | Inhalation | Oral | Dermal | Oral | Dermal | |
| Iron | ND | ND | ND | ND | ND | ND | 0.10 | 12 | 1.0e-03 |
| Lead | ND | ND | ND | ND | ND | ND | 0.50 | 11 | 4.0e-06 |
| Magnesium | ND | ND | ND | ND | ND | ND | 0.30 | 0.01 | 1.0e-03 |
| Manganese | 1.1e-04 | 1.0e-01 | 4.0e-03 | ND | ND | ND | 0.03 | 14 | 1.0e-03 |
| Mercury | 8.6e-05 | 8.6e-05 | 4.5e-05 | ND | ND | ND | 0.15 | 19 | 1.0e-03 |
| Nickel | ND | 2.0e-02 | 2.0e-03 | 8.4e-01 | 4 | ND | 0.10 | 12 | 1.0e-03 |
| Potassium | ND | ND | ND | ND | ND | ND | 0.05 | 0.01 | 1.0e-03 |
| Selenium | ND | 5.0e-03 | ND | ND | ND | ND | 0.97 | 19 | 1.0e-03 |
| Silver | ND | ND | 3.0e-04 | ND | ND | ND | 0.10 | 23 | 6.0e-04 |
| Sodium | ND | ND | ND | ND | ND | ND | 0.05 | 0.01 | 1.0e-03 |
| Thallium | ND | 7.0e-05 | 3.5e-06 | ND | ND | ND | 1.00 | 24 | 1.0e-03 |
| Vanadium | ND | 7.0e-03 | 3.5e-04 | ND | ND | ND | 0.01 | 20 | 1.0e-03 |
| Zinc | ND | 2.0e-01 | 6.0e-02 | ND | ND | ND | 0.30 | 19 | 1.0e-03 |
| Cyanide | ND | 2.0e-02 | 1.4e-02 | ND | ND | ND | 0.17 | 12 | 1.0e-03 |

Notes:

Toxicity values were obtained from the U.S. EPA's Integrated Risk Information System (IRIS), U.S. EPA's "Health Effects Assessment Summary Tables" (HEAST, Annual FY-1991), and information provided by U.S. EPA Environmental Criteria Assessment Office (ECAO). Toxicity values for the TIC groupings are values for the representative compounds.

Chemical specific oral and dermal absorption were provided by ECAO; specific references are given below. In the absence of chemical specific values, it was assumed that the oral absorption efficiency for organic compounds and metals was 50 % and 5 %, respectively. The dermal absorption estimates were assumed to be 30% for organic compounds and 1.0 % for metals. The oral and dermal absorption estimates are presented as unitless values where 1.0 represents 100 % (complete) absorption. Chemical-specific dermal permeability constants were obtained from the U.S. EPA "Superfund Exposure Assessment Manual" (SEAM) 1988, or the ECAO. As required by the U.S. EPA, when chemical-specific information is not available, default values were estimated (E) using the following equation:

$$\log DPC = -2.72 + 0.71 \log Kow - 0.0061 MW$$

where

DPC = Dermal Permeability Constant
Kow = Octanol/Water Partition Coefficient
MW = Molecular Weight

Reference Doses and Slope Factors designated for the dermal route of exposure are not provided in the U.S. EPA information sources, but were calculated from corresponding values for the oral route of exposure. These values are used to calculate risks associated with chemical dose estimates based on an absorbed (in contrast to an administered) level of chemical. All chemical dose estimates for the dermal route of exposure are based on absorbed chemical levels. The following relationships were used to derive dermal toxicity values:

Oral: Reference Dose (administered) x Oral Absorption Estimate = Dermal Reference Dose (absorbed)
Oral Slope Factor (administered) / Oral Absorption Estimate = Dermal Slope Factor (absorbed)

TABLE 5

CHEMICAL TOXICITY VALUES AND ABSORPTION ESTIMATES USED FOR RISK QUANTIFICATION

Seagertown Industrial Area Site RI

FOOTNOTES - (Listed to the right of the value)

- I = Verified in IRIS 5/15/91
 H = Values from HEAST FY-1991
 D = "Data inadequate for quantitative risk assessment" (HEAST); applies to all RfDs for this compound.
 ND = Value not determined for this compound.
 C = Values from Interim Guidance for Dermal Exposure Assessment. (OHEA-E-367, 3/91, Review Draft)
 E = Value estimated
 S = Values from the Superfund Environmental Assessment Manual (EPA/540/1-88/001) Table A-4.
 1 = Value withdrawn by IRIS pending further review.
 2 = Compound under IRIS review.
 3 = Total carcinogenic PAHs; RfDs and SF values from Benzo[a]pyrene used.
 4 = Nickel slope factor for nickel refinery dust.
 5 = IRIS not queried for this compound
 6 = Values from ECAO Technical Support Center.
 7 = Baranowska-Dutkiewicz, B., 1981. Absorption of Hexavalent Chromium in Man. Arch. Toxicol., 47: 47-50.
 8 = Value for endosulfan used for endosulfan sulfate.
 Chemical Absorption notes:
 11 = U.S.EPA Technical Support Document 1990, based on lead uptake biokinetic model
 12 = Health Effects Assessment (HEA), 1984
 13 = Health & Environmental Effects Profile (HEEP), 1985
 14 = Drinking Water Criteria Document (DWCD), 1986
 15 = Health & Environmental Effects Document (HEED), 1986
 16 = Drinking Water Health Advisory (DWHA), 1987
 17 = Health & Environmental Effects Document (HEED), 1987
 18 = Health Effects Assessment (HEA), 1988
 19 = Agency for Toxic Substances & Disease Registry (ATSDR), 1988, 1989
 20 = Health Effects Assessment (HEA), 1987, 1989
 21 = Health & Environmental Effects Document (HEED), 1989
 22 = Memorandum from K.A. Hammerstrom (ORD/OHEA/EAG) to L. Woodruff (Reg. X), 11-26-90
 23 = Ambient Water Quality Criteria Document (AWQCD), 1980
 24 = Toxicology and Biological Monitoring of Metals in Humans (Carson, et al., 1986)
 Dermal Permeability Constant Default Values:
 Inorganics - Water (1.0e-03), (ECAO, 1991)

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The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Table 6 (pp. 55-56) presents the calculated Hazard Indices for the potentially exposed populations identified. The table summarizes the risk estimates by type of land use, area, environmental media and routes of exposure. Risk in Table 6 is reported in a different kind of scientific notation. For example, $1e-04$ is a different way of expressing 1×10^{-4} or 1 in 10,000.

Exposures to multiple sources of contamination through several routes of exposure may occur. Therefore, the sum of all hazard indices for each exposed population is given.

An HI of 21 was calculated for the ingestion of GATX pond soil by an onsite resident under the future site use scenario. An HI of 2.2 was calculated for the ingestion of GATX sludge bed and lagoon soil by an onsite resident under the future site use scenario. An HI of 1.9 was calculated for the ingestion, inhalation and dermal contact with the GATX area ground water by an onsite resident under the future site use scenario. Antimony and manganese represent the majority of the HI risk. These naturally-occurring metals were not found at excessive concentrations in the sludge/soil on the GATX property.

An HI of 6.7 was calculated for the ingestion, inhalation and dermal contact with the Lord ground water by an onsite resident under the future site use scenario.

Under current Site use conditions the SCI property does not pose a health concern. PAH compounds detected in subsurface soils were comparable to concentrations found in background samples. The SCI property is vegetated by a lawn of grass. The health effects of exposure to the SCI soil contamination under a future Site use scenario as a residential property was assessed quantitatively in the Risk Assessment performed in the RI. Table 6 (pp. 55-56) presents the results of the RA. The HI was several orders of magnitude less than 1 ($3e-07$ or .000003).

Health risks associated with the SMC property were qualitatively assessed based on the RI analytical results and Site conditions. One sediment sample from a vegetated area that collected surface water from offsite areas contained PCB at a concentration of 260 ppb. Because of the low concentration of the contaminant detected, and the low potential for exposure to the sediment, it was determined that this medium does not pose a health concern. The level of PCB in the sediment is below the 10 to 25 ppm action level for industrial areas and the 1 ppm action level for residential areas specified in EPA's "Guidance on Remedial Action for Superfund Sites with PCB Contamination," OSWER Directive No. 9355.4-01, August, 1990.

TABLE 6

Summary of Risk Estimates by Type of Land Use, Area, Potentially
Exposed Population and Medium

Sacertown Industrial Area Site RI

Current Land Use Conditions

| Table Index | Medium | Hazard Index by Route | | | Cancer Risk by Route | | |
|-------------|--------------------------|---|-------|------------|----------------------|-------|--------------|
| | | Dermal | Oral | Inhalation | Dermal | Oral | Inhalation |
| | | | | | | | <u>Total</u> |
| | | <u>Exposed Population: On-site Trespasser (children) - GATX</u> | | | | | |
| Y-1 | Sludge Area Surface Soil | --- | 7e-05 | --- | --- | 2e-07 | 2e-07 |
| Y-2 | Rail Area Surface Soil | --- | 7e-05 | --- | --- | --- | --- |
| Y-3 | Pond Surface Sediment | --- | 9e-02 | --- | --- | 5e-05 | 5e-05* |
| Y-4 | Pond Surface Water | --- | 4e-05 | --- | --- | 3e-09 | 3e-09 |
| Y-5 | Pond Air | --- | --- | 1e-03 | --- | --- | 5e-07 |
| | Total Risk | | | | | | 5e-05 |
| | | <u>Exposed Population: On-site Worker - GATX</u> | | | | | |
| Y-6 | Pond Air | --- | --- | 1e-02 | --- | --- | 1e-05* |
| | Total Risk | | | | | | 1e-05 |
| | | <u>Exposed Population: Off-site Residents - GATX</u> | | | | | |
| Y-7 | Pond Air | --- | --- | 2e-02 | --- | --- | 3e-05* |
| | Total Risk | | | | | | 3e-05 |
| | | <u>Exposed Population: On-site Trespasser (children) - Lord</u> | | | | | |
| Y-8 | Impoundment Surface Sed. | --- | 1e-04 | --- | --- | 4e-11 | 4e-11 |
| | Total Risk | | | | | | 4e-11 |
| | | <u>Future Land Use Conditions</u> | | | | | |
| | | <u>Exposed Population: On-site Residents - SCI</u> | | | | | |
| Y-9 | Property Soils | --- | 3e-07 | --- | --- | --- | --- |
| | Total Risk | | | | | | --- |

TABLE 6

| Table Index | Medium | Hazard Index by Route | | | | Cancer Risk by Route | | | |
|--|-------------------|-----------------------|-------|------------|--------|----------------------|-------|------------|--------|
| | | Dermal | Oral | Inhalation | Total | Dermal | Oral | Inhalation | Total |
| Exposed Population: On-site Residents - GATX | | | | | | | | | |
| Y-10 | Sludge Area Soils | --- | 2e+00 | --- | 2e+00* | --- | 4e-03 | --- | 4e-03* |
| Y-11 | Rail Siding Soils | --- | 1e-01 | --- | 1e-01* | --- | 3e-05 | --- | 3e-05* |
| Y-12 | Pond Soils | --- | 2e+01 | --- | 2e+01* | --- | 3e-01 | --- | 3e-01* |
| Y-13 | Pond Air | --- | --- | 2e-02 | 2e-02* | --- | --- | 3e-05 | 3e-05* |
| Y-14 | Pond Groundwater | 8e-02 | 2e+00 | 3e-05 | 2e+00* | 1e-07 | 5e-06 | 1e-06 | 6e-06* |
| Total Risk | | | | | 2e+01 | | | | 3e-01 |
| Exposed Population: On-site Residents - Lord | | | | | | | | | |
| Y-15 | Impoundment Soils | --- | 3e-02 | --- | 3e-02* | --- | 4e-08 | --- | 4e-08* |
| Y-16 | Sump Groundwater | 7e-02 | 7e+00 | 2e-03 | 7e+00* | 3e-05 | 2e-02 | 1e-03 | 2e-02* |
| Total Risk | | | | | 7e+00 | | | | 2e-02 |

Footnote:

- * = denotes that exposure to this medium may be a health concern for the exposed population.
 NA = not applicable because no carcinogens were selected as chemicals of potential concern in medium.
 ND = not determined because inhalation reference doses were not available.
 --- = not considered applicable for specific pathway.

Risk in Table 6 is reported, for example, as 1e-04 which is a different way of expressing 1×10^{-4} or 1 in 10,000.

Hazard Indexes and Cancer Risk reported in Table 6 is rounded up one number for numbers .5 and higher and rounded down for numbers .4 and lower. Actual risk numbers calculated and used in the text of the ROD are in Appendix Y in the Remedial Investigation Report.

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2. Carcinogenic Risk

For potential carcinogens, risks are estimated as probabilities. Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency slope and expressing the result in scientific notation. An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site. Table 6 (pp. 55-56) presents the calculated potential carcinogenic risk to the potentially exposed populations for each area of the Site.

An excess cancer risk of 2.8×10^{-1} was calculated for the ingestion of GATX pond soil by an onsite resident under the future site use scenario. An excess cancer risk of 3.8×10^{-3} was calculated for the ingestion of GATX sludge bed and lagoon soil by an onsite resident under the future site use scenario. An excess cancer risk of 2.7×10^{-5} was calculated for the ingestion of GATX rail siding area soil by an onsite resident under the future site use scenario. An excess cancer risk of 6.4×10^{-6} was calculated for the ingestion, inhalation and dermal contact with the GATX area ground water by an onsite resident under the future site use scenario.

An excess cancer risk of 2.3×10^{-2} was calculated for the ingestion, inhalation and dermal contact with the Lord ground water by an onsite resident under the future site use scenario.

Carcinogenic risk associated with exposure to contaminants present in the SCI soil was quantitatively assessed. The SCI soil was determined not to present a carcinogenic risk.

Carcinogenic risk associated with the SMC property was qualitatively assessed based on the RI analytical results and Site conditions. The SMC property was determined not to present an unacceptable risk.

B. Environmental Risks

An Ecological Assessment was performed for the Site. Most of the Site is occupied by buildings, paved areas, and lawns. Undeveloped Site areas are limited to coarse lawns north of SMC and south of the Lord southern fence line, old field areas mostly on the former GATX property, and a pond on the GATX property. The area surrounding the Site includes the Borough of Saegertown and less developed land. The heavily populated commercial/residential section of the Borough is located to the west of the Site. Some rural residences, farmland, and woods lie to the north, east, and south of the Site. Aquatic resources in

the area include French Creek, with a warm water fishery, and Woodcock Creek, with a cold water fishery. Mussel species were observed in French Creek downstream from the Site. The northern riffleshell and clubshell mussels, which were recently proposed for listing as endangered species under the Endangered Species Act of 1973, may inhabit French Creek. Macroinvertebrate populations were sampled at several locations on French and Woodcock Creeks. Similar numbers of macroinvertebrate families were identified in both Creeks.

The only Site wetland exists around the GATX pond. The GATX pond and wetland contains contamination at levels that could pose a threat to migratory birds.

Table 7 (pp. 59-61) lists the maximum values of chemicals present in the media of ecological concern at the Site. Site contaminants of concern were limited to the GATX pond soil/sediment, the GATX lagoon/sludge bed soil, and the soil south of the Lord property. Contaminants in these areas include VOCs, PAHs and other SVOCs, PCBs/pesticides and metals. Contaminants of concern did not occur at concentrations above twice the background concentrations at the SMC or SCI properties, in outlying GATX property areas, or in French Creek.

Table 8 (p. 62) lists the potential ecological exposure pathways at the Site for many kinds of exposed populations. Exposure concentrations for chemicals of concern were developed for burrowing mammals, based on their incidental consumption of maximum concentrations of contaminants in Site soils through eating plant material, burrowing and grooming, and drinking water from the GATX pond. The exposure concentrations were compared with toxicological doses producing initial effects likely to affect the health of small mammals. This exposure concentration is referred to as the lowest-observed-adverse-effect level ("LOAEL"). Table 9 (pp. 63-64) presents the risk estimates, in terms of the Hazard Quotient and LOAEL, to small mammals from Site contaminants. The resulting hazard quotients indicate little potential for concern from the Lord soils. One SVOC compound (naphthalene) at the former GATX pond and two SVOC compounds (hexachlorobutadiene, hexachlorobenzene) at the former lagoon/sludge bed area had hazard quotients that suggested potential problems for a small mammal population.

Several other chemicals of concern, including lead, PCBs and several PAHs, were available at potentially high dosages, but could not be properly assessed because appropriate LOAEL values are not available. Without toxicological information from literature sources, these chemicals cannot be assessed quantitatively. However, locations of elevated concentrations of these chemicals are the same as those of maximum concentrations of chemicals for which quantitative assessments were possible, namely the GATX pond and lagoon/sludge bed areas.

TABLE 7

Maximum Values of Chemical Detected in Media of Ecological Concern
Sagertown Industrial Area Site RI

| | (1) French Cr. Background Surface Water | (2) French Cr. Surface Water | (3) GATX Pond Surface Water | (4) French Cr. Background Sediment | (5) French Cr. Sediment | (6) GATX Pond Sediment | (7) Shallow Site Soil Background | (8) SMC Shallow Soils | (9) SCI Shallow Soils | (10) GATX Pond Area Shallow Soils | (11) GATX Pond Lagoon Sludge Bed Soils | (12) Other GATX Area Shallow Soils | (13) Lord Corp. Shallow Soils |
|------------------------|---|---------------------------------------|--------------------------------------|---|-------------------------------|------------------------------|---|--------------------------------|--------------------------------|--|--|--|---|
| METALS | | | | | | | | | | | | | |
| Aluminum | 83 | ND | ND | 5,570,000 | 6,040,000 | 21,900,000 | 11,000,000 | 8,760,000 | 6,850,000 | 12,400,000 | 9,240,000 | 15,200,000 | 14,500,000 |
| Antimony | ND | 101 | ND | ND | ND | ND | ND | ND | ND | 15,100 | ND | ND | ND |
| Arsenic | ND | ND | ND | 5,900 | 17,400 | 830,000 | 13,500 | 10,100 | 8,800 | 134,000 | 21,000 | 22,400 | 8,900 |
| Barium | 25 | 31 | 14 | 42,100 | 33,300 | 690,000 | 82,800 | 55,900 | 45,000 | 248,000 | 90,800 | 110,000 | 124,000 |
| Cadmium | ND | ND | ND | ND | ND | 24,900 | ND | ND | ND | 8,300 | ND | ND | ND |
| Calcium | 24,900 | 27,000 | 14,000 | 1,960,000 | 14,600,000 | 10,900,000 | 2,470,000 | 1,160,000 | 661,000 | 18,900,000 | 38,000,000 | 4,600,000 | 3,950,000 |
| Chromium | ND | 11 | ND | 7,800 | 6,600 | 576,000 | 11,100 | 9,000 | 5,900 | 174,000 | 72,800 | 16,200 | 22,300 |
| Cobalt | ND | ND | ND | ND | ND | 3,100 | 9,200 | 3,800 | 3,500 | 19,500 | 5,600 | 8,900 | 6,800 |
| Copper | ND | ND | ND | 9,600 | 12,300 | 324,000 | 16,900 | 16,000 | 12,000 | 168,000 | 29,500 | 33,600 | 69,900 |
| Iron | 229 | 828 | ND | 11,900,000 | 16,800,000 | 49,700,000 | 21,700,000 | 17,800,000 | 17,300,000 | 220,000,000 | 20,600,000 | 27,100,000 | 27,100,000 |
| Lead | ND | ND | ND | 10,500 | 50,900 | 3,410,000 | 34,300 | 16,400 | 14,100 | 2,910,000 | 149,000 | 52,200 | 33,400 |
| Magnesium | 4,660 | 4,940 | 2,840 | 1,480,000 | 2,990,000 | 2,830,000 | 2,510,000 | 2,390,000 | 1,910,000 | 4,770,000 | 9,530,000 | 2,670,000 | 2,500,000 |
| Manganese | 34 | 40 | ND | 577,000 | 325,000 | 294,000 | 871,000 | 884,000 | 625,000 | 1,200,000 | 651,000 | 969,000 | 497,000 |
| Mercury | ND | ND | ND | ND | ND | 305,000 | 80 | ND | ND | 5,900 | 420 | ND | 220 |
| Nickel | ND | ND | ND | ND | 8,700 | 152,000 | 17,100 | 13,100 | 14,200 | 42,300 | 15,800 | 18,700 | 16,700 |
| Platinum | 1,120 | 1,160 | 1,120 | 892,000 | 538,000 | 1,640,000 | 792,000 | 523,000 | 639,000 | 1,220,000 | 1,010,000 | 1,210,000 | 1,340,000 |
| Selenium | ND | ND | ND | ND | ND | 24,600 | ND | ND | ND | 5,300 | ND | ND | 570 |
| Silver | ND | 14 | ND | ND | ND | 4,000 | ND | ND | ND | ND | ND | ND | ND |
| Sodium | 5,220 | 5,860 | 4,540 | ND | ND | ND | ND | ND | ND | 4,770,000 | ND | ND | ND |
| Thallium | ND | ND | ND | ND | 830 | 5,900 | 970 | 650 | ND | 25,300 | 840 | 1,400 | ND |
| Vanadium | ND | ND | ND | ND | ND | 29,400 | 14,000 | 15,400 | ND | 14,100 | 11,100 | 18,000 | 20,700 |
| Zinc | ND | ND | 28 | 40,300 | 52,600 | 6,340,000 | 78,100 | 43,200 | 42,100 | 1,620,000 | 254,000 | 86,200 | 248,000 |
| Cyanide | ND | ND | ND | ND | ND | 5,800 | ND | ND | ND | 25,000 | 16,000 | ND | ND |
| VOLATILES | | | | | | | | | | | | | |
| 1,2-dichloroethene | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 160 | ND | ND |
| chloroform | ND | ND | ND | ND | 80 | ND | ND | ND | ND | 2,000 | ND | ND | ND |
| 1,1,1-tri-chloroethane | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1 | ND | ND | ND |
| 1,2-dichloropropane | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 11 | ND | ND |
| trichloroethene | ND | ND | 3 | ND | ND | 610,000 | ND | ND | ND | 39,000 | 870 | ND | ND |
| 1,1,2-trichloroethane | ND | ND | ND | ND | ND | 43,000 | ND | ND | ND | ND | ND | ND | ND |
| benzene | ND | ND | ND | ND | ND | 40,000 | ND | ND | ND | 210,000 | 420 | ND | ND |
| tetrachloroethene | ND | ND | 2 | ND | ND | 1,500,000 | ND | ND | ND | 30,000 | 1,500 | ND | ND |

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TABLE 7

| | (1) French Cr. Background Surface Water | (2) French Cr. Surface Water | (3) GATX Pond Surface Water | (4) French Cr. Background Sediment | (5) French Cr. Sediment | (6) GATX Pond Sediment | (7) Shallow Site Soil Background | (8) SMC Shallow Soils | (9) SCI Shallow Soils | (10) GATX Pond Area Shallow Soils | (11) GATX Pond Lagoon Sludge Bed Soils | (12) Other GATX Area Shallow Soils | (13) Lord Corp. Shallow Soils |
|---------------------------|--|------------------------------------|-----------------------------------|---|-------------------------------|------------------------------|---|--------------------------------|--------------------------------|--|--|---|---|
| 1,1,2,2-tetrachloroethane | ND | ND | ND | ND | ND | 27,000 | ND | ND | ND | ND | ND | ND | ND |
| toluene | ND | ND | ND | ND | ND | 44,000 | 17 | 5 | 5 | 230,000 | 1,200 | 49 | 3 |
| chlorobenzene | ND | ND | ND | ND | ND | 170,000 | ND | ND | ND | 14,000 | 24,000 | ND | ND |
| ethylbenzene | ND | ND | ND | ND | ND | 27,000 | 3 | ND | ND | 25,000 | 44,000 | ND | ND |
| styrene | ND | ND | ND | ND | ND | 22,000 | ND | ND | ND | 2,700 | 230 | ND | ND |
| xylenes | ND | ND | ND | ND | ND | 95,000 | 3 | ND | ND | 210,000 | 2,300 | ND | ND |
| PESTICIDES/PCBs | | | | | | | | | | | | | |
| Dieldrin | ND | ND | ND | ND | ND | ND | 1.4 | ND | ND | ND | ND | ND | ND |
| 4,4'-DDE | ND | ND | ND | ND | ND | ND | 4.3 | ND | ND | ND | ND | ND | 80 |
| 4,4'-DDT | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 70 |
| alpha chlordane | ND | ND | ND | ND | ND | ND | 0.44 | ND | ND | ND | ND | ND | ND |
| gamma chlordane | ND | ND | ND | ND | ND | ND | 0.39 | ND | ND | ND | ND | ND | ND |
| Arochlor 1260 | ND | ND | ND | ND | ND | 33,000 | ND | ND | ND | 830,000 | ND | ND | ND |
| Arochlor 1254 | ND | ND | ND | ND | ND | ND | ND | 260 | ND | ND | ND | ND | ND |
| SEMI-VOLATILES | | | | | | | | | | | | | |
| Ph:tol | ND | ND | ND | ND | ND | 150,000 | ND | ND | ND | 970,000 | ND | ND | 65 |
| 1,2-dichlorobenzene | ND | ND | ND | ND | ND | 1,200,000 | ND | ND | ND | 250 | 230,000 | ND | ND |
| 1,4-dichlorobenzene | ND | ND | ND | ND | ND | 520,000 | ND | ND | ND | ND | 440,000 | ND | ND |
| 2-methylphenol | ND | ND | ND | ND | ND | 70,000 | ND | ND | ND | 380,000 | ND | ND | ND |
| 4-methylphenol | ND | ND | ND | ND | 130 | 180,000 | ND | ND | ND | 1,100,000 | ND | ND | ND |
| 2,4-dimethylphenol | ND | ND | ND | ND | ND | 150,000 | ND | ND | ND | 430,000 | ND | ND | ND |
| benzoic acid | ND | ND | ND | ND | 53 | ND | ND | 130 | ND | 630,000 | NA | 76 | 25,000 |
| 1,2,4-trichlorobenzene | ND | ND | ND | ND | ND | 1,500,000 | ND | ND | ND | ND | 240,000 | ND | ND |
| naphthalene | ND | ND | ND | ND | ND | 5,900,000 | 330 | ND | ND | 17,000,000 | 2,400,000 | ND | ND |
| hexachlorobutadiene | ND | ND | ND | ND | ND | 310,000 | ND | ND | ND | ND | 180,000 | ND | ND |
| 2-methylnaphthalene | ND | ND | ND | ND | ND | 4,000,000 | 140 | ND | ND | 6,900,000 | 800,000 | ND | ND |
| acenaphthylene | ND | ND | ND | ND | ND | 440,000 | 73 | ND | ND | 1,600,000 | 140,000 | ND | ND |
| acenaphthene | ND | ND | ND | ND | ND | 2,800,000 | 85 | ND | ND | 4,300,000 | 490,000 | ND | ND |
| dit-enzofuran | ND | ND | ND | ND | ND | 3,400,000 | 120 | ND | ND | 5,200,000 | 570,000 | ND | ND |
| 2,4-dinitrotolene | ND | ND | ND | ND | ND | 100,000 | ND | ND | ND | ND | ND | ND | ND |
| fluorene | ND | ND | ND | ND | ND | 5,500,000 | 180 | ND | ND | 7,300,000 | 970,000 | ND | ND |

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TABLE 7

| | (1) French Cr. Background Surface Water | (2) French Cr. Surface Water | (3) GATX Pond Surface Water | (4) French Cr. Background Sediment | (5) French Cr. Sediment | (6) GATX Pond Sediment | (7) Shallow Site Soil Background | (8) SMC Shallow Soils | (9) SCI Shallow Soils | (10) GATX Pond Area Shallow Soils | (11) GATX Pond Lagoon Sludge Bed Soils | (12) Other GATX Area Shallow Soils | (13) Lord Corp. Shallow Soils |
|--------------------------------|---|---------------------------------------|--------------------------------------|---|-------------------------------|------------------------------|---|--------------------------------|--------------------------------|--|--|--|---|
| | | | | | | | | | | | | | |
| hexachloro- benzene | ND | ND | ND | ND | ND | 200,000 | 57 | ND | ND | 610 | 50,000 | ND | ND |
| phenanthrene | ND | ND | ND | 58 | 75 | 26,000,000 | 700 | ND | ND | 16,000,000 | 1,800,000 | 45 | ND |
| anthracene | ND | ND | ND | ND | 61 | 70,000,000 | 630 | ND | ND | 45,000,000 | 3,000,000 | ND | ND |
| di-n- butylphthalate | ND | ND | ND | 62 | ND | 190,000 | ND | ND | ND | ND | ND | ND | ND |
| fluoranthene | ND | ND | ND | 99 | 170 | 4,900,000 | 800 | ND | ND | 8,200,000 | 640,000 | 160 | 59 |
| pyrene | ND | ND | ND | 90 | 150 | 4,100,000 | 740 | ND | ND | 8,200,000 | 510,000 | 110 | ND |
| butylbenzyl- phthalate | ND | ND | ND | ND | ND | ND | 51 | ND | ND | ND | 120 | ND | ND |
| benzo(a)- anthracene | ND | ND | ND | 54 | 91 | 2,200,000 | 460 | ND | ND | 3,100,000 | 170,000 | 55 | ND |
| chrysene | ND | ND | ND | ND | 82 | 3,300,000 | 430 | ND | ND | 13,000,000 | 210,000 | 68 | ND |
| bis(2-ethylhexyl) phthalate | ND | ND | ND | 82 | 65 | 180,000 | ND | 65 | ND | 3,400 | ND | ND | 110 |
| di-n- octylphthalate | ND | ND | ND | ND | ND | 100,000 | ND | ND | ND | ND | ND | ND | ND |
| benzo(b)- fluoranthene | ND | ND | ND | 73 | 110 | 1,500,000 | 1,000 | ND | ND | 4,000,000 | 130,000 | 120 | ND |
| benzo(k)- fluoranthene | ND | ND | ND | 73 | ND | 730,000 | 1,000 | ND | ND | 4,000,000 | 130,000 | 120 | ND |
| benz(a)pyrene | ND | ND | ND | ND | 71 | 1,100,000 | 320 | ND | ND | 1,900,000 | 210,000 | ND | ND |
| benzo(1,2,3-cd)- pyrene | ND | ND | ND | ND | ND | 400,000 | 260 | ND | ND | 770,000 | 71,000 | ND | ND |
| dibenz(a,h)- anthracene | ND | ND | ND | ND | ND | 140,000 | ND | ND | ND | 300,000 | 380 | ND | ND |
| benzo(g,h,i)- perylene | ND | ND | ND | ND | ND | 360,000 | 280 | ND | ND | 780,000 | 71,000 | ND | ND |

Notes:

- (1) from SW01-01
 (2) from SW02-01, SW03-01, SW04-01
 (3) from SW05-01, SW06-01
 (4) from SD-01-01
 (5) from SD02-01, SD03-01, SD04-01
 (6) from SD05-01, SD06-01
 (7) from SSB11-04, SSB12-04, SSB17-04, SU03-02
 (8) from SD09-01, SSB01-04, SSB01-06
 (9) from SSB16-04
 (10) from SSAP82-03, SSAP88-03, SSAP89-04, SSAP90-04, SSB07-02, SSB07-04, SSB08-04, SSB09-04, TP01-04, TP03-02, TP04-02
 (11) from SU01-02, SU02-02, SSAP83-04, SSAP84-03, SSAP85-03, SSAP86-04, SSAP87-03
 (12) from SSB05-04, SSB06-02, SSB06-04, SSB13-04, SSB14-02, SSB15-04
 (13) from SSB10-02, SD07-01, SD08-01

All values are in ug/L or ug/kg.

Potential Ecological Exposure Pathways Saegertown Industrial Area Site RI

| Potential Source (Environmental Medium) | Exposure Point | Route of Contaminant Uptake | Exposed Population | Exposure Potential |
|--|----------------------|--------------------------------|---|--|
| Surface water | French Creek | Direct contact | Fish, algae, macrophytes, aquatic birds, macroinvertebrates, reptiles | Low, contaminants do not appear site related. |
| | | Ingestion | Fish, aquatic birds, macro- invertebrates, reptiles | Low, contaminants do not appear site related. |
| Sediment | French Creek | Direct contact | Macrophytes, macroinvertebrates | Low, contaminants do not appear to be site related. |
| Biota | French Creek | Biomagnification | Fish, small mammals, reptiles, aquatic birds | Low, contaminants are not present in large concentrations. |
| Surface water | GATX Pond | Direct contact | macrophytes, algae, macroinvertebrates, aquatic birds, reptiles | Low, little contamination is present in pond water. |
| | | Ingestion | Fish, aquatic birds, macroinvertebrates | Low, little contamination is present in pond water. |
| Sediment | GATX Pond | Direct contact | Macrophytes, macroinvertebrates, amphibians | High, some organics and metals bioaccumulate and biomagnify. |
| Biota | GATX Pond | Biomagnification | Small mammals, birds | High, some organics and metals bioaccumulate and biomagnify. |
| Soil | Terrestrial Habitats | Direct contact | Small mammals, reptiles, soil invertebrates | High in some areas, some organics and metals bioaccumulate and biomagnify. |
| | | Ingestion | Small mammals, reptiles | High in some areas, some organics and metals bioaccumulate and biomagnify. |
| | | Biomagnification | Small mammals, birds, reptiles | High in some areas, some organics and metals bioaccumulate and biomagnify. |

TABLE 9

Risk Estimates to Small Mammals from Site Contaminants
Sacertown Industrial Area Site RI

| | GATX Pond Area | | | GATX Former Lagoons/Sledge Bed | | | Lord Corp. | | |
|-----------------------------|--|---|--------------------|--|---|--------------------|--|---|--------------------|
| | Exposure Value CDI from Table 8-5 (ug/kg/day) | Toxicity Endpoint LOAEL from Table 8-6 (mg/kg/day) | Hazard Quotient | Exposure Value CDI from Table 8-5 (ug/kg/day) | Toxicity Endpoint LOAEL from Table 8-6 (mg/kg/day) | Hazard Quotient | Exposure Value CDI from Table 8-5 (ug/kg/day) | Toxicity Endpoint LOAEL from Table 8-6 (mg/kg/day) | Hazard Quotient |
| Metals | | | | | | | | | |
| Antimony | 45.3 | 0.35 | 0.1 | ND | 0.35 | 0 | ND | 0.35 | 0 |
| Arsenic | 402 | NA | -- | 63 | NA | -- | 26.7 | NA | -- |
| Barium | 745 | 5.1 | 0.1 | 274 | 5.1 | 0.05 | 372 | 5.1 | 0.07 |
| Cadmium | 49.5 | NA | -- | ND | NA | -- | ND | NA | -- |
| Chromium | 528 | 2.4 | 0.2 | 221 | 2.4 | 0.09 | 68 | 2.4 | 0.03 |
| Copper | 628 | NA | -- | 110 | NA | -- | 262 | NA | -- |
| Lead | 8830 | NA | -- | 452 | NA | -- | 101 | NA | -- |
| Mercury | 18.1 | NA | -- | 1.4 | NA | -- | 0.7 | NA | -- |
| Nickel | 126.9 | 5 | 0.03 | 47.4 | 5 | 0.009 | 50.1 | 5 | 0.01 |
| Selenium | 15.9 | 0.41 | 0.04 | ND | 0.41 | 0 | ND | 0.41 | -- |
| Thallium | 75.9 | 0.2 | 0.4 | ND | 0.2 | -- | ND | 0.2 | 0 |
| Zinc | 6153 | NA | -- | 967 | NA | -- | 0.84 | NA | -- |
| Cyanide | 75 | 10.8 | 0.007 | 48 | 10.8 | 0.004 | ND | 10.8 | 0 |
| Volatiles | | | | | | | | | |
| 1,2-dichloroethene | ND | 17 | 0 | 0.48 | 17 | 0.00003 | ND | 17 | 0 |
| 1,1,1-trichloroethene | 6 | 12.9 | 0.0005 | ND | 12.9 | 0 | ND | 12.9 | 0 |
| 1,1,2-trichloroethene | 0.003 | 90 | 3e-08 | ND | 90 | 0 | ND | 90 | 0 |
| 1,2-Dichloropropane | ND | NA | -- | 0.03 | NA | -- | ND | NA | -- |
| Trichloroethene | 117 | NA | -- | 2.6 | NA | -- | ND | NA | -- |
| 1,1,2-Trichloroethane | ND | 3.9 | -- | ND | 3.9 | 0 | ND | 3.9 | 0 |
| Benzene | 630 | NA | -- | 1.26 | NA | -- | ND | NA | -- |
| Tetrachloroethene | 90.2 | 14 | 0.006 | 4.5 | 14 | 0.0003 | ND | 14 | 0 |
| 1,1,1,2,2-Tetrachloroethane | ND | NA | -- | ND | NA | -- | ND | NA | -- |
| Chlorobenzene | 690 | 223 | 0.003 | 3.6 | 223 | 0.00002 | 0.01 | 223 | 4e-08 |
| Ethylbenzene | 42 | 27.3 | 0.002 | 72 | 27.3 | 0.003 | ND | 27.3 | 0 |
| Styrene | 75 | 97.1 | 0.00004 | 132 | 97.1 | 0.001 | ND | 97.1 | 0 |
| Xylenes | 8.1 | 200 | 0.0006 | 0.69 | 200 | 3e-06 | ND | 200 | 0 |
| | 630 | 179 | 0.004 | 6.9 | 179 | 0.00003 | ND | 179 | 0 |

TABLE 9

| | GAIX Pond Area | | | GAIX Former Lagoon/Sludge Bed | | | Load Corp. | | |
|----------------------------|--|---|--------------------|--|---|--------------------|---|---|--------------------|
| | Exposure Value CDI from Table 8-5 (ug/kg/day) | Toxicity Endpoint LOAEL from Table 8-6 (mg/kg/day) | Hazard Quotient | Exposure Value CDI from Table 8-5 (ug/kg/day) | Toxicity Endpoint LOAEL from Table 8-6 (mg/kg/day) | Hazard Quotient | Exposure Endpoint CDI from Table 8-5 (ug/kg/day) | Toxicity Endpoint LOAEL from Table 8-6 (mg/kg/day) | Hazard Quotient |
| <u>Metals</u> | | | | | | | | | |
| <u>Pesticides/PCBs</u> | | | | | | | | | |
| 4,4'-DDE | ND | NA | -- | ND | NA | -- | 0.24 | NA | -- |
| 4,4'-DDT | ND | 0.05 | 0 | ND | 0.05 | 0 | 0.21 | 0.05 | 0.004 |
| Arochlor 1260 | 2963 | NA | -- | ND | NA | -- | ND | NA | -- |
| <u>Semivolatile</u> | | | | | | | | | |
| Phenol | 4071 | 60 | 0.07 | ND | 60 | -- | 0.27 | 60 | 4e-06 |
| 1,4-dichlorobenzene | 0.75 | NA | -- | 690 | NA | -- | ND | NA | -- |
| 1,2-dichlorobenzene | ND | 89 | 0 | 1320 | 89 | 0.01 | ND | 89 | 0 |
| 2-methylphenol | 1595 | 50 | 0.03 | ND | 50 | 0 | ND | 50 | 0 |
| 4-methylphenol | 4617 | 50 | 0.09 | ND | 50 | 0 | ND | 50 | 0 |
| 2,4-dimethylphenol | 1805 | 50 | 0.04 | ND | 50 | 0 | ND | 50 | 0 |
| Benzoic acid | 2644 | NA | -- | ND | NA | -- | 105 | NA | -- |
| 1,2,4-Trichlorobenzene | ND | 20 | 0 | 1007 | 20 | 0.05 | ND | 20 | 0 |
| Naphthalene | 71,349 | 35.7 | 2.0 | 10,073 | 35.7 | 0.3 | ND | 35.7 | 0 |
| Hexachlorobutadiene | ND | 0.2 | 0 | 755 | 0.2 | 4 | ND | 0.2 | 0 |
| 2-Methylnaphthalene | 28,959 | NA | -- | 3358 | NA | -- | ND | NA | -- |
| Acenaphthylene | 6715 | NA | -- | 588 | NA | -- | ND | NA | -- |
| Acenaphthene | 18,047 | 175 | 0.1 | 2056 | 175 | 0.01 | ND | 175 | 0 |
| Fluorene | 21,824 | NA | -- | 2392 | NA | -- | ND | NA | -- |
| Fluorene | 30,638 | 125 | 0.2 | 4071 | 125 | 0.03 | ND | 125 | 0 |
| Hexachlorobenzene | 2.6 | 0.08 | 0.03 | 210 | 0.08 | 3 | ND | 0.08 | 0 |
| Phenanthrene | 67,152 | NA | -- | 7555 | NA | -- | ND | NA | -- |
| Anthracene | 188,865 | 1000 | 0.2 | 12,591 | 1000 | 0.01 | ND | 1000 | 0 |
| Fluoranthene | 34,415 | 125 | 0.3 | 2686 | 125 | 0.02 | 0.2 | 125 | 2e-06 |
| Pyrene | 34,415 | 75 | 0.5 | 2140 | 75 | 0.03 | ND | 75 | 0 |
| Butylbenzylphthalate | ND | 159 | 0 | 1.8 | 159 | 1e-05 | ND | 159 | 0 |
| Benzo(a)anthracene | 13,011 | NA | -- | 713 | NA | -- | ND | NA | -- |
| Chrysene | 54,561 | NA | -- | 881 | NA | -- | ND | NA | -- |
| Bis(2-ethylhexyl)phthalate | 14.3 | 19 | 0.0008 | ND | 19 | -- | 0.5 | 19 | 0.00003 |
| Benzo(b)fluoranthene | 16,788 | NA | -- | 546 | NA | -- | ND | NA | -- |
| Benzo(k)fluoranthene | 16,788 | NA | -- | 546 | NA | -- | ND | NA | -- |
| Benzo(a)pyrene | 7974 | NA | -- | 881 | NA | -- | ND | NA | -- |
| Indeno(1,2,3-cd)pyrene | 3232 | NA | -- | 298 | NA | -- | ND | NA | -- |
| Thiobenz(a,h)anthracene | 1259 | NA | -- | 1.6 | NA | -- | ND | NA | -- |
| Benzo(g,h,i)perylene | 3274 | NA | -- | 298 | NA | -- | ND | NA | -- |

NOTES:

Hazard Quotient = Exposure Value/Toxicity Endpoint/ 10^3 ug/mg
 ND = Not detected in area samples
 NA = Value not available
 -- = Hazard quotient cannot be calculated.

C. Significant Sources of Uncertainty

The BRA makes certain assumptions in calculating risk for the Site and reflects some omissions. For example, the BRA assumes that the Site is fully characterized and that critical toxicity values derived primarily from animal studies accurately assess risk. Reference doses incorporate conservative uncertainty factors, and cancer slope factors estimate upper bound 95th percentile values. No consideration was given to the likelihood of the actual occurrence of the current and future Site use scenarios. No allowance was made for antagonistic or synergistic chemical interactions in calculating toxicity of chemicals. The toxicity of the tentatively identified compounds was not considered since little is known about these chemicals. Some uncertainty is introduced into the risk assessment process as a result of these assumptions and omissions.

D. Risk Assessment Conclusions

An unacceptable level of risk is presented by the former GATX pond, sludge bed and lagoon areas in a future land use scenario involving an onsite resident's accidental ingestion of soil contaminants. Actual or threatened releases of hazardous substances from this portion of the Site, if not addressed by implementing the response action selected in this ROD, may present a substantial endangerment to public health, welfare, or the environment.

An unacceptable level of risk is presented by the groundwater in the vicinity of the Lord property in a future land use scenario involving an onsite resident's ingestion, inhalation and dermal contact with the ground water contaminants. Actual or threatened releases of hazardous substances from this portion of the Site, if not addressed by implementing the response action selected in this ROD, may present a substantial endangerment to public health, welfare, or the environment.

VII. DESCRIPTION OF REMEDIAL ALTERNATIVES

In accordance with Section 300.430 of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. § 300.430, a list of remedial response actions and representative technologies were identified and screened to determine whether they would meet the remedial action objectives at the Site. Those that would meet the remedial action objectives are discussed below as Remedial Alternatives.

Section 121(d) of CERCLA requires that remedial actions at CERCLA Sites at least attain legally applicable or relevant and appropriate federal and State standards, requirements, criteria and limitations which are collectively referred to as "ARARs,"

unless such ARARs are waived under CERCLA Section 121(d)(4). Applicable requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under federal or State law that specifically address hazardous substances found at the Site, the remedial action to be implemented at the Site, the location of the Site or other circumstances present at the Site. Relevant and appropriate requirements are those substantive environmental protection requirements, criteria or limitations promulgated under federal or State law which, while not applicable to the hazardous materials found at the Site, the remedial action itself, the Site location or other circumstances at the Site, nevertheless address problems or situation sufficiently similar to those encountered at the Site that their use is well-suited to the Site. ARARs may relate to the substances addressed by the remedial action (chemical-specific), to the location of the Site (location-specific), or to the manner in which the remedial action is implemented (action-specific).

It should be noted that all costs, time frames and waste/treatment volumes indicated below are estimates based on the RI/FS and the Administrative Record for this Site. This information will be further refined for the selected remedial alternatives during the remedial design.

SUMMARY OF REMEDIAL ALTERNATIVES FOR THE SAEGERTOWN INDUSTRIAL AREA SITE

- GATX Alternative 1 - No Action
- GATX Alternative 2 - Containment Onsite (Capping)
- GATX Alternative 3A - Offsite Landfilling
- GATX Alternative 3B - Offsite Incineration
- GATX Alternative 3C - Offsite Disposal as a Hazardous Waste Fuel
- GATX Alternative 4A - Onsite Landfarming
- GATX Alternative 4B - Onsite Slurry Phased Bioreactor
- GATX Alternative 5 - Solvent Extraction
- GATX Alternative 6 - Onsite Incineration
- GATX Alternative 7A - Combination Alternative with Landfarming
- GATX Alternative 7B - Combination Alternative with Slurry Phased Bioreactor
- GATX Alternative 8 - Combination Alternative with Solvent Extraction

- Lord Alternative 1 - No Action
- Lord Alternative 2 - Ground Water Containment and Source Control
- Lord Alternative 3 - Ground Water Pumping and Treatment
- Lord Alternative 4 - In-situ Air Sparging
- Lord Alternative 5 - In-situ Biological Treatment
- Lord Alternative 6 - Combination with Air Sparging, Steam Stripping or Biological Treatment
- Lord Alternative 7 - Combination with In-situ Vapor Extraction

A. Remedial Alternatives for GATX Soil/Sludge

GATX ALTERNATIVE 1 - NO ACTION

Major Components of the Remedial Action

The NCP requires that EPA consider a "No Action" Alternative for every site to establish a baseline for comparison to Alternatives that do require action. Under this Alternative, no action would be taken at the former GATX property to monitor, remove, remediate, contain, or otherwise address soil/sludge contamination. No treatment or containment would be performed under this Alternative.

Estimated Capital Costs: \$0
Estimated Annual O&M Costs: \$0
Estimated Present-Worth Costs: \$0
Estimated Implementation Time: N/A

Compliance with ARARS

There are no ARARS associated with a No Action Alternative.

GATX ALTERNATIVE 2 - CONTAINMENT ONSITE (Capping)

Major Components of the Remedial Action

This Alternative would involve capping all the areas of surface and subsurface sludge and contaminated soil on the former GATX property. A cap would be utilized to minimize precipitation infiltration, reduce the potential for erosion and transport of contaminated surface soil, minimize the potential for the volatilization of VOCs into the ambient air, eliminate the generation of particulate airborne contaminants and prevent exposure as a result of dermal contact and ingestion. Some surface regrading would be necessary to redirect surface water that currently collects in the GATX pond and other low areas. The cap would consist of a vegetative (topsoil) layer, a drainage (sand) layer and a low permeability (synthetic and soil) layer.

Deed restrictions, fencing and continued ground water monitoring would be needed to reduce the potential for future human exposure. Caps require long-term maintenance and have an uncertain design life. Caps need to be inspected for settlement, intrusion by burrowing animals, ponding of liquids, erosion and invasion by naturally occurring deep-rooted vegetation. In addition, ground water monitoring wells need to be maintained and periodically sampled. No treatment would be performed under this Alternative.

Estimated Capital Costs: \$1,010,000
Estimated Annual O&M Costs: \$82,500
Estimated Present-Worth Costs: \$1,700,000
Estimated Implementation Time: One Year

Compliance with ARARs

Capping of the pond would impact wetlands area. This Alternative would have to comply with the provisions for protection of wetlands and flood plain management in 40 C.F.R. Parts 6 and 230 and 25 PA Code §§ 105.17-105.20(a).

Fugitive dust emissions generated during remedial activities will be controlled in order to comply with fugitive dust regulations in the federally-approved State Implementation Plan for the Commonwealth of Pennsylvania, 25 PA Code §§ 123.1 - 123.2, and will not violate the National Ambient Air Quality Standards for particulate matter, 40 C.F.R. § 50.6 and 25 PA Code §§ 131.2 and 131.3.

GATX ALTERNATIVE 3A - OFFSITE LANDFILLING

Major Components of the Remedial Action

The RI has estimated that 9,000 cubic yards of sludge/soil are contaminated on the former GATX property. Under Alternative 3A this material would be excavated and removed for offsite disposal. Sludge and contaminated soil would initially be excavated based on visual observations. Verification samples would then be collected to demonstrate that residual PAH concentrations in soil are below the established cleanup criteria for the Site. Areas of contaminated soil exceeding established cleanup criteria for the Site would subsequently be excavated for treatment or disposal. Excavation and sampling activities would continue until the residual contaminant concentrations in both the pond and former lagoon/sludge bed areas meet the established cleanup criteria for the Site. The former GATX pond would have to be drained prior to excavation, then regraded with clean soil to its former contours. Other excavated areas would have to be backfilled and graded.

Offsite landfilling may require above-ground pretreatment of sludge and soil to remove VOCs. Pretreatment by vapor extraction would be used to render the sludge and contaminated soil non-hazardous in order to meet the RCRA Land Disposal Restriction. The sludges/soils would then be transported offsite for disposal at a solid waste landfill.

During and after implementation of this Alternative, monitoring would be performed to assess the impact and effectiveness of the

removal of the source contaminants in the pond, lagoon and sludge bed areas ("source removal") on ground water, and the need for ground water remediation.

Estimated Capital Costs: \$10,000,000

Estimated Annual O&M Costs: \$25,000

Estimated Present-Worth Costs: \$10,100,000

Estimated Implementation Time: One Year

Compliance with ARARs

This Alternative would comply with the applicable portions of the PADER Ground Water Quality Protection Strategy, which prohibits continued ground water quality degradation, since the entire waste volume will be removed from the Site.

This Alternative would comply with PADER regulations for the generation and transportation of hazardous wastes (25 PA Code Chapter 262, Subchapters A and C, and Chapter 263).

Offsite and onsite treatment, storage and disposal would comply with RCRA regulations and standards for owners and operators of hazardous waste treatment, storage and disposal facilities, in accordance with 25 PA Code Chapter 264, Subchapters A-E, Subchapter I (containers) and Subchapter J (tanks).

Any treatment of the soil to remove VOCs under this Alternative would comply with the requirement for treatment before disposal to meet Land Disposal Regulations (40 C.F.R. Part 268).

ARARs for Excavation, Removal of Contamination and Soil Handling (Applicable to GATX Alternatives 3A, 3B, 3C, 4A, 4B, 5, 6, 7A, 7B and 8):

Determinations about the effectiveness of any soil remediation at the Site would be based on EPA document no. 230/02-89-042, Methods for Evaluating Cleanup Standards, Vol. I: Soils and Solid Media.

Any generation, treatment, storage and offsite disposal of PCB-impacted soil and debris would comply with 40 C.F.R. Part 761 and specifically, Subpart G. Determinations about the effectiveness of soil remediation of PCB waste at the site would be based on EPA document no. 560/05-85-026, Verification of PCB Spill Cleanup by Sampling and Analysis.

In the event that any Alternative did not comply with State regulations for the closure of hazardous waste sites (25 PA Code Chapter 264, Subchapter G), the closure regulations would be waived if an Equivalent Standard of Performance were achieved by the removal of the contaminated soils.

Excavation for offsite disposal would impact the pond and wetland area. This Alternative would have to comply with the provisions for protection of wetlands and flood plain management in 40 C.F.R. Parts 6 and 230. and 25 PA Code §§ 105.17-105.20(a).

Fugitive dust emissions generated during remedial activities will be controlled in order to comply with fugitive dust regulations in the federally-approved State Implementation Plan for the Commonwealth of Pennsylvania, 25 PA Code §§ 123.1 - 123.2, and will not violate the National Ambient Air Quality Standards for particulate matter, 40 C.F.R. § 50.6 and 25 PA Code §§ 131.2 and 131.3.

GATX ALTERNATIVE 3B - OFFSITE INCINERATION

Major Components of the Remedial Action

This Alternative incorporates all of the actions outlined in Alternative 3A except that instead of offsite disposal at a landfill, the sludge/soil would be transported to an offsite permitted commercial incinerator. During and after implementation of this Alternative, monitoring would be performed to assess the impact and effectiveness of the source removal on ground water and the need for ground water remediation.

Estimated Capital Costs: \$33,690,000
Estimated Annual O&M Costs: \$25,000
Estimated Present-Worth Costs: \$33,800,000
Estimated Implementation Time: One Year

Compliance with ARARS

This Alternative would comply with the ARARS for excavation, removal of contamination and soil handling specified under GATX Alternative 3A.

The offsite incineration would be performed at a RCRA permitted facility.

If the sludge contains concentrations of PCBs greater than 50 ppm, the operation of the offsite incinerator would be required to meet applicable storage and treatment regulations as specified in 40 C.F.R. Part 761.

GATX ALTERNATIVE 3C - OFFSITE DISPOSAL AS A HAZARDOUS WASTE FUEL

Major Components of the Remedial Action

This Alternative incorporates all of the actions outlined in Alternative 3A except for the final offsite disposal location. Instead of offsite disposal at a landfill or incinerator, the

sludge/soil would be transported to a cement kiln approved for the burning of hazardous waste-derived fuels. During and after implementation of this Alternative, a ground water monitoring program would be performed to assess the impact and effectiveness of the source removal on ground water and the need for ground water remediation.

Estimated Capital Costs: \$11,710,000
Estimated Annual O&M Costs: \$25,000
Estimated Present-Worth Costs: \$11,800,000
Estimated Implementation Time: One Year

Compliance with ARARS

This Alternative would comply with the ARARS for excavation, removal of contamination and soil handling specified under GATX Alternative 3A.

Burning the contaminated sludge and soil as a fuel in a cement kiln in the Commonwealth of Pennsylvania would comply with 25 PA Code Chapter 127.

40 C.F.R. Part 266, Subpart H is also an ARAR for the burning of contaminated sludge and soil as a fuel.

GATX ALTERNATIVE 4A - ONSITE LANDFARMING

Major Components of the Remedial Action

This Alternative would involve the excavation and contained storage ("staging") onsite of contaminated soils and sludge for biological treatment in an engineered cell. Landfarming is a process by which microorganisms degrade waste. Biodegradation of waste by microorganisms can be optimized when conditions including Ph, oxygen, nutrient availability and moisture are controlled. Sludge from the Site would require mixing with clean soil prior to placement in a landfarm treatment cell since it is too contaminated in its present condition. Sludge would periodically be added to the cell as biodegradation of the waste occurred until all of the contaminated material is treated.

Estimated Capital Costs: \$4,300,000
Estimated Annual O&M Costs: \$513,000
Estimated Present-Worth Costs: \$7,500,000
Estimated Implementation Time: Eight Years

Compliance with ARARS

This Alternative would comply with the ARARS for excavation, removal of contamination and soil handling specified under GATX Alternative 3A.

ARARS for residual contaminants which remain onsite would include

40 C.F.R. Part 264, Subparts F and G, pertaining to releases from Solid Waste Management Units (SWMUs) and the closure and post-closure regulations for RCRA landfills.

The operation of the biological treatment system would have to meet the RCRA hazardous waste and TSCA PCB regulations. The construction and operation of the landfarm treatment cells would have to comply with 25 PA Code Chapter 264, Subchapter L, governing hazardous waste piles.

Since landfarming would be performed in engineered treatment cells designed to meet RCRA ARARs for waste piles, the RCRA Land Disposal Restriction ("LDRs") should not apply to the placement of soil into the treatment cells. The operation of the landfarm would have to comply with 40 C.F.R. Part 264, Subpart M, and 25 PA Code Chapter 264, Subchapter M, pertaining to land treatment of hazardous waste.

If VOC emissions from the landfarm exceed PADER requirements, an off-gas capture and treatment system would have to be incorporated into the ventilation system for the landfarm enclosure. Landfarm VOC emissions would be collected and treated by carbon absorption or thermal treatment.

GATX ALTERNATIVE 4B - ONSITE SLURRY PHASED BIOREACTOR

Major Components of the Remedial Action

This Alternative would involve the excavation and staging onsite of contaminated soils and sludge for biological treatment in a slurry phased biological reactor. Slurry phased bioreactors offer greater control over biological treatment processes than landfarming. Increased contact time between the microorganism and the contaminants, use of engineered microorganisms, decreased acclimation time and greater control over process parameters, can all be achieved in the bioreactor. A slurry, made by mixing 15% sludge or soil (by weight) with water, would be processed through the bioreactor. A residual amount of contaminants would remain in the soil/sludge after treatment.

Estimated Capital Costs: \$9,200,000
Estimated Annual O&M Costs: \$958,000
Estimated Present-Worth Costs: \$12,200,000
Estimated Implementation Time: Three Years

Compliance with ARARs

This Alternative would comply with the ARARs for excavation, removal of contamination and soil handling specified under GATX Alternative 3A.

ARARs for GATX Alternative 4A are also applicable to this Alternative.

The offsite disposal of generated biological treatment sludge from the slurry phase bioreactors would have to comply either with 25 PA Code Chapter 264, Subchapters A-E, I and J, or 25 PA Code Chapters 287-289 (Residual Waste Regulations).

A treatability variance from the applicable LDRs under 40 C.F.R. § 268.44 would be required to allow the biologically treated sludge and soil to be redeposited on-Site.

GATX ALTERNATIVE 5 - SOLVENT EXTRACTION

Major Components of the Remedial Action

This Alternative involves the excavation and staging of contaminated sludge and soil for onsite solvent extraction. Solvent extraction transfers the contaminants from the solid phase to the liquid phase. A solvent is used to wash the contaminants out of the soil/sludge. As many as eight separate washings may be needed to reduce the levels of contaminants in the soil/sludge to acceptable levels. The extracted contaminants would then be transported offsite for incineration or secondary fuel blending.

Estimated Capital Costs: \$8,770,000
Estimated Annual O&M Costs: \$2,180,000
Estimated Present-Worth Costs: \$13,300,000
Estimated Implementation Time: Two Years

Compliance with ARARS

This Alternative would comply with the ARARS for excavation, removal of contamination and soil handling specified under GATX Alternative 3A.

The ARARS specified in GATX Alternatives 4A and 4B pertaining to hazardous waste classification and treatment, air emissions, and obtaining a treatability variance from the RCRA LDRs, also apply to solvent extraction treatment.

GATX ALTERNATIVE 6 - EXCAVATION AND ONSITE INCINERATION

Major Components of the Remedial Action

This Alternative would involve the excavation, pretreatment and staging of contaminated soil/sludge for onsite incineration. Pretreatment of the soil/sludge, including mixing and screening, would be required to provide a uniform feedstock for the incinerator. The removal efficiencies that are attainable for incineration would reduce the risk to human health and the environment to acceptable levels for both the current and future Site use scenarios. Incineration of the soil/sludge would reduce or eliminate the toxicity and volume of organic contaminants by converting them to non-toxic combustion gases. Ash remaining

after the incineration could be redeposited onsite or removed for offsite disposal, either with or without fixation to immobilize any metals in the ash. If the ash passed the Toxicity Characteristic Leachate Procedure ("TCLP") test (i.e., were determined to be non-hazardous), it would not require fixation prior to onsite or offsite disposal.

Estimated Capital Costs: \$11,670,000
Estimated Annual O&M Costs: \$25,000
Estimated Present-Worth Costs: \$11,700,000
Estimated Implementation Period: Six Months to One Year

Compliance with ARARs

This Alternative would comply with the ARARS for excavation, removal of contamination and soil handling specified under GATX Alternative 3A.

The operation of the onsite incinerator will comply with 25 PA Code Chapter 264, Subchapter O.

Air emissions from onsite incineration will comply with PADER Air Quality Regulations 25 PA Code Chapters 121-143, specifically §§ 121.7, 123.1, 123.2 and 127.1.

Air emissions will also comply with 40 C.F.R. § 266.106 (for metals) and 40 C.F.R. Part 50 (for releases of carbon monoxide, lead, nitrogen dioxide, particulate matter (PM₁₀), ozone and sulfur oxides). Increased carcinogenic and non-carcinogenic risk from emissions during the implementation of the remedy will not exceed 1×10^{-6} , or an HI greater than 1, for a modeled maximally exposed individual.

Additional ARARs for this Alternative are discussed in Section X, "Statutory Determinations."

GATX ALTERNATIVE 7A - COMBINATION ALTERNATIVE WITH LANDFARMING

Major Components of the Remedial Action

This Alternative would combine either onsite incineration or offsite disposal of the pond area sludge and soil with landfarming to remediate the lagoon and sludge bed area sludge and soil. Approximately 4,000 cubic yards of soil/sludge would either be incinerated onsite or removed for offsite disposal (in accordance with GATX Alternatives 6, 3A, 3B or 3C) and approximately 5,000 cubic yards of contaminated soil/sludge would be biologically treated in a landfarm onsite (in accordance with GATX Alternative 4A). Biologically treated soil and any ash from any onsite incineration would be used for backfilling excavations. Concentrations of organic contaminants in the lagoon/sludge bed area sludges are an order of magnitude lower than the concentrations of organic contaminants in the pond area sludges. This initial lower concentration would result in a

lower residual concentration after biological treatment has been completed.

Estimated Capital Costs: \$8,890,000
Estimated Annual O&M Costs: \$419,000
Estimated Present-Worth Costs: \$11,100,000
Estimated Implementation Time: Four Years

Compliance with ARARs

This combination Alternative would have to comply with the ARARs for GATX Alternatives 3A, 3B, 3C (offsite disposal) or 6 (Onsite Incineration) and GATX Alternative 4A (Onsite Landfarming). See the descriptions of these Alternatives for a discussion of the ARARs.

GATX ALTERNATIVE 7B - COMBINATION ALTERNATIVE WITH SLURRY PHASED BIOREACTOR

Major Components of the Remedial Action

This Alternative would combine either onsite incineration or offsite disposal of the pond area sludge and soil (in accordance with GATX Alternatives 6, 3A, 3B or 3C) with slurry phased bioreactor treatment (in accordance with GATX Alternative 4B) to remediate the lagoon and sludge bed area sludge and soil. This Alternative is the same as GATX Alternative 7A except that a bioreactor rather than landfarming would be utilized for the less contaminated soil/sludge.

Estimated Capital Costs: \$11,900,000
Estimated Annual O&M Costs: \$823,000
Estimated Present-Worth Costs: \$13,700,000
Estimated Implementation Time: Three Years

Compliance with ARARs

This combination Alternative would have to comply with the ARARs for GATX Alternatives 3A, 3B, 3C (offsite disposal) or 6 (Onsite Incineration) and GATX Alternative 4B (Onsite Slurry Phased Bioreactor). See the descriptions of these Alternatives for a discussion of the ARARs.

GATX ALTERNATIVE 8 - COMBINATION ALTERNATIVE WITH SOLVENT EXTRACTION

Major Components of the Remedial Action

This Alternative would combine either onsite incineration or offsite disposal of the pond area sludge and soil (in accordance with GATX Alternatives 6, 3A, 3B or 3C) with solvent extraction treatment (in accordance with GATX Alternative 5) to remediate the lagoon and sludge bed area sludge and soil. This Alternative

is the same as GATX Alternative 7A (Combination Alternative with Landfarming) except that solvent extraction rather than landfarming would be utilized for the less contaminated soil/sludge.

Estimated Capital Costs: \$11,340,000
Estimated Annual O&M Costs: \$1,503,000
Estimated Present-Worth Costs: \$14,600,000
Estimated Implementation Time: Two Years

Compliance with ARARs

This combination Alternative would have to comply with the ARARs for GATX Alternatives 3A, 3B, 3C (offsite disposal) or 6 (Onsite Incineration) and GATX Alternative 5 (Onsite Solvent Extraction). See the descriptions of these Alternatives for a discussion of the ARARs.

B. Remedial Alternatives for Lord Ground Water

LORD ALTERNATIVE 1 - NO ACTION

Major Components of the Remedial Action

The NCP requires that EPA consider a "No Action" Alternative for every site to establish a baseline for comparison to Alternatives that do require action. Under this Alternative, no action would be taken at the Saegertown Industrial Area Site to remove, remediate, contain, or otherwise address ground water contamination emanating from the Lord property.

Estimated Capital Costs: \$0
Estimated Annual O&M Costs: \$0
Estimated Present-Worth Costs: \$0
Estimated Implementation Time: N/A

Compliance with ARARs

There are no ARARs for a no action Alternative.

LORD ALTERNATIVE 2 - GROUND WATER CONTAINMENT AND SOURCE CONTROL

Major Components of the Remedial Action

This Alternative would contain ground water by using a hydraulic barrier to prevent further offsite movement of contaminants. Air sparging and extraction wells, an interceptor trench designed for biological treatment, or ground water extraction wells with above-ground treatment of effluent are three examples of containment remedies considered in this Alternative. Unsaturated zone source treatment (vapor extraction) could be implemented in the vicinity of the RG-1 sump as part of this Alternative. For

the purposes of estimating the cost of this Alternative, an assumption was made that ground water pumping and treatment would be used. Ground water would be recovered at 40 gallons per minute and an estimated maximum of 1.5 pounds of contaminants per day would be removed from the treated ground water. A further assumption was made that the ground water would be treated through UV/oxidation, which does not result in VOC air emissions.

Estimated Capital Costs: \$950,000
Estimated Annual O&M Costs: \$120,000
Estimated Present-Worth Costs: \$2,800,000
Estimated Implementation Time: Thirty Years

Compliance with ARARs

It is uncertain whether this containment Alternative would achieve the ARARs associated with restoring ground water to background conditions.

Contamination in the ground water is required to be reduced to background levels by 25 PA Code §§ 264.90 - 264.100, specifically 25 PA Code §§ 264.90(i) and (j) and 264.100(a)(9). PADER's February, 1992, policy document, "Ground water Quality Protection Strategy," would be considered in the implementation of this remedy. This policy document defines the framework for ground water remediation programs. In it, PADER states that its goal is "nondegradation of ground water quality" (p.1), which means that the ultimate goal of all remediation projects is to restore levels to background quality. However, PADER recognizes that "there are technical and economic limitations to immediately achieving the goal of nondegradation for all ground waters" (pp. 1-2), and that levels above background may not present unacceptable risk to human health and the environment. If EPA and PADER determine that it is not technically practicable to achieve the background concentration for any contaminant throughout the entire area of the ground water contamination, both onsite and offsite, then the SDWA MCL for that contaminant will become the chemical-specific ARAR with which this Alternative must comply.

Action-specific ARARs would apply to the discharge of treated ground water. Depending on the method of effluent discharge from the ground water treatment system, applicable NPDES or Publicly Owned Treatment Works ("POTW") pretreatment regulations would apply. Ground water from the Lord property would be pretreated for metals removal, if necessary, in an above-ground remediation system to comply with NPDES or POTW discharge requirements. Any surface water discharge would comply with the substantive requirements of the Clean Water Act NPDES discharge regulations (40 C.F.R. §§ 122.41 - 122.50 and 40 C.F.R. § 131), the Pennsylvania NPDES Regulations (25 PA Code §§ 91 and 92.31), the Pennsylvania Water Treatment Regulations (25 PA Code §§ 95.1 - 95.3 and 97) and the Pennsylvania Water Quality Standards (25 PA Code §§ 93.1 - 93.9).

If ground water is discharged to French Creek, this Alternative would comply with 25 PA Code Chapter 105, Subchapter G (requirements relating to outfalls and headwalls). If ground water is discharged to a POTW, this Alternative would comply with 40 C.F.R. Part 403.

Action-specific ARARs would also apply to the VOC emissions from any air stripping tower. VOC emissions from an air stripping tower would be governed by the PADER air pollution regulations. Air Emissions would also comply with 40 C.F.R. Part 264, Subpart AA, and 25 PA Code Chapter 264, Subchapter AA (Standards for Process Vents), and with 40 C.F.R. Part 264, Subpart BB, and 25 PA Code Chapter 264, Subchapter BB (Air Emissions Standards for Equipment Leaks). Air emissions of Vinyl Chloride would comply with 40 C.F.R. Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAPS).

Air permitting and emissions ARARs are outlined in 25 PA Code Chapters 123, 127, 131, 135 and 139. 25 PA Code § 127.12 requires all new air emission sources to achieve minimum attainable emissions using the best available control technology (BAT). In addition, the PADER air permitting guidelines for remediation projects require all air stripping and vapor extraction units to include emission control equipment. However, the permitting regulations allow for exemptions if a source is considered to be of "minor significance," or if emission controls are not economically or technically feasible. OSWER Directive 9355.0-28 - Control of Air Emissions from Superfund Air Strippers at Superfund Ground water Sites would be an action-specific ARAR for any air stripper used in this remedy.

Fugitive dust emissions generated during remedial activities would be controlled in order to comply with fugitive dust regulations in the federally-approved State Implementation Plan for the Commonwealth of Pennsylvania, 40 C.F.R. Part 52, Subpart NN, §§ 52.2020 - 52.2023, and 25 PA Code § 123.2, and the National Ambient Air Quality Standards for particulate matter in 40 C.F.R. § 50.6 and 25 PA Code §§ 131.2 and 131.3.

This Alternative would comply with the ground water monitoring requirements in 25 PA Code Chapter 264, Subchapter F.

The removal of suspended solids in ground water in a settling tank will result in the generation of small quantities of residual solids requiring disposal. The exact quantity will vary with treatment flow rates. These residual solids shall be tested to determine if they are a RCRA hazardous waste. Similarly, if carbon absorption is utilized with an air stripping tower or vapor extraction vent, a RCRA hazardous waste could result. If a RCRA hazardous waste is determined to be present, this remedy will comply with the regulations for the generation and transportation of hazardous wastes, 25 PA Code Chapter 262, Subchapters A and C, and Chapter 263. It shall also comply with the RCRA regulations and standards for owners and operators of

hazardous waste treatment, storage and disposal facilities, 25 PA Code Chapter 264. In addition, the Department of Transportation Rules for Hazardous Materials Transport (49 C.F.R. Parts 107 and 171-179) shall be met.

This Alternative would comply with CERCLA § 121(d)(3) and with EPA OSWER Directive #9834.11, both of which prohibit the disposal of Superfund site waste at a facility which is not in compliance with §§ 3004 and 3005 of RCRA and all applicable State requirements.

LORD ALTERNATIVE 3 - GROUND WATER PUMPING AND TREATMENT

Major Components of the Remedial Action

The ground water pumping and treatment Alternative is designed to prevent further migration of the contaminant plume and to aggressively flush contaminants from the saturated zone. Ground water would be extracted at a rate of approximately 100 gallons per minute and treated above ground by UV/oxidation or air stripping and discharged either on or offsite. Unsaturated zone source treatment would be implemented in the vicinity of the RG-1 sump as part of this Alternative. An estimated maximum of 4 pounds per day of contaminants would be removed from the ground water. The pounds per day of contaminants removed would reduce with time but possibly could rebound after pumping stopped.

Chlorinated ethenes in the saturated zone would be significantly reduced through the flushing action of the ground water pumping. The effectiveness of this Alternative could be limited by desorption of the contaminants from the saturated zone soil, diffusion of the contaminants in the ground water, and contaminants not dissolved in the ground water which continue to act as a contamination source.

Air stripping would be used to treat the ground water. If the VOC emissions from the air stripper did not qualify as a minor source under the federally-approved Commonwealth of Pennsylvania State Implementation Plan, they would be treated in a carbon adsorption bed or through a UV/Oxidation system. The treatment cost estimate is based on UV/Oxidation which eliminates VOC emissions.

Estimated Capital Costs: \$1,300,000
Estimated Annual O&M Costs: \$145,000
Estimated Present-Worth Costs: \$3,500,000
Estimated Implementation Time: Thirty Years

Compliance with ARARs

The ARARs discussed under Lord Alternative 2 would also apply to Lord Alternative 3.

It is not certain that the ground water pumping and treating

Alternative would achieve the EPA or PADER ground water ARARs. Desorption and diffusion limitations in the saturated zone, as well as the potential presence of contaminants in a non-aqueous phase, have been found to hinder the effectiveness of pump and treat systems in achieving ARARs.

LORD ALTERNATIVE 4 - IN-SITU AIR SPARGING

Major Components of the Remedial Action

The in-situ air sparging Alternative is designed to volatilize contaminants present in the saturated zone and collect them for discharge to the atmosphere or above-ground treatment. Air sparging involves the injection of air under pressure via a network of horizontal trenches or vertical wells into the saturated zone of the aquifer. This Alternative would include elements of Lord Alternative 2 for containment of further offsite movement of contaminants. This Alternative could also include unsaturated zone source treatment by vapor extraction in the vicinity of the RG-1 sump.

The air sparging Alternative would establish a grid on 50 foot centers in an area approximately 400 feet by 400 feet area within the contaminant plume. Two sparging wells screened at shallow and deep intervals would be installed at each grid location to force air into the subsurface. A vapor extraction well, screened in the unsaturated zone, would be located at 100 foot intervals to collect the injected air and contaminants. The entire system would consist of 98 air sparging wells introducing 600 cubic feet per minute ("CFM") of air and 25 extraction wells collecting 1200 CFM. It is estimated that air sparging would remove approximately 4.1 pounds per day of chlorinated ethenes from the ground water and saturated zone. These contaminants, collected in the vapor phase by the extraction wells, would be captured in an above-ground carbon adsorption treatment system.

Estimated Capital Costs: \$3,110,000
Estimated Annual O&M Costs: \$330,000
Estimated Present-Worth Costs: \$4,500,000
Estimated Implementation Time: Five Years

Compliance with ARARs

The ARARs discussed under Lord Alternative 2 would also apply to Lord Alternative 4.

Although it is not certain that the In-Situ Air Sparging Alternative would be capable of achieving ground water ARARs, the limited history which exists for this technology suggests that it is feasible to achieve ground water ARARs in fairly homogeneous, permeable soils like those in the area of the Saegertown Site.

LORD ALTERNATIVE 5 - IN-SITU BIOLOGICAL TREATMENT

Major Components of the Remedial Action

The In-situ Biological Treatment Alternative is designed to degrade saturated zone contaminants in place. Ground water would be pumped and chlorinated ethenes would be treated by uv/oxidation or air stripping. The treated ground water would then have supplemental oxygen/gases, nutrients and other additives mixed with it in an above-ground reactor prior to being reinjected into the aquifer. This Alternative could also include unsaturated zone source treatment by vapor extraction in the vicinity of the RG-1 sump. The effectiveness of the In-situ Biological Treatment Alternative in degrading contaminants depends on the ability of the injected treated ground water to intimately contact the chlorinated ethenes in the aquifer.

Estimated Capital Costs: \$1,490,000

Estimated Annual O&M Costs: \$217,000

Estimated Present-Worth Costs: \$2,400,000

Estimated Implementation Time: Five Years

Compliance with ARARs

It is not known if the In-Situ Biological Treatment Alternative would be capable of achieving ground water ARARs. To date, in-situ biological degradation of chlorinated ethenes has not been demonstrated for full-scale applications.

PADER has expressed concern that the injection of additives into the aquifer would violate its ARARs for "nondegradation of ground waters." The injection of additives into the aquifer should not violate this ground water ARAR, since the remediation goal of background levels applies to the completion of a remediation project. Injected nutrients, etc. would be contained within the ground water extraction/injection systems. At the end of the remediation process, all of the injected additives would be consumed and a return to background conditions would occur. The end result of in-situ biological treatment would thus be in compliance with the PADER ground water ARARs.

The ARARs discussed under Lord Alternative 2 would also apply to Lord Alternative 5.

LORD ALTERNATIVE 6 - COMBINATION OF PUMPING AND TREATMENT WITH AIR SPARGING, STEAM STRIPPING OR BIOLOGICAL TREATMENT

Major Components of the Remedial Action

This Alternative combines the use of in-situ technology for the more highly contaminated area of the plume with ground water pumping and treatment of the downgradient portion of the plume. The pump and treat system would be more cost effective than the

in-situ technology in remediating the portion of the plume with the lower concentrations of chlorinated ethenes. Conversely, the in-situ treatments would be more effective than the pump and treatment technology in treating the more highly contaminated portion of the plume beneath the Lord manufacturing building. The in-situ treatments proposed in this Alternative would be either air sparging, biological treatment or steam stripping. Alternatives 4 and 5 discuss air sparging and biological treatment, respectively. Steam stripping is analogous in design to air sparging except that steam, rather than air, is injected into the saturated zone. The steam stripping wells would be installed in a grid pattern over a portion of the plume approximately 150 feet by 150 feet which would include the RG-1 sump area and an area beneath the manufacturing building. The ground water pump and treat system in this Alternative would extract 85 gallons per minute of ground water from five wells. This combination Alternative would be more effective at removing adsorbed and non-aqueous phase contaminants than the pump and treat Alternative alone. An estimated average of 800 pounds per year of chlorinated ethenes could be removed from the ground water if air sparging were used in this combination Alternative, while the pump and treat system would remove an additional 1100 pounds per year.

Estimated Capital Costs: \$1,840,000
Estimated Annual O&M Costs: \$250,000
Estimated Present-Worth Costs: \$3,400,000
Estimated Implementation Time: Ten Years

Compliance with ARARS

The ARARS discussed under Lord Alternative 2 would also apply to Lord Alternative 6.

This Alternative should achieve ground water ARARS and reduce the risk to below acceptable levels.

Additional ARARS for this Alternative are discussed in Section X, "Statutory Determinations."

LORD ALTERNATIVE 7 - COMBINATION OF PUMPING AND TREATMENT WITH IN-SITU VAPOR EXTRACTION

Major Components of the Remedial Action

This Alternative is similar to Alternative 6 in that ground water pumping and treatment would be used to treat the area of the plume with the lower concentration of contaminants. However, this Alternative would utilize in-situ vapor extraction instead of air sparging, steam stripping or biological treatment for the area of the plume with the higher concentration of contaminants. The pumping and treatment should remediate the plume and also prevent its further migration.

In-situ vapor extraction is only capable of removing contaminants in the unsaturated zone. Therefore, ground water beneath the manufacturing building and in the vicinity of the RG-1 sump would have to be pumped in order to lower the water table and create a deeper unsaturated zone. Six ground water recovery wells pumping a total of 155 gallons of water per minute would be required for this Alternative. Two recovery wells, one to the northeast and one to the west of the manufacturing building, would be used to dewater the highly contaminated portion of the plume. The other four recovery wells would be operated for the pumping and treatment of the downgradient portion of the ground water plume.

The vapor extraction system would be installed in a grid fashion and spaced at intervals in an area 150 feet by 150 feet which would include the RG-1 sump and the manufacturing building. Within this area four vapor extraction wells would be located which would extract a combined total of 200 cubic feet per minute of vapor. VOCs captured in the vapor extraction system would be treated by carbon adsorption. Vapor extraction would take an estimated 4 years to complete. After this time the dewatering wells would be shut down but the four remaining pump and treat wells would continue to operate.

The vapor extraction system would remove an estimated average of 1,300 pounds of chlorinated ethenes per year. The pump and treat system would remove an estimated maximum of 1100 pounds per year.

Estimated Capital Costs: \$1,890,000
Estimated Annual O&M Costs: \$275,000
Estimated Present-Worth Costs: \$3,800,000
Estimated Implementation Time: Fourteen Years

Compliance with ARARs

This combination Alternative would have to comply with the ARARs for Lord Alternative 3 which are discussed under Alternative 2.

This Alternative may achieve ARARs and reduce risk in the future Site use scenario to below acceptable levels. SDWA MCLs would be relevant and appropriate chemical-specific ARARs for ground water. The amount of residual chlorinated ethenes remaining after treatment would depend on the ability of the extracted air to intimately contact all of the chlorinated ethene mass. Therefore, the effectiveness of the dewatering system, the design of the extraction system, the subsurface contaminant distribution, and the presence of subsurface geologic heterogeneities, are all factors that can impact the overall effectiveness of the vapor extraction treatment.

VIII. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial action Alternatives described above for each area of the Site were evaluated under the nine evaluation criteria set forth in the NCP at 40 C.F.R. § 300.430(e)(9). These nine criteria are organized according to the following categories listed in 40 C.F.R. § 300.430(f)(1):

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with applicable or relevant and appropriate requirements (ARARs)

Primary Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria

- Community acceptance
- State acceptance

Threshold criteria must be satisfied in order for an Alternative to be eligible for selection. Primary balancing criteria are used to weigh the strengths and weaknesses of the Alternatives and to identify the Alternative which provides the best balance of the criteria. State and community acceptance are modifying criteria which are taken into account after public comment is received on the Proposed Plan. Descriptions of the individual criteria follow:

Overall Protection of Human Health and the Environment. Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls and/or institutional controls.

Compliance with Applicable or Relevant and Appropriate Requirements. Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes or whether it provides a basis for invoking a waiver.

Long-Term Effectiveness and Permanence. Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain its effectiveness over time. It includes the consideration of residual risk and the adequacy and reliability of controls.

Reduction of Toxicity, Mobility, and Volume. Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies a remedy may employ.

Short-Term Effectiveness. Short-term effectiveness refers to the period of time needed to complete the remedy and any adverse impacts on human health and the environment that may be posed during the construction and implementation of the remedy until cleanup levels are achieved.

Implementability. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement that remedy.

Cost. Cost includes estimated capital, operation and maintenance, and net present worth costs.

Community Acceptance. Community acceptance addresses whether or not the public agrees with the Preferred Remedial Alternative. This is assessed in the Record of Decision following a review of the public comments received on the Administrative Record and the Proposed Plan.

State Acceptance. State acceptance addresses whether the State concurs with, opposes, or has no comment on the Preferred Remedial Alternative.

A. Comparative Analysis of Alternatives for GATX Soil/Sludge

Overall Protection of Human Health and the Environment

Since GATX Alternative 1 (No Action) would neither eliminate nor reduce to acceptable levels the threats to human health or the environment presented by contamination at the Site, it will not be discussed in the remainder of this analysis.

GATX Alternative 2 (Capping) would not reduce the mass of contaminants or their toxicity but would reduce the level of risk associated with the current Site use by preventing contact and accidental ingestion of the contaminated sludge and soil by limiting the air exposure route. Alternative 2 would still pose an unacceptable risk under the future Site use scenario.

GATX Alternatives 3A, 3B, 3C (offsite disposal) and 6 (Onsite Incineration) would reduce the level of risk associated with the current and future Site use scenarios. Alternatives 3B, 3C and 6 are capable of destroying over 99.99% of the organic contaminants (VOCs, PAHs and PCBs) with a corresponding reduction in toxicity. Incinerator air pollution control devices are expected to be able to achieve air ARARS. GATX Alternative 3A, Offsite Landfilling, would not reduce the toxicity or volume of contaminants in the

soil or sludge, unless combined with some treatment.

GATX Alternatives 4A, 4B, 5, 7A, 7B and 8 (biological treatment and solvent extraction) are capable of significantly reducing the level of VOCs and PAHs in the soil and sludge. However, residual contamination would remain following the implementation of these Alternatives. The amount of residual contamination would be less for the combination Alternatives 7A, 7B and 8 since the more highly contaminated sludge and soil would be removed for offsite disposal and only the less contaminated sludge and soil would be treated onsite. It is not known whether the removal efficiencies of Alternatives 4A, 4B, 5, 7A, 7B and 8 would reduce the concentration of residual contaminants to a level where they would pose an acceptable risk in current or future Site use scenarios.

Compliance with ARARs.

All Alternatives would attain their respective federal and State ARARs. However, GATX Alternatives 4A, 4B, 5, 7A, 7B and 8 may require a treatability variance in order to comply with RCRA Land Disposal Restrictions.

Long-Term Effectiveness and Permanence.

As stated above, GATX Alternatives 3A, 3B, 3C and 6 would either effectively destroy the organic contaminants or remove them from the Site. These Alternatives would all permanently reduce the level of risk associated with the current Site use and any possible future Site use.

Alternatives 4A, 4B, 5, 7A, 7B and 8 would achieve a significant reduction in contaminant volume. However, it is unclear whether the residual remaining after biological treatment would be low enough to prevent risk in the future Site use scenario.

Alternative 2 would not achieve a permanent reduction in contaminant mass. Long-term effectiveness would depend on maintaining the cap's integrity and on institutional controls, such as deed restrictions.

Reduction of Toxicity, Mobility, or Volume through Treatment.

GATX Alternatives 3B, 3C and 6 would achieve the highest reduction in contaminant toxicity, mobility and volume. Thermal treatment of organics (VOCs and PAHs) can destroy over 99.99% of these contaminants. However, thermal treatment processes do not destroy metals. In GATX Alternative 6, incinerators equipped with particulate scrubbers would be capable of removing metals at the concentrations found in the GATX sludge. The captured metals and those remaining in the ash following thermal treatment could be immobilized, by chemical fixation or incorporation in a matrix, prior to onsite or offsite disposal.

Alternatives 7A, 7B and 8 would involve thermal treatment of approximately 4,000 cubic yards of the more heavily contaminated soil and sludge from the pond area. The thermal treatment portion of these Alternatives would achieve at least a 99.99% destruction of the organic contaminants. However, the remaining approximately 5,000 cubic yards of the soil and sludge would be treated by a biological treatment or solvent extraction and the actual percentage of reduction of organic contaminants that can be achieved by these Alternatives is not clear.

Alternative 5 (and the relevant portion of Alternative 8) would utilize solvent extraction to leach contaminants from the soil and sludge, and would then collect the contaminants and treat them. Because of the high concentration of contaminants in the sludge at the Site, solvent extraction would only reduce the material requiring offsite disposal by approximately 60%. Some residual contaminants would remain in the soil and sludge after treatment. Since solvent extraction has not yet been demonstrated on a full scale, removal efficiencies and levels of residuals are hard to predict. Metals can be removed from the soil in a second soil washing process after the solvent has extracted the VOCs and PAHs.

Alternatives 4A and 4B (Biological Treatment) would achieve some reduction in toxicity and volume. However, little data is available to predict the removal efficiency attainable and the volume of residual contamination that would remain. Some of the sludge contains as much as 27% organic contaminants. Under these Alternatives, dilution with clean soil would be required in order to reduce the contaminants to a level that would not be toxic to bacteria used in the biological treatment. Research has shown that the larger PAH compounds are more difficult and take longer to biologically degrade. Some of these same PAH compounds are considered carcinogenic and would have the most stringent risk-based cleanup levels. Metals are not subject to biological degradation processes and would remain in the soil and sludge. VOCs present in the sludge and soil are likely to volatilize during the biological treatment processes.

Alternatives 2 and 3A (Capping and Offsite Landfilling, respectively) do not reduce the toxicity, mobility or volume of the contaminants, unless some treatment is done to the soil and sludge prior to offsite landfilling.

Short-Term Effectiveness.

GATX Alternatives 2 through 8 would all reduce the risk associated with the current Site use scenario. However, nearby residents and onsite remedial construction workers could be exposed to airborne particulates and contaminants that might volatilize from the sludge and soil during excavation and material-handling activities.

Alternative 6 would take the least time to complete: an estimated

6 months to one year. Alternatives 2, 3A, 3B, and 3C would take an estimated one year to complete. Alternatives 5 and 8 and Alternatives 4B and 7B would take an estimated two years and three years, respectively, to complete. Alternatives 7A and 4A would take the longest to complete: an estimated four years and eight years, respectively.

Implementability.

There are no implementability issues associated with Alternatives 1, 2 (Capping) or 3A (Offsite Landfilling).

Thermal treatment, which is associated with GATX Alternatives 3B, 3C, 6 and portions of Alternatives 7A, 7B and 8, is a proven technology. Mobile incinerators are available to perform the onsite thermal treatment as outlined in Alternative 6. There is no known commercial incinerator in Pennsylvania to which the soil and sludge can be sent for offsite disposal.

Biological treatment associated with Alternatives 4A and 4B and portions of Alternatives 7A and 7B has been specified in numerous CERCLA RODs with similar waste. The sludge and soil volumes may be too small to justify the mobilization and capital expense of the slurry phased biological treatment system called for in Alternatives 4B and 7B. A very large area would be required in order to construct the landfarm treatment cell called for in Alternatives 4A and 7A. This is due to the need to dilute the sludge and soil with clean soil, which would increase the volume of waste to be treated.

Solvent extraction associated with Alternative 5 and a portion of Alternative 8 has yet to be demonstrated in a full scale soil cleanup. Contaminants have varying solubility in solvents and the most appropriate solvent or solvents to use would have to be determined in treatability studies prior to implementing this remedy. Solvent residuals can remain in the soil after treatment and may require further treatment of the soil prior to its being redeposited onsite. Wastewater is produced in the solvent extraction process and would have to be treated and discharged. The cost estimate for solvent extraction assumes that the wastewater would be disposed of at the Saegertown POTW. The capital costs for this Alternative would increase significantly if a discharge permit to the Saegertown POTW were denied.

Costs.

Capital costs include the primary equipment needs for an Alternative. Operation and Maintenance (O&M) costs include the costs for utilities and general maintenance of the equipment. Net present worth is the total cost of the equipment and its operation and maintenance cost for a 10-year period. Of the Alternatives containing remedial action, GATX Alternative 2 (Containment Onsite) would have the lowest capital and net present worth cost. Alternative 3B (Offsite Incineration) would

have the highest capital and net present worth cost. GATX Alternative 6, the selected remedy for the former GATX property, has the third highest capital cost and is the seventh highest Alternative in net present worth costs.

Community Acceptance.

The October 20, 1992 Proposed Plan and the November 5, 1992 public meeting produced a number of comments from the general public and from potentially responsible parties (PRPs) for the Site. Responses to these comments appear in the Responsiveness Summary section of this ROD. There were no objections to EPA's proposed selection of GATX Alternative 6 as the remedy for this portion of the Saegertown Industrial Area Site.

State Acceptance.

The Commonwealth of Pennsylvania concurs with the selection of GATX Alternative 6 as the remedy for this portion of the Site.

B. Comparative Analysis of Alternatives for Lord Ground Water

Overall Protection.

Lord Alternative 1 (No Action) would neither eliminate nor reduce to acceptable levels the threats to human health or the environment presented by contamination at the Site. Therefore, it will not be discussed further in this analysis.

Lord Alternative 2 (Containment) would not reduce contaminant volume enough to lower future risk to acceptable levels. Therefore, it will not be discussed further in this analysis.

All of the remaining Lord Alternatives (Alternatives 3 through 7) have the potential to reduce the amount of contaminant mass in the ground water aquifer, with varying degrees of efficiency. All could be expected to produce a protective remedy.

Compliance with ARARs.

Lord Alternatives 3 through 7 can all meet the requirements of ARARs.

Long Term Effectiveness and Permanence.

Lord Alternatives 3 through 7 would likely reduce risk to acceptable levels under the future Site use scenario. Lord Alternative 3 (Pumping and Treatment), although not as effective as the in-situ treatment Alternatives 4, 5, 6 and 7, is a proven technology.

Alternative 6 combines a proven technology in pumping and treatment with source removal of contaminants by air sparging,

steam stripping or biological degradation for the area of the plume with the highest contaminants.

Alternative 4 (Air Sparging) has not been specified in any CERCLA RODs to date but has been demonstrated to be effective at a small number of sites involving chlorinated VOCs and gasoline contaminants.

Alternative 5 (In-situ Biological Treatment of chlorinated ethenes) has yet to be demonstrated for a full scale remediation project. If incomplete degradation were to occur, breakdown products could be formed that are more toxic than the parent compounds.

Alternative 7 combines pumping and treatment with source removal by vapor extraction. Vapor extraction is designed to remove contaminants from the unsaturated zone and would not be as effective at removing contaminants from the saturated zone.

Reduction of Toxicity, Mobility, or Volume through Treatment.

Lord Alternatives 3 through 7 would significantly reduce the chlorinated ethene mass in the saturated zone and ground water at the Site.

Alternatives 4 (Air Sparging) and 6 (Combination Pumping and Treatment with Air Sparging, Steam Stripping or Biological Treatment) should be more effective at removing contaminants in any adsorbed or non-aqueous phase.

If a successful biological treatment scheme could be developed and implemented, Alternative 5 (In-situ Biological Treatment) would reduce the toxicity and mass of contaminants.

Alternative 7 (Combination Pumping and Treatment with In-situ Vapor Extraction), while the most proven in-situ treatment, has implementation problems associated with the need to lower the water table in the contaminated area. Contaminants would remain on soil particles after the water table was lowered. However, once the water table was lowered, the soil would no longer be subject to the ground water flushing action of the pumping and treatment portion of this Alternative. In addition, vapor extraction normally is used to treat the most highly contaminated source area. It is not practical to install a vapor extraction system to treat the entire area where the water table would be lowered.

Short-Term Effectiveness.

The risk associated with the current Site use scenario was not calculated during the FS since there is no current use of the contaminated ground water. No drinking water wells in the area appear to be affected by the ground water contamination on the Lord property. Remedial construction workers would be exposed to

contaminated soil during any well and pipe installation activities associated with Lord Alternatives 3 through 7.

Alternative 3 would take approximately 30 years to complete the remediation. Alternatives 4 and 5 would take approximately 5 years, and Alternatives 6 and 7 would take 10 and 14 years, respectively, to complete remediation.

Implementability.

Lord Alternatives 3 and 7 are proven technologies that have been specified in numerous CERCLA RODs. However, there are several implementability issues associated with the use of Alternative 7 (Combination with In-situ Vapor Extraction) at the Saegertown Site. The information collected during the RI indicates that the mass of the contaminants in the Lord area ground water contamination is present in the saturated zone, and vapor extraction is not capable of removing contaminants from the saturated zone. The water table in the vicinity of the RG-1 sump would have to be lowered in order to implement vapor extraction. The contaminants adsorbed onto the soil in the dewatered area outside the vapor extraction area would not be subject to the ground water flushing action of the pumping and treatment portion of this Alternative.

Air sparging, as discussed in Alternatives 4 and 6, is a fairly recent technology, but it has been shown to be effective at removing chlorinated VOCs at a small number of sites. If improperly designed, air sparging could cause migration of contaminants.

The biological degradation technology used to remediate ground water under Lord Alternative 5 (and the relevant portion of Alternative 6) has not yet been fully developed to effectively degrade TCE and PCE, the primary Site contaminants. Further research would be needed before this remedy could be implemented in a full scale project. Incomplete degradation of chlorinated ethenes could result in the production of vinyl chloride and other degradation products that are as toxic or more toxic than the parent compounds currently present in the aquifer.

Both the air sparging and steam stripping portions of Lord Alternative 6 would be effective in removing the chlorinated ethenes present in the saturated zone. Both technologies utilize the same principle for operation: introducing a gas to volatilize dissolved contaminants from the aquifer by direct contact or by creating turbulence. The effectiveness of both technologies is dependent on the installation of injection and extraction wells in direct contact with the contaminants. Air sparging and steam stripping both utilize a vapor extraction system to remove the injected air or steam containing the contaminants from the unsaturated zone.

Steam stripping, if used in Lord Alternative 6, would require the

construction and operation of a steam source. There are many maintenance and operational problems associated with the production and delivery of steam over long distances.

The presumed source area, the RG-1 sump, is in close proximity to the manufacturing areas on the Lord property. The Alternatives involving source remediation (Alternatives 4, 5, 6 and 7) all involve placement of wells and piping in and around these production areas. However, Lord, has already successfully collected soil gas samples from borings inside its main building onsite.

Costs.

Lord Alternative 5, In-situ Biological Treatment, has the lowest estimated present-worth cost. Lord Alternative 6 (Combination of Pumping and Treatment with Air Sparging, Steam Stripping or Biological Treatment), the preferred Alternative, has the third highest capital cost for an action Alternative, and is the fourth highest in net present-worth cost.

Community Acceptance.

The October 20, 1992 Proposed Plan and the November 5, 1992 public meeting produced a number of comments from the general public and from PRPs for the Site. Responses to these comment appear in the Responsiveness Summary section of this ROD. There were no objections to EPA's proposed selection of Lord Alternative 6 as the remedy for this portion of the Saegertown Site.

State Acceptance.

The Commonwealth of Pennsylvania concurs with the selection of Lord Alternative 6 as the remedy for this portion of the Saegertown Site.

IX. THE SELECTED REMEDIES AND PERFORMANCE STANDARDS

A. Selected Remedy for the Contaminated Soil on the Former GATX Property

Following review and consideration of the information in the Administrative Record file, the requirements of CERCLA and the NCP, and public comment, EPA has selected GATX Alternative 6, (Excavation and Onsite Incineration), for the treatment of the contaminated sludge and soil on the former GATX property. GATX Alternative 6 meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs, and provides the best balance of long term effectiveness and permanence, reduction of toxicity, mobility or volume of contaminants through treatment, short term effectiveness, implementability and cost.

The selected remedy for the former GATX property consists of the following components:

- excavation of contaminated sludge and soil;
- onsite incineration with air pollution controls;
- restoration or replacement of the pond and wetland; and
- long-term ground water monitoring.

1. Excavation of GATX Contaminated Sludge and Soil

The sludge on the former GATX property shall be excavated. Sludge may be defined visually as being a black, viscous, tar-like material. (The results of sludge sampling from the RI suggest that there is a direct correlation between the visual (qualitative) definition of sludge and the quantitative definition of elevated levels of VOCs and PAHs.) All sludge and soil, both contiguous and noncontiguous with the sludge, that contains total carcinogenic PAH concentrations in excess of 1.0 ppm in benzo(a)pyrene ("B(a)P") equivalents, as explained below, shall also be excavated. (Table 10 (p. 94) lists the carcinogenic PAHs whose total shall not exceed 1 ppm in B(a)P equivalents ("1 ppm B(a)P") in the soil following excavation).

The GATX sludge contains a mixture of VOCs, SVOCs (including PAHs) and metals, while the GATX contaminated soil contains primarily SVOCs. The RI indicates that the VOCs are bound in the sludge and not subject to leaching. EPA has established a cleanup level based on the concentration of PAHs, since they are present in both the sludge and the soil. The VOCs, SVOCs and metals in the sludge are commingled with the PAHs and will be removed along with them in the cleanup of the PAHs.

EPA has established relative potency factors ("RPFs") for PAH compounds in Comparative Potency Approach for Estimating the Cancer Risk Associated with Exposure to Mixtures of Polycyclic Aromatic Hydrocarbons (1988). The compound B(a)P is assigned a RPF of one (1.000). The carcinogenic potency of all other PAH compounds are compared to B(a)P and assigned an RPF which represents the carcinogenicity of those compounds in proportion to the carcinogenicity of B(a)P. Table 10 below lists the PAH compounds which are present in the soil and shows their RPF or B(a)P equivalents.

Table 10

| CARCINOGENIC PAH | RELATIVE POTENCY FACTOR (B(a)P EQUIVALENT) |
|------------------------|---|
| benzo(a)pyrene | 1.000 |
| benzo(a)anthracene | 0.145 |
| benzo(b)fluoranthene | 0.140 |
| benzo(k)fluoranthene | 0.066 |
| chrysene | 0.004 |
| dibenzo(a,h)anthracene | 1.110 |
| indeno(1,2,3-cd)pyrene | 0.232 |

The total carcinogenicity of all of the PAH compounds in the sludge or soil is calculated in two steps. First, the concentration of each PAH compound listed in Table 10 which is identified in soil and sludge is multiplied by its RPF to derive its B(a)P equivalent concentration. The individual concentrations, in B(a)P equivalents, of all PAH compounds are then added together to obtain the total concentration of PAH compounds in B(a)P equivalents.

2. Performance Standard for GATX Sludge and Soil

EPA has developed a Performance Standard ("cleanup level") for the contaminated sludge and soil based on a concentration of carcinogenic PAHs that, if left in the soil, would not affect ground water and would not present an unacceptable risk to human health or the environment through ingestion. The Performance Standard is expressed in terms of a carcinogenic risk-based concentration. The total concentration of carcinogenic PAH compounds in the soil following excavation shall not exceed 1.0 ppm in B(a)P equivalents (the Performance Standard).

The excavation of contaminated sludge and soil shall continue until such time as the Performance Standard for PAH contaminants in onsite soil has been achieved, as determined by EPA.

3. GATX Onsite Incineration with Air Pollution Controls

An incinerator and support structures shall be mobilized onsite. The incinerator shall be equipped with air pollution controls capable of reducing metal emissions in order to achieve the NCP and RCRA-required risk criteria. The air pollution controls proposed to be used in the onsite incinerator shall be subject to EPA approval prior to the implementation of the remedy.

Excavated sludge and soil shall be processed to provide a uniform feedstock for the incinerator. Processing may include, but shall not be limited to, drying, mixing and shredding, as approved by EPA. Sampling for PCBs in the waste to be incinerated shall be conducted according to the US EPA document entitled Verification of PCB Spill Cleanup By Sampling and Analysis, August 1985.

If debris is encountered in the excavated material, it shall either be decontaminated and/or treated to render it non-hazardous for offsite disposal, or processed through the onsite incinerator. Debris shall be determined to be non-hazardous if it passes the TCLP test and is not a RCRA characteristic waste.

The onsite incinerator ash shall be tested to determine the concentration of metals in the ash. If the ash does not pass the TCLP test and is determined to be hazardous, it shall either be treated prior to placement in the excavated area onsite or removed for offsite disposal. Ash remaining onsite shall comply with the PADER residual waste regulations.

Following treatment of the sludge and soil on the former GATX property, the onsite incinerator shall be demobilized and removed from the Site.

4. Performance Standards for the GATX Onsite Incinerator

The onsite incinerator shall be operated to achieve a Destruction and Removal Efficiency ("DRE") of 99.99% for all organic chemicals in the waste, with the exception of polychlorinated biphenyls ("PCBs"). The onsite incinerator shall achieve a DRE of 99.9999% for any waste containing PCBs. The total concentration of carcinogenic PAH compounds in the resulting incinerator ash shall not exceed 1.0 ppm in B(a)P equivalents.

All incinerator emissions shall comply with the regulations in 40 C.F.R. Part 50 for releases of carbon monoxide, lead, nitrogen dioxide, particulate matter (PM₁₀), ozone and sulfur oxides. Noncarcinogenic emission rates shall not exceed the Reference Air Concentrations set forth in 40 C.F.R. Part 266, Appendix IV. Increased carcinogenic and non-carcinogenic risk presented by the incinerator emissions shall not exceed 1×10^{-6} , or an HI greater than 1, for a modeled maximally exposed individual.

5. Restoration or Replacement of the GATX Pond and Wetland

Once excavation is complete, the excavated areas shall be regraded to pre-existing contours. The pond and wetland area onsite shall be restored, or an equal area shall be created, to replace any habitat destroyed in the implementation of the remedy. The restoration or replacement of the pond and wetland habitat shall be subject to EPA approval.

6. Long-Term Monitoring of the GATX Ground Water

The ground water beneath the former GATX property shall be monitored for contaminants found in the sludge throughout the implementation of the remedy and for at least five years following the completion of remedial construction.

EPA shall determine the number of monitoring wells necessary to verify the performance of the remedial action. The installation of additional monitoring wells may be required. The wells shall be sampled quarterly during the implementation of the remedy and for the first two years following the completion of the sludge/soil removal. Thereafter, the wells shall be sampled semi-annually until background concentrations of contaminants have been achieved. Once background levels have been reached, the wells shall be sampled for twelve consecutive quarters. If contaminants remain at the background level for twelve consecutive quarters, monitoring can be discontinued.

If EPA determines at any time that action to address ground water contamination beneath the former GATX property is necessary to protect public health or the environment, such action may be addressed in an amendment to this ROD or an Explanation of Significant Differences.

7. Five Year Review

Five Year Reviews will be conducted after the remedy is implemented to ensure that the remedy continues to protect human health and the environment.

B. Selected Remedy for the Groundwater in the Vicinity of the Lord Property

Following review and consideration of the information in the Administrative Record file, the requirements of CERCLA and the NCP, and public comment, EPA has selected Lord Alternative 6 (Combination Pumping and Treatment with Air Sparging) for the treatment of the ground water contamination in the vicinity of the Lord property. Lord Alternative 6 meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs, and provides the best balance of long term effectiveness and permanence, reduction of toxicity, mobility and volume of contaminants through treatment, short term effectiveness, implementability and cost.

The selected remedy consist of the following components:

- Delineation of the ground water plume;
- ground water extraction and treatment through air stripping or UV/oxidation;

- air sparging injection wells;
- vapor extraction and treatment through carbon adsorption; and
- long-term ground water monitoring.

1. Delineation of the Ground Water Plume in the Vicinity of the Lord Corporation

Prior to installation of the extraction wells, additional monitoring wells shall be installed on the Lord property and to the west of the Lord property in order to determine the extent of the contaminant plume. Monitoring wells shall also be installed to delineate the vertical extent of the ground water plume. The number and location of these wells shall be approved by EPA.

The contaminant plume shall be defined as the presence of any of the hazardous substances listed in Table 11 (p. 98) in the groundwater at concentrations above background concentrations.

2. Ground Water Extraction and Treatment

Ground water shall be extracted using multiple extraction wells, the exact location and number of which will be determined by EPA during the design of the ground water recovery system. The system shall be designed to capture and treat the contaminant plume, as defined above.

Recovered ground water shall be treated using an onsite treatment system. Suspended solids shall be removed using a settling tank or clarifier followed by an on-line filtration unit. The ground water shall then be treated using a packed column airstripping unit or a UV/oxidation system. Final flow rates and air stripper or UV/oxidation system specifications shall be determined by EPA, in consultation with PADER, during the remedial design.

The treated effluent shall be discharged to French Creek via a storm water outfall pipe that drains the Site surface water. As an alternative, the effluent may be utilized by Lord Corporation for its non-contact cooling water needs. Lord's current NPDES permit for non-contact cooling water discharge would have to be amended, with PADER approval, if ground water effluent were to be added to this flow.

If an air stripping unit is utilized, contaminants in the effluent air shall be captured by a carbon adsorption unit, the dimensions of which shall be determined by EPA, in consultation with PADER, during the remedial design. The air stripping tower shall reduce emissions to the minimum attainable level through the use of the Best Available Technology ("BAT"), in accordance with 25 PA Code § 127.12(a)(5).

3. Performance Standard for Ground Water in the Vicinity of the Lord Property

Groundwater extraction, treatment and discharge shall be required until such time as EPA determines, in consultation with PADER, that the Performance Standard for each contaminant of concern has been achieved to the extent technically practicable throughout the entire area of groundwater contamination, both onsite and offsite.

The Performance Standard for each contaminant of concern in the ground water (see Table 11) shall be the lower of either the background concentration or the SDWA MCL for that contaminant. The background concentration for each contaminant of concern shall be established in accordance with the procedures for ground water monitoring set forth in 25 PA Code § 264.97 before ground water treatment begins. In the event that a contaminant of concern is not detected in samples taken for the establishment of background concentrations, the detection limit for the method of analysis utilized with respect to that contaminant shall constitute the "background" concentration of the contaminant.

The MCLs for all of the contaminants of concern are set forth at 40 C.F.R. § 141.61. The MCLs, the detection limits and the appropriate analytical methods for testing for the contaminants of concern are listed in table 11 below:

Table 11

Contaminants of Concern in Ground Water in the Vicinity of the Lord Property

| Contaminant | MCL (ug/l) | Detection Limit (ug/l) | Method |
|----------------------------|------------|------------------------|--------|
| vinyl chloride | 2 | .18 | 601 |
| 1,1-dichloroethene | 7 | .13 | 601 |
| 1,2-dichloroethene (cis) | 70 | .12 | 524.2 |
| 1,2-dichloroethene (trans) | 100 | .06 | 524.2 |
| 1,2-dichloroethane | 5 | .03 | 601 |
| trichloroethene | 5 | .12 | 601 |
| 1,1,1-trichloroethane | 200 | .13 | 601 |
| tetrachloroethene | 5 | .03 | 601 |
| xylene | 10,000 | .05-.13 | 524.2 |

Method 601 is found in 40 C.F.R. Part 136

Method 524.2 is found in 40 C.F.R. Part 141

4. Air Sparging and Vapor Extraction Wells

Air sparging injection wells shall be installed in the source area of the ground water contamination on the Lord Corporation property. The exact location and number of injection wells will be determined by EPA during the design of the air sparging system. A sufficient quantity of air shall be injected into the ground water aquifer beneath the Lord Corporation property to strip contaminants present in the aquifer.

Vapor extraction wells shall be installed in the unsaturated zone in the vicinity of the source area. The exact location and number of vapor extraction wells will be determined by EPA during the design of the air sparging system. A sufficient quantity of soil gas shall be extracted from the unsaturated zone to capture contaminants stripped from the ground water by the air injected in the sparging wells. The vapor phase contaminants recovered by the extraction wells will be captured by a carbon adsorption unit, the dimensions of which will be determined by EPA, in consultation with PADER, during the remedial design. The carbon adsorption unit must reduce emissions to the minimum attainable level through the use of the Best Available Technology ("BAT"), in accordance with 25 PA Code § 127.12(a)(5).

5. Long-Term Monitoring of the Ground Water in the Vicinity of the Lord Property

The ground water in the vicinity of the Lord property shall be monitored for the hazardous substances listed in Table 11 (p. 98) throughout the implementation of the remedy and for at least five years following the completion of remedial construction.

EPA will determine the number of monitoring wells necessary to verify the performance of the remedial action. The installation of additional monitoring wells may be required. The wells shall be sampled quarterly during the implementation of the remedy and for the first two years following the completion of the construction. Thereafter, the wells shall be sampled semi-annually until background concentrations of contaminants have been achieved. Once background levels have been reached, the wells shall be sampled for twelve consecutive quarters. If contaminants remain at background levels for twelve consecutive quarters, monitoring can be discontinued.

During the ground water monitoring period, if the concentrations in the ground water of any of the contaminants listed in Table 11 exceeds their background concentrations, the pump and treat system shall be restarted and operated until the background concentration has once more been attained for twelve consecutive quarters.

6. Five Year Review

Five Year Reviews will be conducted after the remedy is

implemented to ensure that the remedy continues to protect human health and the environment.

7. Lord Corporation Ground Water Remedy Implementation

An operation and maintenance plan for the ground water extraction and treatment system shall be required. The performance of the ground water extraction and treatment system shall be carefully monitored on a regular basis and the system may be modified, as warranted by the performance data collected during the operation. These modifications may include, for example, alternate pumping of the extraction wells or the addition or elimination of certain extraction well(s).

It may become apparent during the implementation or operation of the ground water extraction system and its modifications, that contaminant levels have ceased to decline and are remaining constant at levels higher than the Performance Standards over some portion of the contaminated plume. If EPA determines, in consultation with PADER, that implementation of the selected remedy demonstrates that it will be technically impractical to achieve and maintain the Performance Standards throughout the entire area of the ground water contamination, EPA may require that any and all of the following measures be taken, for an indefinite period of time, as further modification(s) of the existing system:

- 1) long-term gradient control may be provided by low level pumping, as a containment measure;
- 2) chemical-specific ARARs may be waived for those portions of the aquifer for which EPA determines, in consultation with PADER, that it is technically impracticable to achieve further contaminant reduction;
- 3) institutional controls may be provided/maintained to restrict access to those portions of the aquifer where contaminants remain above Performance Standards; and
- 4) remedial technologies for ground water restoration may be re-evaluated.

The decision to invoke any or all of these measures may be made during the 5-year reviews of the remedial action. If such a decision is made, EPA may amend the ROD or issue an Explanation of Significant Differences.

C. Selected Alternative for the SMC Property

EPA has selected the No Action Alternative for the SMC property since it will be protective of human health and the environment.

D. Selected Alternative for the SCI Property

EPA has selected the No Action Alternative for the SCI property since it will be protective of human health and the environment.

X. STATUTORY DETERMINATIONS

Section 121 of CERCLA requires that a selected remedy:

- . be protective of human health and the environment;
- . comply with ARARs;
- . be cost-effective;
- . utilize permanent solutions and Alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- . address whether the preference for treatment as a principal element is satisfied.

A description of how the selected remedies satisfy each of the above statutory requirements is provided below.

A. Protection of Human Health and the Environment

The selected remedies for the Site will be protective of human health and the environment by reducing the principal threat posed at the Site, on the former GATX property: sludge and soil contamination, and by addressing the ground water contamination in the vicinity of the Lord Corporation property. Potential health threats posed by the Site through exposure pathways (i.e. direct contact, ingestion of sludge, contaminated soils, sediments and contaminated ground water, and inhalation of ambient air) will be eliminated by the remedies selected in this ROD.

Soil and sludge on the former GATX property that poses a principal threat (i.e., that exceeds 1 ppm B(a)P equivalent) will be excavated and treated onsite in an incinerator. Contaminants in the ground water in the vicinity of the Lord property will be remediated to background levels.

B. Compliance with ARARs

All applicable or relevant and appropriate requirements (ARARs) pertaining to the selected remedies for the former GATX property and the ground water contamination in the vicinity of the Lord property will be attained. The ARARs are presented below.

GATX Excavation and Onsite Incineration.

The remedy for the former GATX property will comply with the applicable portions of the PADER Ground Water Quality Protection Strategy, which prohibits continued ground water quality degradation, since all contaminated sludge and soil which could potentially impact the ground water will be excavated for treatment onsite.

Offsite and onsite treatment, storage and disposal will comply with RCRA regulations and standards for owners and operators of hazardous waste treatment, storage and disposal facilities. If it occurs in the Commonwealth of Pennsylvania, it will comply with 25 PA Code Chapter 264. If it occurs outside of the Commonwealth of Pennsylvania, it will comply with 40 C.F.R. Part 264 or other federally-authorized State regulations.

RCRA regulations for the generation and transportation of hazardous wastes (25 PA Code Chapter 262, Subchapters A and C, and Chapter 263) and the Department of Transportation Rules for Hazardous Materials Transport (49 C.F.R. Parts 107 and 171-179) will be met.

Determinations about the effectiveness of any soil remediation at the Site will be based on EPA document no. 230/02-89-042, Methods for Evaluating Cleanup Standards, Vol. I: Soils and Solid Media.

Any generation, treatment, storage and offsite disposal of PCB-impacted soil and debris will comply with 40 C.F.R. Part 761 and specifically, Subparts D and G. Determinations about the effectiveness of soil remediation of PCB waste at the Site will be based on EPA Document No. 560/05-85-026, Verification of PCB Spill Cleanup by Sampling and Analysis.

The location of the onsite incinerator will comply with siting requirements in 25 PA Code Chapter 269.

The operation of the onsite incinerator will comply with 25 PA Code Chapter 264, Subchapter O.

Air emissions from onsite incineration will comply with PADER Air Quality Regulations, 25 PA Code Chapters 121-143, specifically §§ 121.7, 123.1, 123.2 and 127.1.

Air emissions will also comply with 40 C.F.R. § 266.106 (for metals) and 40 C.F.R. Part 50 (for releases of carbon monoxide, lead, nitrogen dioxide, particulate matter (PM₁₀), ozone and sulfur oxides). Increased carcinogenic and non-carcinogenic risk from emissions during the implementation of the remedy will not exceed 1×10^{-6} , or an HI greater than 1, for a modeled maximally exposed individual.

If a wet scrubber is used in the air pollution controls for the onsite incinerator, or the pond requires draining prior to

excavation, any effluent discharged to surface water will comply with the substantive requirements of the Clean Water Act NPDES discharge regulations (40 C.F.R. §§ 122.41 - 122.50 and 40 C.F.R. Part 131), the Pennsylvania NPDES Regulations (25 PA Code §§ 91 and 92.31), the Pennsylvania Water Treatment Regulations (25 PA Code §§ 95.1 - 95.3 and 97) the Pennsylvania Water Quality Standards (25 PA Code §§ 93.1 - 93.9), and 25 PA Code § 105 (requirements relating to outfalls and headwalls).

A variance from the RCRA LDRs may have to be obtained to allow the thermally treated soil to be redeposited onsite. However, it is expected that applicable LDRs can be met, since incineration is the best demonstrated available technology (BDAT) for most of the organic compounds.

Excavation for onsite treatment will impact the pond and wetland area. This Alternative will comply with the provisions for protection of wetlands and flood plain management in 40 C.F.R. Parts 6 and 330 and 25 PA Code §§ 105.17-105.20(a). It will also comply with erosion control requirements related to excavation activities in 25 PA Code Chapter 102.

Incinerator ash redeposited onsite will comply with the residual waste regulations as set forth in 25 PA Code Chapters 287-289.

In the event that the remedy does not comply with Pennsylvania regulations for the closure of hazardous waste sites (25 PA Code Chapter 264, Subchapter G), the closure regulations will be waived if an Equivalent Standard of Performance is achieved by the removal of the contaminated soils.

Fugitive dust emissions generated during remedial activities will be controlled in order to comply with fugitive dust regulations in the federally-approved State Implementation Plan for the Commonwealth of Pennsylvania, 25 PA Code §§ 123.1 - 123.2, and will not violate the National Ambient Air Quality Standards for particulate matter, 40 C.F.R. §§ 50.6 and 25 PA Code §§ 131.2 and 131.3.

This remedy will comply with the ground water monitoring requirements in 25 PA Code Chapter 264, Subchapter F.

This remedy will comply with CERCLA § 121(d)(3) and with EPA OSWER Directive #9834.11, both of which prohibit the disposal of Superfund site waste at a facility which is not in compliance with §§ 3004 and 3005 of RCRA and all applicable State requirements.

Lord Ground water Pumping and Treatment in Combination with Air Sparging.

Contamination in the ground water in the vicinity of the Lord property is required to be reduced to background levels by 25 PA Code §§ 264.90 - 264.100, specifically 25 PA Code §§ 264.90(i) and (j) and 264.100(a)(9). PADER's February, 1992, policy document, "Ground water Quality Protection Strategy," will be followed in the implementation of this remedy. This policy document defines the framework for ground water remediation programs. In the document, PADER states that its goal is "nondegradation of ground water quality" (p. 1), which means that the ultimate goal of all remediation projects is to restore levels to background quality. However, PADER recognizes that "there are technical and economic limitations to immediately achieving the goal of nondegradation for all ground waters" (pp. 1-2), and that levels above background may not present unacceptable risk to human health and the environment. The background concentration for each contaminant of concern shall be established in accordance with the procedures for ground water monitoring in 25 PA Code § 264.97, which shall be an ARAR for this remedy. The SDWA MCLs listed in Table 11 are also ARARs with which this remedy will comply.

Action-specific ARARs for the discharge of treated ground water will be met. Depending on the method of effluent discharge from the ground water treatment system, applicable NPDES or POTW pretreatment regulations will apply. Ground water from the Lord property will be pretreated for metals removal, if necessary, in an above-ground remediation system, in order to comply with NPDES or POTW discharge requirements. If the effluent is discharged to French Creek, this remedy will comply with the substantive requirements of the Clean Water Act NPDES discharge regulations (40 C.F.R. §§ 122.41 - 122.50 and 40 C.F.R. Part 131), the Pennsylvania NPDES Regulations (25 PA Code §§ 91 and 92.31), the Pennsylvania Water Treatment Regulations (25 PA Code §§ 95.1 - 95.3 and 97), the Pennsylvania Water Quality Standards (25 PA Code §§ 93.1 - 93.9), and 25 PA Code Chapter 105 (requirements relating to outfalls and headwalls). If the effluent is discharged to a Publicly Owned Treatment Works (POTW), this remedy will comply with 40 C.F.R. Part 403.

VOC emissions from any air stripping tower will be governed by the PADER air pollution regulations. Air Emissions will also comply with 40 C.F.R. Part 264, Subpart AA, and 25 PA Code Chapter 264, Subchapter AA (Standards for Process Vents), and with 40 C.F.R. Part 264, Subpart BB, and 25 PA Code Chapter 264, Subchapter BB (Air Emissions Standards for Equipment Leaks). Air emissions of Vinyl Chloride will comply with 40 C.F.R. Part 61, Subpart F, National Emission Standards for Hazardous Air Pollutants (NESHAPS).

Air permitting and emissions ARARs are outlined in 25 PA Code Chapters 123, 127, 131, 135, and 139. 25 PA Code § 127.12 requires all new air emission sources to achieve minimum attainable emissions using the best available technology ("BAT"). In addition, the PADER air permitting guidelines for remediation projects require all air stripping and vapor extraction units to include emission control equipment. However, the permitting regulations allow for exemptions if a source is considered to be of "minor significance," or if emission controls are not economically or technically feasible. During design of the air stripping unit, PADER shall determine from actual design flow rates and VOC loading rates whether emission controls need to be installed.

If required, a vapor phase carbon adsorption or thermal destruction unit shall be installed to ensure compliance with § 112 of the Clean Air Act, 42 U.S.C. § 7412, National Emission Standards for Hazardous Air Pollutants (NESHAPs). The relevant and appropriate NESHAP for vinyl chloride is set forth at 40 C.F.R. Part 61, Subpart F. OSWER Directive 9355.0-28 - Control of Air Emissions from Superfund Air Strippers at Superfund Ground water Sites will be an action-specific ARAR for any air stripper used in this remedy.

The removal of suspended solids in ground water in a settling tank will result in the generation of small quantities of residual solids requiring disposal. The exact quantity will vary with treatment flow rates. These residual solids shall be tested to determine if they are a RCRA hazardous waste. Similarly, if carbon absorption is utilized with an air stripping tower or vapor extraction vent, a RCRA hazardous waste could result. If a RCRA hazardous waste is determined to be present, this remedy will comply with the regulations for the generation and transportation of hazardous wastes, 25 PA Code Chapter 262, Subchapters A and C, and Chapter 263. It shall also comply with the RCRA regulations and standards for owners and operators of hazardous waste treatment, storage and disposal facilities, 25 PA Code Chapter 264. In addition, the Department of Transportation Rules for Hazardous Materials Transport (49 C.F.R. Parts 107 and 171-179) shall be met.

Fugitive dust emissions generated during remedial activities will be controlled in order to comply with fugitive dust regulations in the federally-approved State Implementation Plan for the Commonwealth of Pennsylvania, 25 PA Code §§ 123.1 - 123.2, and will not violate the National Ambient Air Quality Standards for fugitive dust generated during construction activities, 40 C.F.R. §§ 50.6 and 52.21(j) and 25 PA Code §§ 131.2 and 131.3.

This remedy will comply with the ground water monitoring requirements in 25 PA Code Chapter 264, Subchapter F.

This remedy will comply with CERCLA § 121(d)(3) and with EPA OSWER Directive #9834.11, both of which prohibit the disposal of Superfund site waste at a facility which is not in compliance with §§ 3004 and 3005 of RCRA and all applicable State requirements.

C. Cost-Effectiveness

The estimated present worth cost of the selected remedy for the former GATX property (excavation and onsite incineration) is \$11,700,000. The estimated present worth cost for offsite incineration as hazardous waste is \$33,800,000, or almost three times the cost for onsite incineration. The estimated present worth cost for onsite incineration does not include the cost for immobilizing metals remaining in the ash. It assumes that no such treatment will be necessary.

Onsite incineration is a proven technology and the best available technology for the destruction of organics. Costs for other Alternatives were comparable but the technology was not as proven and residuals would remain following treatment.

The estimated present worth cost of the selected remedy for the ground water contamination in the vicinity of the Lord property (ground water pumping and treatment combined with air sparging) is \$3,400,000. Ground water pumping and treatment alone would have a comparable cost but would not directly treat the area which is the source of the contamination and would take an estimated thirty years to complete. The in-situ biological Alternative would have a lower present worth cost, \$2,400,000, but the degradation process has not been fully developed or implemented on ground water contaminated with TCE and PCE. Air sparging alone as an Alternative would not be as cost effective at treating areas of lower contaminant concentrations and the full extent of the ground water plume.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedies represent the maximum extent to which permanent solutions and treatment technologies can be utilized while providing the best balance among the other evaluation criteria. Of the alternatives evaluated that are protective of human health and the environment and meet ARARs, the selected remedies provide the best balance of tradeoffs in terms of long-term and short-term effectiveness and permanence, cost, implementability, reduction in toxicity, mobility, or volume through treatment, State and community acceptance, and preference for treatment as a principal element.

The selected remedy for the contaminated sludge and soil on the former GATX property, excavation and onsite incineration, will provide a higher degree of treatment and a lower residual contamination than the other Alternatives evaluated.

The selected remedy for the contaminated ground water in the vicinity of the Lord property, pumping and treatment with air sparging, combines a proven technology with a promising innovative technology. This remedy presents fewer implementation problems, and requires a shorter time frame for completion, than the other Alternatives evaluated.

E. Preference for Treatment as a Principal Element

Onsite incineration of the contaminated sludge and soil on the former GATX property fulfills the statutory preference for remedies that employ treatment as a principal element.

Ground water pumping and treatment combined with air sparging of the contaminated ground water in the vicinity of the Lord property also fulfills the statutory preference for remedies that employ treatment as a principal element.

XI. EXPLANATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Saegertown Industrial Area Site was released for public comment on October 21, 1992. The Proposed Plan identified GATX Alternative 6 (Excavation and Onsite Incineration) and Lord Alternative 6 (Combination of Pumping and Treatment with Air Sparging, Steam Stripping or Biological Treatment) as EPA's preferred Alternatives for soil and ground water remediation. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments it was determined that no significant changes to the remedies, as originally identified in the Proposed Plan, were necessary.

SAEGERTOWN INDUSTRIAL AREA SITE
Saegertown Borough, Crawford County, Pennsylvania

RESPONSIVENESS SUMMARY
December 1992

This Responsiveness Summary documents public comments received by EPA during the public comment period on the Proposed Plan for the Saegertown Industrial Area Site ("the Site"). It also provides EPA's responses to those comments. The Responsiveness Summary is organized as follows:

- Overview
- Summary of Citizens' Comments Received During the Public Meeting and EPA's Responses
- Summary of Written Comments Received and EPA's Responses

A. OVERVIEW

The public comment period on the Proposed Plan for the Saegertown Industrial Area Site began on October 19, 1992 and ended on December 20, 1992. EPA held a public meeting at the Saegertown Junior/Senior High School on November 5, 1992.

At the meeting, EPA representatives summarized the results of the Remedial Investigation ("RI"), the Feasibility Study ("FS") and the Baseline Risk Assessment ("BRA") performed for the Site. They then presented EPA's preferred remedial alternatives for mitigating the public health and environmental threats posed by contamination at the Site. They explained that the Proposed Plan addresses contamination in the ground water in the vicinity of the Lord Corporation ("Lord") property, and contamination in the soil and sludge on the former General American Transportation Corporation ("GATX") property.

Local residents offered comments on the Proposed Plan. Most comments related to concerns about the effects of the incineration of contaminated soil and sludge on nearby residents. The transcript of the public meeting is contained in the Administrative Record for the Site.

B. SUMMARY OF CITIZENS' COMMENTS RECEIVED DURING THE PUBLIC MEETING AND EPA'S RESPONSES

Comments made during the public meeting and EPA's responses are summarized below:

Public Comment #1: What safeguards can be used to protect against dust generated and volatile organic compounds ("VOCs")

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liberated during the excavation, transportation, loading and crushing of the waste to be fed into the incinerator?

EPA Response: The potential for VOC emissions from the remedy implementation will be assessed during the remedial design prior to beginning the excavation. VOCs will be monitored during the remedy implementation. If EPA determines that VOC emissions pose a threat to offsite residents or onsite workers and/or exceed the ARARs for these emissions, measures will be taken to control them. Such measures can include the use of foam suppressants or the construction of a structure over the excavation area and treatment of the emissions from the structure prior to its discharge to the atmosphere.

Public Comment #2: Would the drought conditions present during the ground water investigation at the Site make the contaminant concentration higher or effect the movement of the ground water?

EPA Response: The ground water investigation occurred over a period of approximately eight months and included two rounds of sampling of wells in the Site area. Samples were taken in January 1991 and again in September 1991. Contaminant concentrations in one well were lower in September than they were in January. Because of the limited number of sampling points, it is not possible to conclude that the drought affected contaminant concentrations. The lower results in September may simply represent a seasonal variation. More ground water samples will be taken during the implementation of the remedy. These will enable EPA to identify and predict any contaminant trends. Nonetheless, EPA believes that sufficient information regarding ground water movement and contamination was collected during the RI to enable EPA to select a remedy for this Site.

Public Comment #3: Who determines what action is taken to clean up the Site?

EPA Response: The Regional Administrator of EPA Region III determines the action that is necessary to clean up the Site. He must first determine that an unacceptable threat to human health or the environment exists. The Administrative Record contains the information that the Regional Administrator and his representatives use to assess the risk to human health and the environment and to select the remedy.

Public Comment #4: Who makes the final decision on whether incineration is used at the Site?

EPA Response: The Regional Administrator of EPA Region III makes the final decision on the selected remedy. All public comments are considered before a final decision is made. EPA also seeks the concurrence of the Pennsylvania Department of Environmental Resources ("PADER") on the selected remedy.

Public Comment #5: Copies of a paper entitled "Problems with

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Hazardous Waste Incinerators" were handed out at the meeting and discussed. This paper was issued by the Citizen's Clearinghouse for Hazardous Waste ("Citizen's Clearinghouse") in August, 1991. For the convenience of the reader, a copy of this paper is appended to this Responsiveness Summary.

EPA Response: EPA disagrees with the conclusions reached in the Citizen's Clearinghouse paper. The following information is presented in response to the major issues raised therein:

a) Hazardous waste incinerators do not achieve 100% destruction of waste but they routinely achieve, and are regulated to achieve, 99.99% to 99.9999% destruction of organic chemicals in waste. Incinerators are the best available technology for the destruction of organic chemical waste.

Metals are not destroyed by the incineration process, but more than 95% of most metals can be captured in air pollution control devices. In recent tests conducted during the incineration of waste at the Bog Creek Superfund Site in Howell Township, New Jersey, the air pollution control devices captured more than 99% of most of the metals in the waste.

b) Products of incomplete combustion ("PICs") are organic compounds that are present in incinerator emissions but are not present or detectable in the fuel or air fed to the incinerator. During the trial burn of the incinerator at this Site, the incinerator emissions will be sampled for volatile and semi-volatile PICs (which include dioxins and furans). Data from these samples will be used in a risk assessment, to ensure that PICs in the incinerator emissions do not present an unacceptable risk to human health.

c) EPA assessed the risk of exposure to metals in the incinerator emissions through the use of an air model, assuming certain design specifications for the incinerator and worst case meteorologic conditions. The risk assessment was based on the assumption that a child inhaled outside air containing metals emissions at the most impacted location for 24 hours a day over a one-year period. A further assumption was made that air pollution controls would capture 95% of most metals emitted from the incinerator, despite the fact that recent results indicate that more than 99% of most metals emitted by incinerators can be captured in air pollution control equipment. The air modeling results indicate that, if a million people were exposed to metals emissions under the circumstances described above, eight additional cancers could result. Expressed in scientific notation, this is an 8.0×10^{-6} risk level, which is within EPA's acceptable range for the protection of human health and the environment. The model did not predict any non-carcinogenic health effects.

d) Acid gases produced by the incinerator will be neutralized in the air pollution control devices prior to their release in the incinerator emissions.

e) Incinerator ash will be subjected to the Toxicity Characteristic Leachate Procedure ("TCLP") test to determine whether it is a hazardous waste. If the ash fails the TCLP test (i.e., if it is a hazardous waste), it will be treated to render it non-hazardous. The ash may then be used as fill for the excavation onsite or removed for offsite disposal. If the ash passes the TCLP test (i.e., if it is non-hazardous), it may be used as fill for the excavation onsite or removed for offsite disposal without further treatment.

f) Any wastewater produced by the incinerator will be tested and treated according to National Pollutant Discharge Elimination System ("NPDES") permit requirements prior to discharge to surface water.

g) There is no evidence to suggest that the concentration of organic contaminants in the former GATX sludge poses the threat of fire or explosion upon incineration. Further testing can be performed in the design phase of the project to assess the heat value of the waste in British Thermal Units ("BTUs"). If the waste is determined to present a fire or explosion threat, additional controls can be placed on the storage, handling and feeding of the waste into the incinerator.

The incinerator will be operated in compliance with OSHA and other regulations that address industrial safety. It will also comply with the RCRA regulations for hazardous waste treatment (although permits for onsite treatment are not required at Superfund sites). The RCRA regulations include personnel training and emergency or contingency planning. In addition, the incinerator will be equipped with an automatic waste feed cutoff system, which will halt the operation of the incinerator whenever the predetermined control limits are exceeded. The control limits will be established by EPA.

h) The Citizen's Clearinghouse paper refers to a scientist reportedly working for the National Bureau of Standards who concluded that incinerators achieve a destruction removal efficiency ("DRE") OF 79.23%. This scientist was Dr. J. F. Welch, who at the time the paper was written was not working for the National Bureau of Standards. EPA has reviewed this paper and determined that it contained a fundamental error in the use of statistics in the calculation of the DRE. EPA believes that the Agency calculates the DRE for incinerators accurately, and that incinerators are capable of achieving a 99.99% to 99.9999% DRE for organic waste.

Additional information: The following additional information on

the selected remedy for the former GATX property may help to allay public concern:

Contaminated sludge and soil on the former GATX property is the only waste that will be incinerated onsite. The total quantity of waste is estimated to be 9,000 cubic yards or 13,500 tons. The incinerator will operate for a period of 6 months to one year. (It will be onsite longer than this to allow for setup and testing, including a trial burn). At the completion of the project, the incinerator will be removed from the Site.

The trial burn will be conducted on waste that has the highest concentration of contaminants. The purpose of the trial burn is to establish the specific control limits which will produce emissions within acceptable contaminant limits. PICs, metals and other particulates cannot be continuously monitored throughout the operation of the incinerator, but control limits, such as oxygen, carbon monoxide, carbon dioxide, stack gas flow rate and temperature, can be continuously monitored. During the trial burn, the incinerator emissions will be sampled and the various control limit readings will be recorded. Analysis of the samples will reveal the concentrations of PICs, metals and other particulates that are emitted when the incinerator is operated under specific control limits.

Once the optimum control limits are established by EPA, the operator of the incinerator is required to record them and make them available for review by the public and inspectors. As discussed above, if any of the control limits are exceeded while the incinerator is in operation, an automatic waste feed cutoff system will halt the operation. In addition, multiple safety controls are built into the incinerator.

In the Record of Decision ("ROD"), EPA has established Performance Standards for the incinerator emissions which will be protective of human health and the environment. These Performance Standards are discussed in Section IX.A, Subsection 4 of the ROD, "Performance Standards for the Onsite Incinerator." The incinerator's emissions will be constantly monitored for compliance with these Performance Standards.

B. SUMMARY OF WRITTEN COMMENTS RECEIVED AND EPA'S RESPONSES

Copies of all written comments received are contained in the Administrative Record for the Site. The written comments and EPS's responses are summarized below:

PRP Comments: In a 15-page document dated October 20, 1992, Warzyn, Inc. ("Warzyn") commented on the Proposed Plan for the Site "on behalf of the participating potentially responsible parties ('PRPs') for the Saegertown Industrial Area Site."

Warzyn stated that the PRPs support EPA's preferred remedial alternatives for the Site, and that these alternatives are consistent with the results of the RI, the BRA and the FS. The document included descriptions of the preferred remedial alternatives taken from the FS.

EPA Response: No response is necessary.

CCIDA Comments: In a letter dated October 26, 1992, the Solicitor for the Crawford County Industrial Development Authority ("CCIDA") commented on the Proposed Plan for the Site. The Solicitor pointed out that the former GATX property now has approximately six separate owners, none of whom is believed to have had any role in actively polluting the property. He was concerned that owners holding uncontaminated lands would have to pay legal and remediation costs associated with the cleanup. The Solicitor requested that EPA separately identify areas of clean versus contaminated soils. He also stated that CCIDA "does not belong on the roster of those who should be held responsible for ultimate clean up of the Saegertown Site."

EPA Response: The Remedial Investigation Report, which is contained in the Administrative Record for the Site, identifies the areas of contamination found on the former GATX property. In this Record of Decision EPA has determined that action must be taken to remediate the Lagoon/Sludge Bed and Pond Areas on the property. EPA has not yet made a final determination on who should be held responsible for ultimate cleanup of the Saegertown Site.

CCPC Comments: In a letter dated November 24, 1992, the Crawford County Planning Commission ("CCPC") commented on EPA's proposed plans for the former GATX and the Lord Corporation properties. The CCPC pointed out that the former GATX property occupies a strategic location in the Borough and should be treated so that it can be part of Saegertown's developed real estate. The CCPC stated that it did not recommend the No Action or containment alternatives for this property.

With regard to the Lord Property, the CCPC stated that, for the amount of hazard listed for this property, the cost and actions recommended seem excessive. CCPC asked whether this was really necessary.

EPA Response: The selected remedy for the former GATX property will allow for the early development of that property. Incineration is the best available technology for cleanup of the organic contaminants present in the contaminated sludge and soil, and will provide the lowest residual contamination in the soil following treatment of any of the remedial alternatives considered. The time it will take to implement this remedy (six months to one year) is equal to or less than the time that any

other remedial alternative considered would take.

With regard to the Lord property, EPA has determined that the ground water contamination in the vicinity of that property presents an unacceptable risk to human health and the environment based on a future Site use scenario. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") and Pennsylvania law, require that action be taken to reduce the risk and restore the ground water. The selected remedy for this property aggressively treats the source area of the contamination with air sparging and the less contaminated portion of the ground water plume with pumping and treatment. Of the six action alternatives considered for the Lord property, the selected remedy had the third highest capital cost and the fourth highest net present-worth cost.

Lord Corporation Comments: In a letter dated December 17, 1992, the Lord Corporation submitted comments on the Proposed Plan for the Site. Concerns which Lord raised and EPA's responses are summarized as follows:

Lord Comment #1: Lord requested that the ROD acknowledge "the potential need to grant an impracticability variance in the event the ground water remediation is not capable of achieving the site-specific cleanup criteria."

EPA Response: EPA has included a discussion on technical impracticability in Section IX.B.7 of the ROD, "Ground Water Remedy Implementation."

Lord Comment #2: Lord requested that the ROD contain the ground water cleanup criteria and the NPDES effluent discharge criteria for the ground water treatment system.

EPA Response: The ground water cleanup criteria are contained in Section IX.B.3 of the ROD, "Performance Standard for Ground Water." By letter dated November 17, 1992, EPA requested that the Pennsylvania Department of Environmental Resources ("PADER") establish the effluent discharge limits criteria for the proposed NPDES discharge of treated ground water from the Site to French Creek. PADER is in the process of establishing the effluent discharge limits. These limits could not be included in the ROD because they were not available at the time the ROD was completed.

Lord Comment #3: Lord requested that the final decision on whether ground water will be treated by UV/Oxidation or air stripping be deferred to the remedial design phase of the project.

EPA Response: The ROD states that the ground water will be treated either by UV/Oxidation or air stripping. EPA will make the final determination on which form of ground water treatment will be utilized during the remedial design phase.

Lord Comment #4: Lord requested that EPA correct the statement in the Saegertown Industrial Area Superfund Site Fact Sheet to the effect that Lord discharged spills and floor washings to the lagoon (shallow pond) on its property in the past. Lord stated that only non-contact cooling water was ever discharged to the lagoon.

EPA Response: Based on the statements made by Lord in its December 17, 1992, letter, EPA has removed any references in the ROD to past discharges by Lord of spills and floor washings to its onsite lagoon.

GATX Comments: On December 17, 1992, GATX submitted a 13-page document with attachments entitled, "Response Comments to Saegertown Program Proposed Plan for Submittal to the United States Environmental Protection Agency." In the document, GATX stated that it "does not believe that the 1.0 ppm carcinogenic PAH soil cleanup criteria presented in the Proposed Plan is appropriate for the site conditions and sludge contamination matrix" (p.6) and presented "alternative PAH soil cleanup criteria and approaches for their development" (p.2) for consideration by EPA. The major points in GATX's document, and EPA's responses, are summarized as follows:

GATX Comment #1: Developing carcinogenic PAH soil cleanup criteria based on the Summers Model is not appropriate for this Site. (P.6)

EPA Response: GATX has incorrectly assumed that the Proposed Plan's carcinogenic PAH soil cleanup level of 1.0 ppm benzo(a)pyrene ("B(a)P") equivalents was based on the Summers Model. Rather, it was based on EPA's decision to remove all visible sludge and contaminated soil which poses a carcinogenic risk in the 10^{-6} range. The RI sampling results indicate, and GATX acknowledges, that "total carcinogenic PAH concentrations in soil samples collected during the RI around the periphery of the Treatment Lagoon/Sludge Bed and Pond Areas, where sludge presence was not indicated on the boring logs, ranged from below analytical detection limits to 5.2 ppm, with most of the soil samples at or below 1.0 ppm". (Pp. 9 and 12. Emphasis added.) It should be noted that these total carcinogenic PAH concentrations reported in the RI were not expressed as ppms in B(a)P equivalents. The numbers representing concentrations would have been lower had they been expressed as such. (See the discussion on B(a)P equivalents in pages 93-94 of the ROD). EPA concluded from these sampling results that a carcinogenic PAH soil cleanup level of 1.0 ppm in B(a)P equivalents would ensure the removal of

all sludge and soil which poses a carcinogenic risk in the 10^{-6} range. EPA believes that this cleanup level will also be protective of ground water.

GATX Comment #2: The 1.0 ppm carcinogenic PAH soil cleanup criterion presented in the Proposed Plan would be overly stringent for the Site considering it is below what can be found as typical background conditions in urban settings. (p. 6)

EPA Response: From data that GATX submitted with its document, it is clear that a carcinogenic PAH concentration of 1.0 ppm in B(a)P equivalents is also above what can be found in urban settings. Table 2 attached to the document indicates that, in 15 studies conducted on urban soil, carcinogenic PAH concentrations ranged from 0.06 to 5.8 mg/kg (or ppm), with a median concentration of 1.10 mg/kg. The concentrations in Table 2 are not expressed in B(a)P equivalents. The numbers representing concentrations would have been lower had they been expressed as such. Moreover, the Saegertown Industrial Area Site is not in an "urban" (i.e., city) setting. A more appropriate comparison would be with carcinogenic PAH concentrations found in rural soil. Table 2 indicates that in eight studies on rural soils, carcinogenic PAH concentrations ranged from 0.01 to 1.01 mg/kg, with a median concentration of 0.07 mg/kg. Again, the numbers representing concentrations would have been lower had the concentrations been expressed in B(a)P equivalents. Finally, it is significant that background samples of soil taken at the Site itself revealed no detectable carcinogenic PAH in the subsurface. EPA does not agree that a carcinogenic PAH cleanup level of 1.00 ppm in B(a)P equivalents is overly stringent for this Site.

GATX Comment #3 A September 17, 1992 memorandum which EPA forwarded to GATX as support documentation for EPA's carcinogenic PAH soil cleanup level was based on a future residential land use scenario and a 10^{-6} cancer risk level. GATX believes that a future industrial land use scenario and a 10^{-5} cancer risk level are more appropriate for the Site conditions and potential future Site uses. (P.7)

EPA Response: Current Site zoning allows an owner of an industrial facility to have his/her home located next to his/her facility. Therefore, EPA believes it is prudent to use a future residential land use scenario in developing soil cleanup criteria.

The National Contingency Plan ("NCP") establishes acceptable levels of carcinogenic risk for Superfund sites at between one in 10,000 and one in 1 million additional cancer cases. Expressed in scientific notation, this translates to an acceptable risk range of between 1×10^{-4} and 1×10^{-6} for a population exposed to contaminants at a site over a defined period of time. This means that one additional person in ten thousand or one

additional person in a million, respectively, could develop cancer over a defined period of exposure to contaminants at a site. EPA's carcinogenic PAH soil cleanup level of 1 ppm in B(a)P equivalents represents a cancer risk of 6.2×10^{-6} , which is midway between a 10^{-5} and a 10^{-6} risk.

GATX Comment #4: The EPA has used an industrial future land use scenario and a 10^{-5} cancer risk level in developing soil cleanup criteria for analogous Site conditions and contaminant matrices. (P.7)

EPA Response: No two sites are identical. Moreover, Subsection 121(b)(2) of 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. § 9621(b)(2), states that a remedial action meeting the objectives of this subsection may be selected "whether or not such action has been achieved in practice at any other facility or site that has similar characteristics."

GATX Comment #5: GATX prefers to differentiate between surficial and deep soil for the purpose of developing soil cleanup criteria. (P.7)

EPA Response: EPA uses one soil cleanup criterion for both surficial and deep soil because of EPA's desire to remove all visible sludge and contaminated soil in order to reduce the carcinogenic risk posed by direct exposure to PAHs and protect the groundwater. See EPA's response to GATX's Comment #1.

GATX Comment #6: For the first three feet of the surficial soil, GATX proposes an 8.0 ppm carcinogenic PAH soil cleanup criterion on a B(a)P equivalent basis, assuming an industrial future land use scenario and a 10^{-5} cancer risk level. GATX states that deed restrictions and other institutional controls (e.g., requirements of minimal excavation depths or construction of buildings without basements) can also be used to prevent exposure to residual contaminant concentrations in deep soil below 3 feet. (P.8)

EPA Response: EPA prefers the carcinogenic PAH soil cleanup criterion of 1.0 ppm in B(a)P equivalents for the reasons discussed in its response to GATX Comment #1. Further, deed restrictions for minimal excavation depths or construction of buildings without basements would place undue burdens on future use of the property.

GATX Comment #7: For the deep soils below three feet, GATX proposes excavation of sludge and contaminated soil based on visual observation or on a soil cleanup criterion based on the Organic Leachate Model ("OLM").

EPA Response: EPA agrees that visual observation can be used to delineate sludge on the former GATX property and has specified this in the Performance Standards in the ROD. However, EPA believes that a quantitative means of determining that all visible sludge and contaminated soil has been removed is also necessary. It is for this reason that EPA established the carcinogenic PAH soil cleanup level of 1.0 ppm in B(a)P equivalents.

EPA does not agree that use of the OLM would result in a more appropriate cleanup criteria for the deep soil at this Site than the criteria which EPA has established. EPA has reviewed the input parameters which GATX used in the model in arriving at its cleanup criteria for the deep soil of 61.0 ppm. GATX used a distance of 100 feet to the downgradient receptor based on a future industrial Site use scenario. EPA believes that a future residential Site use scenario is more appropriate. (See EPA's response to GATX Comment #3). If GATX had utilized a future residential Site use scenario, the distance to the receptor would have been 0 feet. Changing the distance to 0 feet in the model and still maintaining all the other assumptions used by GATX in developing their proposed carcinogenic PAH soil cleanup criterion, would result in a criterion on the order of 2.0 ppm.

When the OLM was introduced in the Federal Register in November 1986, EPA stated that it intended the model to be a tool for the evaluation of hazardous waste delisting petitions, but not to function as a sole basis for evaluation. 51 Fed. Reg. 41084, 41086 (November 13, 1986) (Emphasis added). EPA made clear that the OLM had its limitations (51 Fed. Reg. 41085) and was an interim tool that would be replaced by an analytical test method such as the Toxicity Characteristic Leachate Procedure ("TCLP") when such a method became available and was determined to be appropriate for delisting. 51 Fed. Reg. 41087, 41092.

GATX Comment #8: "The 10^{-5} cumulative cancer risk level was considered to be protective of human health and the environment by the U.S. EPA in the rationale for the selection of the No Action Alternative for the soil media on both the SCI facility property and the Rail Siding Area of the former GATX property. The use of a 10^{-6} cumulative cancer risk level [for the Lagoon/Sludge Bed and Pond Areas] would be inconsistent with the No Action Alternative in these other instances". (p. 4)

EPA Response: EPA believes it has been consistent in its treatment of the SCI property and the former GATX property. Each area of the Site is evaluated separately. As stated in EPA's response to GATX Comment #3, the carcinogenic PAH soil cleanup level which EPA has established represents a risk level midway between 10^{-5} and 10^{-6} . Moreover, there is a marked difference between the levels of contamination found on the SCI property and the GATX Rail Siding Area and the levels found in the GATX

Lagoon/Sludge Bed and Pond Areas. Based on the sampling data from the RI, the total carcinogenic PAH contamination in the subsurface on the SCI property, when expressed as B(a)P equivalents, is 1.652 ppm at a depth of 4 to 6 feet and .007 ppm at a depth of 16 to 18 feet. In addition, no PCBs and only three VOCs, with a maximum concentration of 25 ppb, were detected on the SCI property. The GATX Rail Siding Area contained .033 ppm carcinogenic PAHs when expressed as B(a)P equivalents. Only one VOC was found in this area at a maximum value of 49 ppb. By contrast, the GATX pond area contains a PCB at 830 ppm, 10 VOCs with concentrations as high as 230 ppm, carcinogenic and noncarcinogenic PAHs, as well as numerous tentatively identified, possibly hazardous, compounds. The concentration of B(a)P in one sample from this area was as high as 1,900 ppm.

GATX Comment #9: GATX requested that EPA rework the following statement in the Proposed Plan "to put the data and circumstances in proper perspective": "Under a scenario where a future onsite resident would utilize this ground water for a potable water supply, its use would not represent an unacceptable future cancer risk (6.4×10^{-6}) but would present an unacceptable non-cancer health effect risk". GATX states, "The two compounds that contributed to the hazard index exceeding a 1.0 cumulative value are antimony and managanese. Neither metal is a primary contaminant of concern on the former GATX property."

EPA Response: EPA does not agree that the statement in the Proposed Plan needs to be reworked. It is supported by the Baseline Risk Assessment in the RI. The two compounds that contributed to the hazard index exceeding a 1.0 cumulative value are antimony and managanese. They represent the majority (23.8% and 74.5%, respectively) of the non-carcinogenic risk calculated for any future consumption of ground water from the former GATX property area.

Antimony was detected in only one well (9S) at 5.3 ppb, a concentration slightly in excess of its required detection limit of 5.0 ppb. Antimony was found in only one soil/sludge sample in the Pond Area at a concentration of 15.10 ppm and was not found in the Lagoon/Sludge Bed Area.

Manganese was detected in only one well (5S) at a concentration which exceeded its background ground water concentration. Other shallow wells closer in proximity to the sludge contained no detected manganese. Manganese was present in both the Pond Area and Lagoon/Sludge Bed Area but at concentrations less than two times its background soil concentration.

GATX Comment #10: GATX requested that the ROD specifically state that the soil cleanup criteria is for "total carcinogenic PAHs expressed on a benzo(a)pyrene equivalent basis". (p.13)

EPA Response: The ROD makes the statement which GATX requests in Section IX.A, Subsection 1, "Excavation of Contaminated Sludge and Soil" and Subsection 2, "Performance Standard for Onsite Sludge and Soil."



Citizen's Clearinghouse for Hazardous Wastes

Center for Environmental Justice

PROBLEMS WITH HAZARDOUS WASTE INCINERATORS

August, 1991

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Incinerators suffer several critical limitations. The most fundamental are described below.

(1) They cannot destroy 100% of the waste that is burned, no matter how well designed. As a result, whatever chemicals are burned in an incinerator will end up in the air, land and waterways of the surrounding community. Incinerators cannot achieve in practice what is predicted in theory. Like any machine, incinerators wear out and break down with use. A new car doesn't work as well after 15,000 miles as it did when it was new. Likewise, incinerators don't work as well after burning 28,000 pounds per day, 24 hours per day, seven days a week.

(2) New products are formed during the burning process. These chemicals are often more toxic than the original waste and include dioxins, considered to be one of the most toxic and dangerous chemicals ever tested.

(3) Incinerators generate toxic emissions including heavy metals such as arsenic, cadmium, mercury, chromium and lead that cannot be destroyed by incineration. Metals stick to tiny particles in the emission gases which escape the pollution control equipment. These tiny particles can be inhaled deep into the lungs where they enter the body and cause damage.

The amount of heavy metals which can be emitted is staggering. Research shows that as much as 53% of heavy metals incinerated is released in stack gases. One incinerator was found to be emitting almost 6,000 pounds of lead a year. Exposure to heavy metals can cause cancer, respiratory damage, liver disease and neurological disorders even at low concentrations.

The most dangerous emissions, however, are the "products of incomplete combustion" or PICs. These are chemicals that were not in the original waste but are newly formed in the incinerator. These products of combustion are even more toxic than the chemicals originally burned. Dioxin, one product of combustion, is the most toxic chemical known to

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man. Dioxin can cause cancer, birth defects, skin disorders and liver damage. Dioxin is also fat soluble meaning that it will accumulate in living organisms and remain in the body for long periods of time.

Others products of incomplete combustion include substances like methylene chloride, carbon tetrachloride, chlorobenzene, chloroform, trichloroethylene, naphthalene and phosgene. Most of these chemicals affect the liver, lungs and central nervous system; some can cause birth defects and reproductive disorders; most cause cancer.

Incinerators also release acid gases such as sulfur oxides and hydrogen chloride that contribute to acid rain, particulates that carry heavy metals and newly formed chemicals that stick to them, nitrogen oxides that contribute to smog formation and carbon monoxide.

(4) Pollution control equipment cannot eliminate toxic emissions. Even the "best available air pollution controls," are not 100% effective. --Scrubbers, which can remove acid gases and particulates, are considered good if they remove 90-95% of the chemicals in the stack gases. Electrostatic precipitators and baghouse filters, which remove particulates, are considered good if they remove 95%. When government and industry describe an incinerator that is designed to destroy 99.99% of the waste being burned, they are already include the effects of using the best available air pollution controls in this estimate.

(5) Incinerators generate toxic ash that needs to be disposed of. Two types of ash are generated by incinerators. Bottom ash which remains in the burner after solids are burned and fly ash collected from the pollution control equipment. There is usually more fly ash and than bottom ash and it is more toxic. Both types of ash are considered hazardous by EPA and must be disposed of in a hazardous waste landfill. Thus incineration does not eliminate the need for landfills.

(6) Incinerators generate toxic wastewater that needs to be disposed of. Perhaps one of the best kept secrets about incinerator pollutants is that they generate a great deal of contaminated wastewater. Almost all incinerators use wet scrubbers to remove acid gases. These wet scrubbers use water that picks up many of the toxic chemicals present in the waste stream. Most incinerators dump this wastewater in a nearby stream or river.

Other problems with incinerators include the potential for leakage during storage; the likelihood of transportation accidents as waste is delivered to the site and ash removed; the potential for explosions, which may not happen often, but when they do, they release large

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quantities of toxic chemicals into the local community; and the release of fugitive emissions which are unplanned and unintentional releases that occur from spills, leaky valves, cracks, damaged drums, dust from ash piles left on the site or evaporation of chemicals from pits, ponds or lagoons. Some estimate that the amount of fugitive emissions released from an incinerator may exceed the amount of toxic chemicals released intentionally from the smoke stack each year.

All of these emissions and problems occur when an incinerator operates as designed or planned. But what happens if something goes wrong? All incinerators undergo frequent periods of "upset" during which the machine is not operating under ideal conditions. Upsets can occur due to a power failure, poor mixing, equipment failures, changes in pressure due to burning reactive or explosive waste. During upset conditions, the emission of toxic chemicals can reach very high levels and cause serious problems in the surrounding community. Upsets may occur many times each day.

Given that these many problems exist, what is EPA doing to regulate and control incinerators? What are the "safeguards" that EPA requires and how well will they protect the community against the many problems that have been identified? EPA requires incinerators to destroy 99.99% (4 nines) of the waste entering the incinerator. This is called the "Destruction and Removal Efficiency" or DRE of the incinerator.

Use of DRE to measure how well an incinerator works has been challenged by many people. One scientist working for the National Bureau of Standards looked at the process EPA uses to measure DREs and found that by using the same emissions results but by making different assumptions, he got a DRE of 79.23% instead of 99.99%. The difference was in the degree of confidence put into the emissions results.

Even if you assume the 99.99% number is correct, ones of toxic chemicals are still being released into the surrounding community. For example, a typical incinerator will process more than 36 million pounds of hazardous waste each year. With no unexpected releases, no fugitive emissions and no accidents or upsets, such an incinerator would still emit 3,600 pounds (nearly 2 tons) of hazardous chemicals each year. So, while removing 4 nines may sound good, it still allows large quantities of chemicals to be released into the local community.

Another safeguard is the trial burn or test burn that is required before an incinerator can be permitted. This is designed to identify and set ideal operating conditions. By passing this one test, incinerators can be licensed to operate for as long as ten years without having to do another test burn. Usually the industry picks no more than 4-6 chemicals to be measured during the test burn and each chemical is burned separately. If the results are ok, the company passes the test.

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Often the company buys pure carbon tetrachloride or another pure chemical for the test burn. The test occurs under carefully controlled conditions which do not reflect actual operating conditions. In the real world, waste is not a single chemical but a complex mixture and operating conditions are very difficult to control. As a result, the test burn has little relationship to the day-to-day operations of the incinerator and the information gathered may be irrelevant, or, at best, misleading.

Companies prepare for a test burn much like a person who has moved away from home for the first time prepares for a visit from their mother. Everything is perfect. Another analogy is that the test burn is like that first test ride with a new car. Very little can go wrong in that short drive and it tells you very little about how the car will operate after 2 or 3 years of constant use.

Another safeguard is the testing the stack gases. It's reasonable to expect that EPA requires testing for dioxins, heavy metals and other chemicals released from the incinerator. Unfortunately, they don't. EPA does not require testing for any of these chemicals. Instead, EPA

EPA requires testing for CO, acid gases and particulates. These tests tell nothing about the toxic chemicals that are released from the incinerator. States can require more specific testing, but that is strictly a point of negotiation between the company and the state.

Because of these problems, we know that incinerators pose many risks, But we do not know how great the risks are. Very little information is available on how much or what levels of contaminants come out of incinerators. How far these contaminants travel is also poorly understood. Without this information, it is difficult to determine public health risks. This uncertainty is further complicated because as scientists we know very little about what happens when people are exposed to low levels of toxic chemicals for long periods of time.

What is clear about incinerators is the track record of the incinerator industry. The overall pattern is that these incinerators have been poorly managed and operated and that they have been a continuous source of air and groundwater pollution.

So if there are so many problems with incinerators, why does EPA and industry embrace them so strongly? The answer lies in 3 factors: 1) Incinerators are the simple alternative to landfills that take all types of waste without need for much processing or pretreatment.

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Incinerators allow industry to pretty much operate the way they always have; 2) Its relatively cheap; 3) The waste "disappears" into the air. With this goes any potential liability the company might have;

So what are the alternatives? The alternative is to get industry to reduce the amount of waste they generate. This does not mean reduce the amount of waste that needs to be disposed of which is EPA's idea of waste reduction. This approach changes nothing about the way or how much waste industry generates. The answer lies in using serious waste reduction methods such as changing raw materials of production, changing production technology and equipment, improving production operations and procedures, substituting less toxic chemicals for safer one, recycling potential waste as part of production and redesigning or reformulating end-products so that less waste is generated.

According to OTA, companies can reduce the amount of waste generated by as much 50% by using serious waste reduction methods. What better way to manage waste than to avoid producing it in the first place.

Despite studies such as that done by OTA and all types of case studies of companies that not only reduced their waste but saved money while doing it, industry has been very slow to change and adopt serious waste reduction methods. This is where grassroots communities come into the picture.

As long as industry can site new hazardous waste incinerators they are not going to change how they do business. As long as a cheap easy alternative exists, industry will not use serious waste reduction methods. But if they can't site new incinerators, they will be forced to sit down and come up with ways to cut back on the waste they generate. CCHW refers to this approach as stopping up the toilet.

Community groups across the country have been successful in stopping proposed incinerators. They have done it with limited resources, hard work and the power generated from an organized community. CCHW has found that the key to success lies not in the ability to bring lawyers and experts into the fight but rather to organize and put pressure on the decision-makers. There is a role and place for technical information, experts and lawyers, but they must fit in with the overall strategy of the community group.

For more information on hazardous waste incinerators or on how you can stop a proposed incinerator in your community, contact CCHW.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
1012 Water Street
Meadville, Pennsylvania 16335
A.C. 814/332-6070
January 12, 1993

Mr. Stanley L. Laskowski
Acting Regional Administrator
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19107

Re: Saegertown Industrial Area Site
Record of Decision (ROD) Concurrence

Dear Mr. Laskowski:

The Record of Decision (as received December 31, 1992) for the Saegertown Industrial Area Site, has been reviewed by the Department.

The major components of the selected remedy include:

1. Excavation and On-site Incineration for the treatment of contaminated sludge and soil on the former GATX property;
2. Groundwater Pumping and Treatment in combination with Air Sparging for treatment of groundwater contamination in and around the Lord property; and
3. No action for SCI area soils and SMC area sediments.

I hereby concur with the EPA's proposed remedy, with the following conditions:

- * The Department's concurrence is based upon the understanding that contaminated groundwater beneath the ~~entire~~ site will be remediated to background quality. Therefore, not only will the contaminated plume beneath and in the vicinity of the Lord property need remediation, but all groundwater beneath the site, including contaminated groundwater beneath the GATX portion of the site, is required to be remediated to background quality.

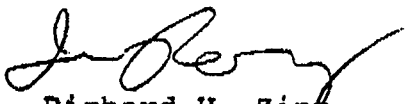
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January 12, 1993

- * EPA will assure that the Department is provided an opportunity to fully participate in any negotiations with responsible parties.
- * The Department will be given the opportunity to concur with decisions related to the design of the remedial action, to assure compliance with DER design-specific ARARs.
- * The Department's position is that its design standards are ARARs pursuant to CERCLA Section 121, and we will reserve our right to enforce those design standards.
- * The Department will reserve its right and responsibility to take independent enforcement actions pursuant to State and Federal law.
- * This concurrence with the selected remedial action is not intended to provide any assurances pursuant to CERCLA Section 104(c)(3).

Thank you for the opportunity to concur with this EPA Record of Decision and for the ongoing cooperation of your staff in this effort. If you have any questions regarding this matter please do not hesitate to contact me.

Sincerely,


f. Richard H. Zinn
Regional Director
Northwest Region

cc: Mr. Kimball (file)
Ms. Dougherty
Mr. Gorman
Mr. Fruehstorfer
Mr. Zinn
Mr. Buchwach
Ms. Brems

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