**EPA/ROD/R03-92/148**
**1992**

# EPA Superfund
# Record of Decision:

**WESTINGHOUSE ELEVATOR CO. PLANT**
**EPA ID: PAD043882281**
**OU 01**
**GETTYSBURG, PA**
**06/30/1992**

Text:
EPA Superfund Record of Decision:

Westinghouse Elevator Plant, PA

NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

RECORD OF DECISION
WESTINGHOUSE ELEVATOR CO. PLANT
Operable Unit 1

DECLARATION

SITE NAME AND LOCATION

Westinghouse Elevator Company Plant
Cumberland Township
Adams County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedial action for the Westinghouse Elevator Company Plant Site in Cumberland County, Pennsylvania. The selected remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation; and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), 42 U.S.C. SS9601 et. seq.; and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the Administrative Record for this Site.

The Pennsylvania Department of Environmental Resources (PADER), acting on behalf of the Commonwealth of Pennsylvania, does not concur 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. S9606, that actual or threatened releases of hazardous substances from this Site, as discussed in Summary of Site Risks, 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 Westinghouse Plant at the Site was constructed in 1968 for the manufacture of elevator and escalator components. Schindler Elevator Corporation has leased and operated the plant building since January 1989. This ROD addresses ground water, surface water and sediment contamination. The ground water at the plant property and in residential wells to the east of the Plant is contaminated above health based levels. The Selected Remedy will address the Principal Threats at the Site which are Dense Non-Aqueous Phase Liquids (DNAPLs) in fractured bedrock and the highly contaminated ground water in contact with the DNAPLs. No action is necessary for surface water and sediment contamination. Additional investigation of contaminated soils is needed because of a recent trichloroethane (TCA) spill and a subsequent ROD will be issued for soils (Operable Unit 2) after a supplementary remedial investigation/feasibility study for soils is completed.

The selected remedy for this Site addresses the long term threats present at the Westinghouse Elevator Plant Site. The selected remedy includes the following components:

. Extraction wells on the Plant property to contain the highly contaminated ground water plume.

. Extraction wells to the east-northeast of the Plant property to both contain and clean up the contaminated ground water that has migrated from the Plant property.

. Treatment of contaminated ground water by air stripping followed by removal of contaminants from the air stream using carbon adsorption.

- Discharge of the treated water to the northern tributary of Rock Creek under an NPDES permit.

- Deed restrictions on the use of ground water on the plant property.

- Ground water monitoring and residential well sampling.

## STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective.

This remedy utilizes permanent solutions and alternative treatment 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 the selected remedy will result in hazardous substances remaining onsite above health-based levels, a review under Section 121(c) of CERCLA,42 U.S.C. S9621 (c) will be conducted within five years after initiation of the remedy to ensure that the selected remedy is providing protection of human health and the environment.

TABLE OF CONTENTS

FOR DECISION SUMMARY

SECTION

I. SITE NAME, LOCATION AND DESCRIPTION

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

IV. SCOPE AND ROLE OF RESPONSE ACTION

V. SUMMARY OF SITE CHARACTERISTICS

VI. SUMMARY OF SITE RISKS

VII. SUMMARY OF ALTERNATIVES

VIII. COMPARATIVE ANALYSIS OF ALTERNATIVES

IX. THE SELECTED ALTERNATIVE

X. STATUTORY DETERMINATIONS

XI. EXPLANATION OF SIGNIFICANT CHANGES

APPENDIX A APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

APPENDIX B FIGURES

APPENDIX C RI DATA TABLES

APPENDIX D RESPONSIVENESS SUMMARY

APPENDIX E ADMINISTRATIVE RECORD INDEX

RECORD OF DECISION
WESTINGHOUSE ELEVATOR CO. Plant Site
OPERABLE UNIT 1

DECISION SUMMARY

## I. SITE NAME, LOCATION AND DESCRIPTION

### Site Description

The Westinghouse Elevator Plant is located on approximately 90 acres of land along the west side of Biglerville Road (Route 34), approximately 1.5 miles north of downtown Gettysburg in Cumberland Township, Adams County, Pennsylvania (figure 1 - Appendix B). The Site coordinates are latitude 39 degree 51' 08" north and longitude 77 degree 14' 21" west. The Plant is bounded to the south by property that is part of the Gettysburg Battlefield National Park; and to the west, north and east by residential and small commercial properties (Figure 2Appendix B). The closest private residences are approximately 200 feet east of the Plant building.

Prior to its current use, most of the property consisted of farmland. A farm pond, approximately two acres in area, existed on the property near what is now the main entrance to the Westinghouse Plant. The Westinghouse Plant ("Plant") was constructed in 1968 for the manufacture of elevator and escalator components. The Westinghouse Electric Co. ("Westinghouse") began operating the Plant following completion of construction and used the solvents TCE and TCA in the manufacturing process. Since January 1989 the Plant has been leased and operated by the Schindler Elevator Corporation ("Schindler").

The regional topography in the area of the Site is low to medium relief, undulating terrain. Specifically, the Site slopes moderately to the east, dropping in elevation from 600 feet above mean sea level (MSL) in the west to 525 feet above MSL in the east.

Ground water is the only source of potable water in the area and residents near the Site are dependent on municipal or private wells. EPA considers this source of drinking water to be a class IIA aquifer.

The Site is located within the watershed of Rock Creek, a small southward-flowing stream located approximately three-quarters of a mile to the east of the Plant. Two small intermittent streams (Northern and Eastern Tributaries - figure 2-Appendix B) are present near the Site. Most surface water at the plant is collected by a storm drain system which eventually discharges to the two tributaries. No flood plains or wetlands are present on the Plant property.

As used herein, the term on-Plant refers to the property on which the Plant is located and the term off-Plant refers to the property beyond the Plant property boundaries. Both on-Plant and off-Plant areas, however, are considered to be part of the Site.

## II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

### Site History

The Plant has been in operation since 1968 as a manufacturing Plant of elevator and escalator components and continues operations currently. The manufacturing process utilized by Westinghouse and continued to be used by Schindler consists of several steps including parts delivery and unloading; metal parts degreasing; rust prevention; primer and finisher paint booth operations oven drying; acoustical coating; machining and sawing; adhesive application; final assembly; and shipping.

Chemical feed materials used in many of the operations include solvents, paints, cutting and lubricating oils, and insulation board. The major solvent used up to 1975 was trichloroethene (TCE), after which time 1,1,1trichloroethane (TCA) was substituted for TCE. Waste materials generated include spent solvents, paint sludges, spent oils and greases, and excess insulation board. The processes which generate the majority of hazardous or otherwise regulated wastes related to contaminants found in ground water are described below.

Metal parts degreasing operations remove thin coatings of oil applied by the parts suppliers to bare metal surfaces for corrosion prevention. Spent solvent saturated with oil is containerized and stored in the drum storage area for off-Site disposal.

Prior to 1975, a Triclene-phosphatizing process preceded paint booth operations. Triclene-phosphatizing is a process of producing a crystalline iron phosphate layer on steel surfaces to prevent corrosion. Major ingredients include TCE and phosphoric acid. Waste materials were either drummed for storage in the drum storage area or pumped into large holding tanks, located near the southwest corner of the Plant, for off-Site disposal. The Triclene procedure was eliminated in 1975 and replaced by a lead chromate primer application process.

Machining and sawing operations utilize lubricating and cutting oils.  Some solvents are used to remove oils from metal parts after cutting operations or to clean equipment motors.  Waste oils and degreasing solvents are drummed and stored in the drum storage area for off-Site disposal.

Prior to 1981, drummed waste chemicals were stored in an area located in the southern portion of the Plant. This area is currently referred to as the old waste drum storage area.  Drummed wastes are currently stored on a covered, diked concrete pad referred to as the hazardous waste drum storage area which is located near the shipping docks.

As a result of Plant operations, a number of potential source areas for the detected contamination were identified at the Site.  These areas include the former solvent remote fill line, the degreasing solvent storage tank location, pumphouse area, railroad dock, and the old waste drum storage area. The location of each area is shown on Figure 3-Appendix B.  Each area is briefly described below.

The former solvent remote fill line is located in the southwestern portion of the facility.  Beginning in 1980, tank trucks containing fresh degreasing solvent filled a storage tank in the interior of the building through this buried line.  Prior to 1980, degreasing solvent was purchased and stored in 55-gallon drums.  In 1985, Westinghouse discontinued the use of the buried remote line.  This area is considered to be a potential source due to the possibility of spills during filling operations or line integrity failures.

Degreasing solvent is currently stored in an above-ground tank located on a diked concrete pad in the courtyard of the building.  This tank is filled through the current remote fill line.  The fill connection is located at the south end of the building and feeds directly to the tank.  This area is considered a potential source due to the possibility of leaks, spills, or ruptures.  In May 1991, a spill of about twenty gallons of solvent occurred and was reported to the PADER by Schindler.  Schindler removed contaminated soil along the concrete pad.  During the sampling necessary to verify this cleanup, a new area of TCE contamination was discovered that could be due to past spills or the former solvent remote fill line.

In the past, metal grates from the Plant's paint booths were cleaned on a concrete pad in the pumphouse area, located at the southwest corner of the Plant.  Caustic solutions with solvents were used to loosen excess paint build-up on the grates.  The loosened paint was then scoured off using a steam cleaner.  This is considered a potential source area due to the nature of operations whereby solvent-contaminated washwater may have been discharged directly into the environment.

At the railroad dock area, located at the north end of the Plant, solvent-coated metal chips and shavings that accumulated at the bottom of degreasing tanks were stored in metal bins prior to removal by truck for recycling. Information in EPA's files indicates that these bins had holes in the bottom to drain the solvent. This area is considered to be a potential source due to solvent drippings leaking out of the containers and migrating into thesubsurface environment.

The old waste drum storage area is located on the southern side of the building. Prior to 1981, drummed waste was stored in this area until shipped for disposal. This is considered to be a potential source due to the possibility of spills. The transcript of the lawsuit Merry vs Westinghouse Electric Corporation, Civil Action No. 86-1673(M.D.PA) contains testimony regarding several major spills in this general area.

In addition to the above-listed potential sources, the former pond area, located on the eastern side of the Plant is considered a potential source based on the soil analyses.  This area may have become contaminated by migration of contaminants from the pumphouse and railroad loading docks along a subsurface channel in the bedrock surface identified in the RI report. Westinghouse has alleged that some drums may have been disposed in the pond before their ownership, but no information has been supplied to EPA to support this assertion.

INVESTIGATIONS

Investigations of alleged environmental problems related to the Site were initiated in 1983, based on complaints from local residents to the Pennsylvania Department of Environmental Resources (PADER).  PADER representatives visited the Plant in 1983 and collected samples from the Plant irrigation well and from neighboring residential wells.  Chemical analyses of these samples confirmed the presence of Volatile Organic Compounds (VOCs) including TCE and TCA in the on-Plant and off-Plant ground water.  Analysis of residential well samples continued until alternative water supplies were provided by Westinghouse.  The residential well sampling indicated widespread contamination throughout the area bounded by Biglerville, Table Rock and Boyd's School Roads.

In October 1983, PADER sampled two suspected source areas on the Plant property including soils from the railroad dock and surface water samples from the old waste drum storage area.  Chemical analysis by both PADER and Westinghouse indicated the presence of volatile organics in surface water, ground water, and soil samples from the Site.  In November 1983, Westinghouse initiated the removal of 10 drums of contaminated soil from the railroad dock area and 33 drums of contaminated soil from the pumphouse area. The drums were manifested as a hazardous waste and were sent to a secure landfill in New York State. Figure 3 - Appendix B shows these areas.

In January 1984, Westinghouse contracted R.E. Wright to serve as a consultant. During 1984, Wright collected additional water and soil samples from various locations at the Site, installed fifteen monitoring wells and conducted a pump test.

In 1984, Westinghouse installed water mains along Biglerville Road and a portion of Boyd's School Road to provide residents with access to the public water supply. Since 1984, Westinghouse has installed additional mains along stretches of Boyd's School Road, Cedar Avenue, Maple Avenue, and Apple Avenue. Westinghouse also installed monitoring wells and sampled ground water from these wells during this time. The extent of the waterlines is shown in figure 2 - Appendix B.

In June 1984, Westinghouse installed and began to extract ground water at the Site and to operate an air stripping tower to remove TCE and other VOCs from ground water. At a later time, PADER ordered Westinghouse to continue the operation of the stripping tower, but Westinghouse contested the Order.
The stripper has been shut down several times for various reasons and then restarted. The stripper has generally been in operation since February 1989 and currently treats about nine gallons per minute of contaminated ground water. The stripper discharges to the Northern Tributary, a stream alongBoyd's School Road, and is regulated by a National Pollutant Discharge Elimination System (NPDES) permit.

On March 10, 1987, Westinghouse entered into a Consent Agreement with EPA to perform a Remedial Investigation and Feasibility Study (RI/FS) of the Site. The Remedial Investigation was completed in two phases: a) Phase I determined the Site contaminants and hydrogeology and b) Phase II investigated the extent of contamination. The Phase II Remedial Investigation Report was completed on July 2, 1991 and a draft Feasibility Study was submitted to EPA in October 1991, which needed substantial modifications. Additionally, finalization of the report was further delayed by the need to investigate soil contamination from a TCA spill which occurred on May 3, 1991, at which time, Schindler Elevator Corporation was operating the Plant. Schindler Elevator removed contaminated soils and sampled the area to verify the cleanup at PADER's request. This area needs additional sampling and study before a remedial action decision can be made on the soil. Therefore, to avoid further delay in the ground water cleanup,
EPA has allowed Westinghouse to submit a revised Feasibility Study that only addresses sediments, surface water, and ground water at the Site. A supplementary (FS) for soils will be issued in the future and a separate Record of Decision (ROD) will be issued for soils at the Site.

## CERCLA ENFORCEMENT

An initial PRP search identified only Westinghouse as a Responsible Party and only Westinghouse was issued a General Notice letter for the RI/FS. However, the TCA spill at the Plant that occurred in May 1991, prompted EPA to issue a General Notice letter to Schindler Elevator Corporation.

Currently, there is ongoing litigation between the PADER and Westinghouse Electric Corporation regarding contamination at the Site. During this litigation, Westinghouse has questioned the basis for their liability, however, EPA considers the Westinghouse Plant operations to be the primary source of ground water contamination at the Site.

## III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and Proposed Remedial Action Plan (Proposed Plan) were released for public comment as part of the administrative record file on April 17, 1991, in accordance with Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G) of CERCLA, 42 U.S.C. SS9613 (k) (2) (B), 9617 (a), 9621 (f)(1)(G). These and other related documents were made available to the public in both the administrative record file located in Region III Offices and at the Adams County Public Library; a notice of availability was published in the Gettysburg Times and The Hanover Evening Sun on April 17, 1991. A public meeting to discuss the Proposed Plan was held on May 6, 1991 in Cumberland Township, Pennsylvania. The comment period was extended at the request of a nearby resident until June 17, 1992. EPA's response to all comments on the Proposed Plan and related documents received during the comment period is included in the Responsiveness Summary in this ROD. In addition, a copy of the transcript of the public meeting has been placed in the administrative record file and information repository.

## IV. SCOPE AND ROLE OF RESPONSE ACTION

The Principal Threat at the Site is from Dense Non-Aqueous Phase Liquids (DNAPLs) that have migrated into fractured bedrock beneath the water table at the Site and the highly contaminated ground water associated with the DNAPLs.

The only significant threat to human health and the environment, identified by the RI, is from domestic use of contaminated ground water. The overall remedial goals for all Site media relate to this threat. The scope and role of the selected alternative addressing on-Plant ground water is to prevent migration of all contaminated on-Plant ground water to the extent technically practicable, especially ground water in contact with DNAPLs, to off-Plant residential wells. The scope and role of the selected alternative addressing off-Plant ground water is the prevention of migration of all of the less contaminated ground water past the area served by public water and the restoration of the off Plant ground water to health based levels (MCLs/MCLGs). The capture zone of both the on-Plant and off-Plant wells will attempt to contain all ground water contaminated above non-zero MCLGs and MCLs, except in the area of the stagnation zone as explained in the description of the selected alternative section.

Soils at the Site were studied during the Phase II investigation and the Risk Assessment did not identify any direct exposure risk to employees or residents, because the contamination is several feet below the surface. However, contaminants may be leaching from subsurface soils, therefore contributing to ground water contamination. Additionally, the recently discovered area of soil contamination near the degreasing fluid storage tank (figure 3Appendix B) needs additional study and assessment. Contaminated soils will be addressed in a subsequent Proposed Plan and Record of Decision (ROD). When EPA addresses problems at a site in more than one ROD, EPA calls each ROD an Operable Unit. Sediments, surface and ground water will be considered Operable Unit One and the following ROD for soils will be considered Operable Unit Two. EPA considers this a final action ROD for Operable Unit One (ground water), but not a final action for the Site.

## V. SUMMARY OF SITE CHARACTERISTICS

### GENERAL

The Westinghouse Plant is located on approximately 90 acres of land along the west side of Biglerville Road (Route 34), approximately 1.5 miles north of downtown Gettysburg in Cumberland Township, Adams County, Pennsylvania (figure 1 - Appendix B). The Gettysburg area has no large rivers nearby and is very dependent on ground water. Yields from wells in the Gettysburg Formation are relatively low and the area is experiencing substantial development placing continuing pressure on the current municipal water supply. The area has three Superfund sites including the Hunterstown Road Site, the Shriver's Corner Site and the Westinghouse Elevator Co. Plant Site. Additionally, a RCRA Site in downtown Gettysburg contaminated several of the municipal wells which were shut down. Before the contamination was discovered at the Westinghouse Plant Site, the adjacent residential areas used private wells for full domestic use. These areas are now served by water lines, but some residents have refused to use public water and some residents use their wells for watering gardens.

Prior to its current use, most of the Plant property consisted of farmland. A farm pond, approximately two acres in area, existed on the property near what is now the main entrance to the Westinghouse Plant. The Westinghouse Plant was constructed in 1968 for the manufacture of elevator and escalator components by Westinghouse. Since January 1989 the Plant has been leased and operated by the Schindler Elevator Corporation.

The manufacturing processes at the Site consist of several steps: parts delivery and unloading; metal parts degreasing; Triclene phosphatizing; primer and finisher paint booth operations; oven drying; acoustical coating; machining and sawing; adhesive application; final assembly; and shipping. Chemical feed materials used in some of these operations include solvents, paints, cutting and lubricating oils, and insulation board. Trichloroethene (TCE) was the primary solvent used at the Site until 1975 at which time 1,1,1trichloroethane (TCA) was substituted.

### LAND USE

The Plant is bounded to the south by property that is part of the Gettysburg Battlefield National Park (Figure 2 - Appendix B). The National Park Service (NPS) is concerned about the limitations that the Westinghouse Plant contamination may place on their ability to site a large well on park property. The NPS is also concerned about the potential to contaminate a residential well, just south of the Plant, and currently used by NPS employees. This well was tested and only a trace of solvents was detected and the level was far below drinking water standards (less than 1 ppb TCE).

Adjacent to the Plant property and north and east of the Plant are residential and small commercial properties. The closest private residences are approximately 200 feet east of the Plant along Biglerville Road. A residential area is to the west of the Plant about 1000 feet from the Plant building. Ground water is the only source of potable water in the area and residents near the Site are dependent on municipal or private wells. EPA's Ground Water Protection Strategy classifies aquifers based on the following criteria:

1) Special Ground Water - Class One - Highly vulnerable ground water that is irreplaceable with no alternative source of drinking water available to substantial populations.

2) Current and Potential Sources of Drinking Water - Class Two Class IIA is water currently used and Class IIB is water that could potentially be used.

3) Ground water not a potential source of drinking water because of quality.

EPA considers this source of drinking water to be a class IIA aquifer. It is estimated that the total population within a three mile radius that uses ground water from the same hydrogeologic formation is 11,600.

## TOPOGRAPHY

The regional topography in the area of the Site is low to medium relief, undulating terrain. Specifically, the Site slopes moderately to the east, toward Rock Creek, dropping in elevation from 600 feet above mean sea level (MSL) in the west to 525 feet above MSL in the east.

### Regional Geology

Prior to the Plant construction the natural soils were classified by the U.S. Soil Conservation Service as part of the Penn-Readington-Croton association. These soils are gently to moderately sloping, shallow to moderately deep shaley soils derived from the underlying Triassic red beds. These natural soils were disturbed due to Plant construction activities. Based on geotechnical information and summaries made by Paul C. Rizzo Associates (PCR), a majority of the soil underlying the Plant is fill material with a mixture of grain sizes from clay to boulders. Some natural soil was encountered, with bed thicknesses between two and four feet.

The Site is located within the Gettysburg Basin, one of a number of discrete elongate sedimentary basins parallel to the Appalachian orogen in eastern North America. These basins are of early Mesozoic age (Late JurassicEarly Triassic) and are comprised largely of continental clastic rocks and accompanying basic intrusive and extrusive igneous rocks (Froelich and Olsen, 1985). Geology local to the Site appears to unmetamorphosed sedimentary rock. The sedimentary rocks underlying the Plant are mapped as the Heidlersburg member of the Gettysburg Formation. The Heidlersburg member is described as a lacustrine (lake deposited) series of red and gray arkosic sandstones, red mudstones, and dark gray sandstones and shales (Root, 1988). Site investigations have mapped the underlying stratigraphy as being comprised of red and gray siltstones and shales overlain by approximately two to ten feet of red to brown clay. Bedrock is generally fractured and weathered in the upper fifty feet and is encountered two to ten feet below ground surface (Rizzo, 1991).

### Regional Hydrogeology

Ground water in the vicinity of the Site is stored in and transmitted through a complex system of interconnected fractures consisting of bedding planes and steeply dipping joints. Investigations have shown that there exists two flow regimes (shallow and deep).

The shallow regime consists of the localized saturated soils and weathered bedrock. Groundwater flow direction in this regime is generally to the east-southeast towards Rock Creek and is primarily influenced by local topography, but bedding planes still produce some anisotropic influence. The approximate ground water gradient in the shallow regime is about 0.03 ft/ft. Net permeabilities from packer tests for this zone ranged from 6 x 10[-6] to 5 x 10[-3] cm/sec.

The deep regime is below weathered bedrock and flow direction is much more complicated and is strongly influenced by the structure of the geology. A multilayered "sandwich" of alternating shale and siltstones dips to the northwest downward about 23 degrees (Figure 4-Appendix B). Water flows primarily within the fractures in the siltstone layers which are the water bearing units between the relatively impermeable shale layers. The shale layers tend to confine the water but some vertical fractures allow water to "leak" from one siltstone layer to a deeper layer. Based on results of the Remedial Investigation and review of other literature, it is estimated that contaminated ground water moves through a complex network of fractures to the northeast. The flow is highly anisotropic with the highest permeability to the north-northeast and the ground water gradient to the east. The general ground water flow direction is the vector result of the direction between the permeability and the direction of the ground water gradient producing a flow to the east-northeast. This direction is consistent with the shape and axis of the contaminant plume. However, the exact pathway taken by the deep ground water, as it moves to the east-northeast, has not been defined. The wells that will be installed to implement the off-Plant remedial action should resolve the remaining hydrogeological questions. The permeabilities in this formation are strongly directionally dependent, with highest permeabilities along strike. Net permeabilities from packer tests ranged from 6 x 10[-6] to 3.3 x 10[-3] cm/second. The approximate ground water gradient in the deep zone was about 0.02 ft/ft.

Another complication to the hydrogeology is the large number of residential wells to the east of the Plant. Although the shale layers tend to confine the ground water into water bearing "units", the open boreholes of residential wells may link many of these units once ground water moves off-Plant.

EPA believes that Rock Creek is the ultimate discharge point for contaminated ground water since Rock Creek is the only large stream that drains the Gettysburg basin.

Known or Suspected Sources of Contamination

After a review of Plant processes and extensive remedial investigations at the Site, at least six potential sources of contamination have been identified. During Phase I and Phase II investigations, soil samples were obtained and analyzed from these areas. The laboratory results indicated that the following contaminants were detected at each area:

- Former solvent remote fill line (fill connection) - None Detected in Phase I, but contaminants in this area have recently been detected by Schindler Elevator Corporation. Possible source - needs additional study.

- Degreasing solvent storage tank - Possible source that needs additional study.

- Pumphouse area- 1,1-dichloroethane (89 ppb) and 1,1,1trichloroethane (432 ppb) during Phase I. Contamination not detected in Phase II boring.

- Railroad dock- Contaminated with VOCs before removal Xylenes (total) (5,100 ppb) detected during Phase II.

- Old drum storage area- None Detected

- Former pond area- trichloroethene (300 ppb); 1,1,1trichloroethane (69 ppb); 1,1-dichloroethane (73 ppb); 1,2-dichloroethane (19 ppb); 1,1-dichloroethene (73 ppb); and 1,2-dichloroethene (total) (97 ppb) during Phase II.

The solvents TCE and TCA are heavier than water and will dissolve only very slowly in ground water. When large amounts of these solvents are spilled they sink through the ground water as a separate phase until they are trapped by solid rock or the bottom of a fracture. They then will dissolve into ground water over many years. These solvents are called Dense Non-Aqueous Phase liquids (DNAPLs). EPA believes that DNAPLs have migrated through the soil into bedrock at the Westinghouse Plant beneath the water table and that this is the primary source of ground water contamination. It is impossible to calculate or estimate the amount of DNAPLs present in the bedrock.

Identified Compounds of Interest

Based on the Remedial Investigations, Compounds of Interest (COI) for groundwater contamination at the Site have been identified. The COI are trichloroethene, 1,1,1-trichloroethane, 1,1-dichloroethene, 1,1dichloroethane, 1,2-dichloroethene, and 1,2-dichloroethane. Trichloroethene is moderately toxic to humans by ingestion and inhalation and is considered a probable carcinogen. 1,1,1-trichloroethane is moderately toxic to humans by ingestion, inhalation, skin contact, subcutaneous (beneath the skin) and intraperitoneal (space between membrane that lines interior wall of abdomen and covers abdominal organs) routes and is currently not considered a carcinogen. 1,1-dichloroethene is a poison by inhalation, ingestion, and intravenous routes; moderately toxic by subcutaneous route; and is currently considered to be a possible carcinogen. 1,1-dichloroethane is moderately toxic by ingestion and is a suspected carcinogen. 1,2-dichloroethene is a poison by inhalation, ingestion, and intravenous routes; moderately toxic by subcutaneous route; and is currently not considered to be a carcinogen. 1,2-dichloroethane is a poison by ingestion; moderately toxic by inhalation and subcutaneous routes; and is considered a probable carcinogen (Sax and Lewis, 1989).

Contaminant Fate and Transport

The primary transport pathway of COI at the Site to off-Plant areas is through ground water migration. Ground water migration of COI appears to be their desorption from solids in potential source areas and their subsequent infiltration into ground water and more importantly, diffusion into ground water from DNAPLs. Once in ground water, they are advected and dispersed.

Ground water in the shallow zone (0-50 feet) flows with the topography to the east-southeast and will carry Site contaminants toward residents to the east-southeast of the Site. The contaminated ground water may move into the deeper zone or be dispersed, explaining the limited extent of the shallow plume.

Ground water in the deeper zone flows to the east-northeast and could be drawn to the north-northeast along strike by wells in a bedrock unit. In general, the ground water will move towards the northeast to residential wells in this area (Figure 2-Appendix B). The extent of the plume in the eastnortheast direction will be further defined during the remedial design.

Trichloroethene slowly degrades in ground water sequentially losing a chlorine atom to form dichloroethane and finally vinyl chloride. TCAdegrades similarly to dichloroethane and finally chloroethane. Vinyl chloride and 1,1 - dichloroethene, two degradation products of TCE, are regarded as more potent carcinogens than TCE due to their high slope factor values. TCE that is not captured may eventually form these compounds.

Currently, the area surrounding the Plant is served by water lines, but in the past, the large number of residential wells in the area south of the Plant in the area near the intersection of Table Rock and Biglerville Roads (Figure 2 - Appendix B) may have drawn some of the Site contaminants to the south along strike to this area. Although EPA suspects that this may have happened, EPA cannot take action without data that links the low levels of contamination in this area with the currently identified plume.

Any VOC-contaminated ground water discharging to streams would be substantially diluted and the VOC contaminants would quickly leave the surface water to air where they would be further diluted and dispersed.

All soil contamination detected recently was in the subsurface where human receptors cannot come into direct contact with the contaminants. The contaminants can, however, leach into ground water.

Extent of Contamination

An extensive ground water investigation has been completed at the Plant Site which consisted of drilling, constructing and sampling seventeen monitoring wells in Phase I of the RI. The wells were logged during drilling and various geological tests were performed during drilling to help define the Site geology. An additional eleven wells were drilled and constructed during Phase II and all twenty-eight wells were sampled. Well locations are shown in figure 5-Appendix B.

On-Plant ground water is currently highly contaminated with up to 20,000 parts per billion VOCs, consisting of the contaminants listed above. Table 1 -Appendix C summarizes laboratory results for ground water samples with contaminants above detection limits. The estimated extent of the ground water plume at deep and shallow depths is shown in Figures 2 and 6 (Appendix B). The shallow wells are about 40 to 100 feet deep and the deep wells about 100 to 300 feet deep.

Off-Plant ground water directly east of the Plant and between Table Rock Road and Biglerville Road had TCE levels above federal drinking water standards Maximum Contaminant Levels (MCLs), 40 C.F.R. S141.61 and Maximum Contaminant Level Goals (MCLGs) 40 C.F.R. S141.50. In the June 1989 Phase I RI, Table 1-4 shows pre-RI TCE levels in well MW-1 at a level greater that 81,000 ppb of TCE and a pre-RI off-Plant residential well at a level of 1,000 ppb of TCE. The highest contaminant level found during the EPA Remedial Investigation in on-Plant and off-Plant ground water is compared to the federal drinking water standards below.

Based on these high levels of ground water contamination, and the Site history, EPA believes that Dense Non-Aqueous Phase Liquids are present in the bedrock on the Plant property. DNAPLs are liquids which are heavier than water and form a separate phase, such as oil and water. These liquids sink through ground water and continue downward through cracks in bedrock until the liquid is trapped. The trapped DNAPLs slowly dissolve into the ground water over a very long period of time. At the Westinghouse Site, DNAPLs would be composed primarily of TCE and TCA. Separate phase DNAPLs have not been observed in any wells or borings, but are almost certainly present considering the high VOC concentrations and persistence of the contaminant levels in on-Plant ground water for over eight years.

Numerous homes are present east of the Plant in the area bounded by Biglerville, Boyd's School and Table Rock Roads. Site contaminants in ground water above MCLs have been detected within this bounded area. This entire area is serviced by a public waterline and all residents in this area have been offered the opportunity for connection to the waterline at Westinghouse's expense (Figure 2-Appendix B).

Many homes are located north of the Plant across Boyd's School Road and are dependent on residential wells. Several residential wells in the area bounded by South Avenue, Meadow Lane, North Avenue, and Biglerville Road have been tested recently and Site contaminants have not been detected.

Homes on Table Rock Road north of Boyd's School Road are dependent on residential wells. Several residential wells in this area were recently sampled. The laboratory results for these samples did not indicate the presence of Site contaminants in the ground water.

Homes to the west of the Site should not be affected because Site groundwater flow direction is to the east in the shallow zone and to the northeast in the deeper zones away from these homes. Wells in this area were sampled in 1983 by PADER and Site contaminants were not detected. Additionally, monitoring wells to the west of the Site did not detect contamination during the Phase II of the RI.

Surface water and sediment samples were collected at the locations shown in Figure 7-Appendix B and the detailed analytical results in tables 2 and 3 Appendix C. Although some 1983 samples did detect VOCs in these streams, the more recent RI laboratory results indicated that the Northern and Eastern tributaries are not currently significantly affected by volatile organic compounds. The Eastern Tributary may be receiving very low levels of TCE, but the dilution in the stream and volatilization probably reduces any contamination below detection limits. The only RI surface water sample that contained Site related VOCs was sample SW-1, from 1990, at a level barely above drinking water standards and a duplicate sample contained none. The Phase II samples did not detect Site related VOCs. Metals levels were within acceptable levels and appear to be background levels. A compound N-nitososodi-npropylamine was detected in one sample at 40 ppb, but was not found in the ground water or in any Site soil samples. A possible source of the very low and questionable level of past VOC contamination is considered to be either seepage from the Former Pond area that is intercepted by a storm drain discharging to the Eastern Tributary or by seasonal shallow ground water discharge.

Many residential well samples were collected in the area near the Plant and analyzed by the PADER between 1983 and 1986. These samples showed widespread contamination in the area bounded by Biglerville, Table Rock and Boyds School Roads. During the development of the Sampling and Analysis Plan, EPA tried to convince Westinghouse that the residential wells should be resampled as part of the Phase II investigation. The monitoring well network proposed by Westinghouse did not address the contamination found in the triangle southeast of the Plant and bounded by Biglerville, Table Rock Roads and Apple Avenue. Westinghouse declined this sampling effort and argued that they were willing to extend the well network as needed to define the contaminant plume from the Plant but they were unwilling to perform widespread sampling for fear that they might find contamination unrelated to the Plant. Westinghouse argued that some residents may have contaminated their own wells with commonly available solvents such as brush cleaners that they may have disposed into their septic systems (The Commonwealth of Pennsylvania has informed EPA that it believes that this area near the intersection of Biglerville Road and Table Rock Road has had sewer service from the mid 1960s.). Westinghouse further argued that professionally installed monitoring well data was far more useful that open borehole residential well data.

EPA finally agreed to a proposal to place several monitoring wells to the southeast of the Plant in the general direction of the Apple Avenue area. EPA expected that contamination would be found in these wells and that additional wells would be needed further to the southeast in the Apple Avenue area. The RI results did not support this expectation, however, EPA suspects that before the waterlines were installed, the numerous wells in the Apple Avenue area may have drawn contamination to this area. If this were true, EPA expects that contaminant levels in the Apple Avenue area would have declined due to natural attenuation. EPA's contractor, Dynamac, sampled two wells in this area that had previously been sampled by the PADER in 1986. The results seem to support this hypothesis, but no firm conclusion can be made regarding the past source of contamination.

| Residence | 1986 | 1991 |
|---|---|---|
| Resident 1 | 100 ppb TCA<br>0.7 1,1 DCA | non detected |
| Resident 2 | 4 ppb TCE<br>0.7 TCA<br>0.9 PCE | 2.0 TCE |

EPA's RI data does not support taking action for this area, however, if the wells installed during the Remedial Action indicate a continuous plume that extends to the Apple Avenue area, the remedial action will encompass this area.

Analysis of the sediment samples in both Phase I and Phase II did not detect Site related VOCs, but did detect various semivolatiles which were attributed to runoff from nearby paved areas. One sample taken near the culvert that carries the eastern tributary just east of Route 34, contained elevated levels of Poly Aromatic Hydrocarbons (PAHs). PAHs are found in the asphalt used to coat roads, coal tar and automobile/truck exhaust. A focused study was conducted to identify the source of the PAHs. The high levels were only found in the area near the culvert and the road, and quickly decreased downstream. Westinghouse also found high levels in the drainage system from their parking lot which had recently been resurfaced. EPA concluded that these levels were from the parking lot resurfacing and were not related to waste disposal. Also, some of the PAHs are certainly due to road runoff. Zinc and lead were also somewhat elevated in SD-1, but these levels pose little risk to human health, are probably attributable to road run-off and attenuate quickly downstream.

Runoff was collected from the Plant roof and storm drains, but contamination was not detected. The

Westinghouse Plant emitted substantial VOCs from a roof vent and the roof samples were taken to determine if TCE mist could be a source of contamination during rain. The total VOC emissions from the Plant were less than 100 tons per year and therefore the Plant was exempt from the Clean Air Act which at that time only regulated major sources of organic emissions (greater than 100 tons per year). Schindler Elevator Corporation has since installed equipment to capture these vapors.

Based on these results, EPA does not plan to remediate surface waters or sediments at the Site.

Soil contamination will be further defined and discussed in a future Record of Decision.

## VI. SUMMARY OF SITE RISKS

### Overview

As part of the Remedial Investigation performed for the Westinghouse Plant Site, a risk assessment was conducted to evaluate the potential impacts of the Site on human health and the environment. Compounds of interest were identified separately for four environmental media: ground water, surface water, sediments and soil. The risks potentially associated with exposure to these chemicals for each media were assessed. In summary, the risks which will affect remedial planning are associated with ingestion of carcinogenic chlorinated aliphatics in ground water. Under the assumed conditions, exposure to soils, surface water and sediments were not associated with risks in excess of EPA target levels.

Potential risks to human health were identified by calculating the risk level or hazard index for each compound of interest. Carcinogenic risks were calculated as the lifetime incremental upper-bound risk (probability) of developing cancer as a result of being exposed to the chemicals of concern under the assumed conditions. Risk for noncarcinogens were evaluated relative to a chronic reference dose (RfD), which is an EPA estimate of a daily exposure level for the human population that is likely to be without an appreciable risk of deleterious health effects during a lifetime. The ratio of the estimated dose to the RfD for each compound of interest is called the hazard index. If the hazard index exceeds one (1.0), there may be concern for potential systemic effects. As a rule, the greater the value of the hazard index above 1.0, the greater the level of concern. The Risk Assessment uses a statistical analysis concept called Reasonable Maximum Exposure (RME) to predict the highest reasonable expected concentrations that a receptor might be exposed to for use in the Risk Assessment. In calculating the risks at the Site, the exposures evaluated assume more extensive contact with the Site contaminants than is probably occurring, or is likely to occur in the future. This concept produces a conservative estimate of risk which is protective of receptors including sensitive sub-populations.

Standard EPA methodologies were used in the Risk Assessment for exposure times, Chronic daily intake factors and key risk exposure factors. Toxicity information was obtained from the IRIS and HEAST toxicological data bases. The Risk Assessment was reviewed and certified by the EPA Sitetoxicologist.

### Exposure Media

Soils and ground water are the media of concern at the Site. Although there are two streams near the Site (tributaries of Rock Creek) they are intermittent streams that are dry much of the year, and the sediments and surface water therein were not considered media of concern for the human health risk assessment.

### Compounds of Interest

Waste materials generated at the Plant included spent solvents, paint sludges, and spent oils. The following compounds of interest were identified:

- target compound list (TCL) volatiles;
- bis(2-ethylhexyl) phthalate; and
- polychlorinated biphenyls (in pumphouse soils only and at very low levels)

### Exposure Assessment

Current and future land use scenarios were considered. Under both scenarios, workers were considered the population of concern on-Plant, while nearby residents and distant residents were the populations of concern off-Plant.

On-Plant workers were assumed to be exposed to Site contaminants via direct contact with (including incidental ingestion of) surface soils. Because the contaminated soils are within the Plant boundary and below the surface, there was assumed to be no soil direct contact exposure pathway for the public. Please note that a supplementary FS for soils will be issued in the future and separate Record of Decision will be issued for soils at the Site.

The off-Plant ground water was evaluated for several risk scenarios. The first risk scenarios assume the use of near-Plant ground water for drinking, showering and watering gardens combined, and also, just from watering gardens. The second set of risk scenarios assume the use of distant off-Plant ground water for drinking, showering and watering gardens and also, just from watering gardens. The third set of risk scenarios assume the use of distant off-Plant water in the future for drinking, showering and watering gardens and also, just from watering gardens. Each set of risk scenarios was evaluated for the risk to adults, children and young children. Additionally, the third set of risk scenarios assume that the ground water contamination increases to the much higher levels of near-Plant ground water.

### Site Risk Characterization

Under the assumed exposure conditions, the highest estimated risks from exposure to Site contamination are the potential cancer risks associated with use of contaminated ground water by near-Plant residents. Most of the risk (99%) is associated with ingestion and shower-room inhalation of 1,1dichloroethene and trichloroethene in groundwater. Assumptions regarding potable water and irrigation uses of groundwater produced estimated lifetime excess cancer risks between 3 x 10[-4] and 6 x 10[-5] for off-Plant residents.

A subsequent Proposed Plan will detail the risks due to Site soils. It should be noted, however, that the only VOC contaminated soils ever detected were adjacent to the Westinghouse Plant Building, which is on private property, and that exposure of residents or children to these soils would be of very limited duration, even if trespassing occurred. Soils have been removed from the pumphouse area and the railroad loading dock. These areas were sampled in Phase II and no contamination was detected. The contaminated soil in the pond area is deep and poses no risk from contact with surface soil in this area. The courtyard area is still under investigation, but is in an area not accessible to the public. None of these areas evaluated in the Risk Assessment posed a direct contact risk to the public even if exposure occurred. The estimated risks associated with direct contact with on-Plant surface soils were very low (approximately 2 x 10[-7]).

### On-Plant ground water

VOCs in ground water at the Site are above the Maximum Contaminant Level (MCL) allowed in potable water by the Safe Drinking Water Act. For example, the most contaminated well on-Plant contained 20,000 parts per billion (ppb) TCE and the most contaminated off-Plant well contained 230 ppb TCE. The MCL for TCE is 5 ppb. The on-Plant ground water would be associated with cancer risk levels several orders of magnitude in excess of EPA's target risk levels if it were used for drinking water. This water is not used currently for drinking water and a deed restriction will prevent its use for drinking water in the future.

### Off-Plant groundwater

The results of the risk assessment for off-Plant ground water can be summarized as follows:

a) Watering gardens under any scenario did not pose a risk in excess of EPA target levels to the public and risks were quite low. The excess cancer risk varied from a high of 3 x 10[-7] to a low of 8 x 10[-8]. In other words, the highest increased cancer risk from watering gardens was less than one in three million.

b) An assumption of full domestic use of groundwater posed an increased cancer risk that was outside of EPA's target risk range. The increased cancer risk varied from a high of 3 x 10[-4] for near-Plant resident adults to a low of 1 x 10[-4] for distant off-Plant resident children. Acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 1.0 x 10[-4] and 1.0 x 10[6] or one in ten thousand to a one in one million chance of developing cancer.

SUMMARY OF POTENTIAL CANCER RISKS AND HAZARD INDICES FOR RECEPTORS AT THE Plant

| Receptors | Current Land Use Scenario Cancer Risk | Current Land Use Scenario Hazard Index | Future Land Use Scenario Cancer Risk | Future Land Use Scenario Hazard Index |
|---|---|---|---|---|
| On-Plant Maintenance Worker | 1.54E-07 | 0.00 | 1.54E-07 | 0.00 |
| Near-Plant RESIDENTS | | | | |
| Irrigation Use Only: | | | | |
| - Adults | 1.49E-07 | 0.00 | 1.49E-07 | 0.00 |
| - Children | 2.62E-07 | 0.00 | 2.62E-07 | 0.00 |
| - Young Children | 1.05E-07 | 0.00 | 1.05E-07 | 0.00 |
| Potable Water and Irrigation Uses: | | | | |
| - Adults | 2.71E-07 | 0.06 | 2.71E-04 | 0.06 |
| - Children | 2.30E-04 | 0.08 | 2.30E-04 | 0.08 |
| - Young Children | 1.19E-04 | 0.16 | 1.19E-04 | 0.16 |
| DISTANT Off-Plant RESIDENTS | | | | |
| Irrigation Uses Only: | | | | |
| - Adults | 7.60E-08 | 0.00 | 1.49E-07 | 0.00 |
| - Children | 1.34E-07 | 0.00 | 2.62E-07 | 0.00 |
| - Young Children | 5.35E-08 | 0.00 | 1.05E-07 | 0.00 |
| Potable Water and Irrigation Uses: | | | | |
| - Adults | 1.38E-04 | 0.03 | 2.71E-04 | 0.06 |
| - Children | 1.17E-04 | 0.04 | 2.30E-04 | 0.08 |
| - Young Children | 6.07E-05 | 0.08 | 1.19E-04 | 0.16 |

Relevant Risk Management Issues

The excess cancer risk levels for domestic use of groundwater are outside of EPA's acceptable risk range for both on-Plant and off-Plant ground water. Contamination in both on-Plant and off-Plant ground water is above the MCL's promulgated under the Safe Drinking Water Act. Either of these conditions is sufficient to require a Remedial Action for on-Plant and off-Plant groundwater. It is important to note that a public water line serves residents adjacent to the Plant and that there are no known receptors using contaminated ground water as a source of drinking water. There are however, some residents located in the area of concern that have been offered the opportunity to be connected to the water line and have declined the offer. Many residential wells are still in operation and are used for watering lawns and gardens. Future purchasers of the properties in this area may be unaware of the problem. Additionally, there exists a threat for possible human health risks if at sometime in the future, development occurs down-gradient of the Site with installation of new wells or if a change in the use of the adjacent National Park property occurs that could lead to the potential use of ground water as a major drinking water source.

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

ECOLOGICAL ASSESSMENT

Methods

Surface water and sediments of the tributaries to Rock Creek were considered the media-of-interest for ecological receptors. Soils at the Plant were not ecological exposure media because contaminated surface soils are within or near process areas at the Plant that are not likely exposure points for ecological receptors. Ground water was considered as a source of contamination based on the potential for ground water to discharge into the tributaries, but not as a direct contact medium.

Although several other chlorinated aliphatics were detected at low levels in ground water during Phase I, trichloroethene (TCE) accounted for 90 to 95% of total aliphatics in ground water and was the only compound detected in sediment or surface water samples at concentrations significantly above the detection limit. During Phase II, only non-Site related contaminants were detected in surface water. Acetone, carbon tetrachloride and chloroform are solvents used in analytical labs that are often found even in blanks (analysis of pure water). Therefore, TCE was chosen as an indicator chemical to evaluate potential toxicological effects to ecological receptors resulting from exposure to total chlorinated aliphatics.

A quantitative assessment of the toxicity of TCE in tributary surface water to aquatic organisms was conducted. Potential ecological effects to benthos under current conditions were assessed assuming interstitial pore water concentrations were the same as surface water concentrations. Possible future contamination of sediment interstitial pore water via ground water discharge and the potential toxic effects on benthic invertebrates were also evaluated. The potential effects of exposure to TCE in the tributaries by terrestrial vertebrates were evaluated qualitatively. No ecological effects were expected based on this evaluation. Aquatic toxicity tests, bioassays, and terrestrial surveys were deemed unnecessary based on the chemical sampling/analysis of surface water and sediments.

No critical habitats, wetlands or endangered species were identified at this Site, which is an industrial property in a developed surrounding.

Summary of Ecological Risk Characterization

Under current conditions, compounds of interest in surface water and sediments are below the threshold level for chronic or acute effects to aquatic and benthic organisms. Additionally, no risks are anticipated for terrestrial vertebrates that may come into contact with the streams.

Under future conditions, there is a potential for chronic effects for benthic organisms in the Eastern Tributary and Rock Creek if future interstitial pore water concentrations of chlorinated aliphatics reach the levels currently present in ground water near these surface water bodies. However, it is very unlikely that these concentrations will be reached in the interstitial pore water due to dilution and dispersion of the contaminants during migration. EPA's remedial action for ground water will address this very small risk.

## VII. SUMMARY OF ALTERNATIVES

The Superfund process requires that the alternative chosen to clean up a hazardous waste site meet two threshold criteria: 1) protect human health and the environment, and 2) comply with federal and state Applicable or Relevant and Appropriate Requirements (ARARS). EPA's primary balancing criteria for a selecting a remedial alternative are: long term effectiveness and permanence; short term effectiveness; reduction of volume, toxicity, or mobility of contaminants; cost effectiveness; and implementability. EPA's modifying criteria are State and community acceptance.

The Feasibility Study evaluated remedial alternatives for contaminated ground water on the Plant property separately from ground water which has migrated off-Plant. This was done since ground water beneath the Site is considerably more contaminated than off-Plant ground water and is in contact with DNAPLs. Since technology presently does not exist to effectively recover DNAPLs from fractured bedrock, cleanup efforts will be difficult. Additionally, ground water beneath the Plant is not used for human consumption, posinga risk only from future potential use which can be prevented by way of institutional controls (i.e. deed restrictions). Since off-Plant contaminated ground water has been shown to contain contaminants in lower concentrations and is probably not in direct contact with DNAPLs, cleanup efforts should be less difficult. Institutional controls such as deed restrictions on surrounding residential properties would be extremely difficult, if not impossible, to implement. For this section, ground water beneath the Site will be referred to as on-Plant ground water, and groundwater which has migrated past the Plant property boundaries will be referred to as off-Plant ground water. The Superfund Site encompasses all areas of contaminated soil and ground water.

The Feasibility Study reviewed a variety of technologies to see if they were applicable to the contamination at the Site. The technologies determined to be most applicable to these materials were developed into remedial alternatives. These alternatives are presented and discussed below. Many other technologies were reviewed and screened out. This screening process is fully detailed in the Feasibility Study in the administrative record. The treatment alternatives evaluated are well established technologies and treatability studies were not necessary.

Five on-Plant and five off-Plant alternatives were developed during this scoping study. These on-Plant and off-Plant alternatives can be combined to select a remedy for the Site. In addition, instead of alternatives that combine off-Plant and on-Plant responses, two overall Site-wide alternatives were developed that have a common treatment system. For the two SiteWide alternatives all off-Site extracted groundwater is piped on-Plant and treated along with the on-Plant extracted ground water. These two Sitewide alternatives provide options that avoid the construction and operation of a treatment facility off-Plant. All costs and implementation time-frames specified below are scoping estimates based on best available information. The Present Worth Cost is the total cost, in current dollars, of the remedy including capital costs and 30 years of operation and maintenance of the remedial action. Appendix B of the Feasibility Study presents detailed preliminary cost estimates for each of the remedial alternatives. The time frames to reach ground water cleanup goals are virtually impossible to predict at this Site. A 30 year operation cost estimate was used for both on-Plant and off-Plant. The "capture zone" (the area to which contaminated ground water will be drawn to) for on-Plant groundwater must be maintained until non-zero MCLGs and MCLs are maintained for twelve consecutive quarters. The capture zone is the entire area within which ground water is recovered through the extraction well network. The off-Plant extraction wells must operate until non-zero MCLGs or MCL levels are also reached and maintained for twelve consecutive quarters.

The "area of attainment" for both on-Plant and off-Plant ground water is the entire ground water contamination plume that has COI levels above non-zero MCLGs and MCLs, is related to the Plant property and can be captured with a technically practicable design as determined by EPA.

An EPA review of the Site every five years will be conducted to ensure continued protection of human health and the environment.

The following alternatives have been presented in the Proposed Plan as possible remedies at the Site:

On-Plant Alternatives

1) No Action
2) Limited Action/Institutional Controls
3A) Extraction and Peroxidation/UV Catalysis Treatment of Ground Water
3B) Extraction and Air Stripping of Ground Water - Carbon Treatment of Effluent Air Stream
4) Aquifer Restoration Off-Plant Alternatives

1) No Action
2) Limited Action/Institutional Controls
3A) Ground water Extraction with Aqueous Phase Carbon Adsorption Treatment
3B) Extraction and Air Stripping of Ground Water - Carbon Treatment of Effluent Air Stream
4) Aquifer Restoration

Site-Wide Alternatives

1A) Site-Wide Extraction System with On-Plant Peroxidation/UV Catalysis Treatment
1B) Site-Wide Extraction and On-Plant Air Stripping of Ground Water - Carbon Treatment of Effluent Air Stream

Below are descriptions of each of the presented remedial alternatives.

Common elements of all remedies except the no action and limited action alternatives: installation of additional monitoring wells, ground water monitoring quarterly for two years and annually afterwards, annual residential well sampling and analysis, and deed restrictions on the Westinghouse property.

On-Plant Alternative 1 - No Action

| | |
|---|---|
| Capital Cost | $ 0 |
| Annual Operation & Maintenance Cost | $ 22,500 |
| Present Worth | $ 401,000 |
| Months to Implement | 0 |

On-Plant Alternative 1 is a no action alternative. As part of this alternative, the ground water would be monitored quarterly for the next 30 years. The existing interim pumping and treatment system would not operate. The no action alternative evaluation, which is required by the National Contingency Plan (NCP), the EPA regulations that interpret the Superfund Act, is retained for comparison purposes. Under the no action alternative, there wouldnot be deed restrictions nor any other institutional controls. This alternative relies on natural environmental attenuation mechanisms such as dispersion and degradation to eventually decrease maximum VOC concentrations to below MCLs.

On-Plant Alternative 2 - Limited Action/Institutional Controls

Capital Cost $ 171,930

Annual O&M Cost $ 113,180

Present Worth $ 2,035,840

Months to Implement 6

The on-Plant limited action/institutional controls alternative for on-Plant ground water assumes that the existing interim pump and treatment scheme would continue. Two wells currently extract about 9 gallons per minute of ground water in front of the Plant.

The ground water treatment consists of air stripping in a packed column on the Plant Site. In air stripping, the volatile organic hydrocarbon contaminants in extracted ground water trickling down through the packed column are vaporized into air flowing up through the column. Carbon treatment of the effluent air stream from the column would be added to the existing stripper. This involves passing the air stream through activated charcoal which adsorbs the hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed and the effluent air stream must be periodically monitored to make sure the carbon is functioning. The frequency on monitoring would be determined by EPA during the Remedial Design. About two tons per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the current NPDES permit if possible. If a modified permit is required, during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

On-Plant Alternative 3A - Source Control/Management of Migration (SC/MM) Ground Water Extraction and Peroxidation/UV Catalysis Treatment of Ground Water

Capital Cost $ 910,151

Annual O&M Cost $ 251,480

Present Worth $ 4,858,600

Months to Implement 18

This alternative would employ extraction of contaminated on-Plant ground water using pumping wells. Source control is defined as pumping near the Plant building and Management of Migration is defined as pumping near the property boundary. The pumping system would be designed to capture all contaminated ground water at the Plant property technically practicable, as approved by EPA during Remedial Design.

Extracted ground water would be treated on-Plant by the peroxidation/UV catalysis process. This process involves the use of the strong oxidizing chemical hydrogen peroxide to convert undesirable chemical species by addition of oxygen. The process reduces the carbon in the aliphatic hydrocarbon chains, breaking down carbon-hydrogen and carbon-halogen bonds. Ultraviolet (UV) is used as a catalyst in the peroxidation process. As a result, complex and resistant chemical species can either be fully degraded to basic components such as carbon dioxide and water, or broken down to simpler, more easily degradable molecules. The discharged water would be periodically monitored for contaminants at a frequency determined by EPA during Remedial Design.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the current NPDES permit if possible. If a modified permit is required, during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume. This alternative captures most of the on-Plant VOCs for on-Plant treatment and disposal.

On-Plant Alternative 3B - SC/MM Ground Water Extraction and Air Stripping Treatment and Carbon Adsorption

Capital Cost $ 404,179

Annual O&M Cost $ 113,180

Present Worth $ 2,238,780

Months to Implement 12

This alternative would employ extraction of contaminated on-Plant ground water using pumping wells. Source control is defined as pumping near the Plant building and Management of Migration is defined as pumping near the property boundary. The pumping system would be designed to capture all contaminated ground water at the Plant property technically practicable, as approved by EPA during Remedial Design.

Ground water would be treated on-Plant using air stripping and carbon adsorption of contaminants from the air stream. The first stage of ground water treatment consists of air stripping in a packed column on the Plant Site. In air stripping, the volatile organic hydrocarbon contaminants in extracted ground water trickling down through the packed column are vaporized into air flowing up through the column. Carbon treatment of the effluent air stream from the column is the second stage of treatment. This involves passing the air stream through activated charcoal which adsorbs the hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed and the effluent air stream must be periodically monitored to make sure the carbon is functioning. About four tons per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of off-site as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the current NPDES permit if possible. If a modified permit is required, during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

On-Plant Alternative 4 - Attempted Aquifer Restoration

| | |
|---|---|
| Capital Cost | $ 3,164,955 |
| Annual O&M | $ 177,000 to $ 136,100 |
| Present Worth | $ 5,630,220 |
| Months to Implement | 24 |

This alternative would extract ground water from numerous wells located at the source areas, near the property boundaries, and parallel to the centerlines of the shallow and deep plume. As part of this process, a portion of the treated ground water would be re-injected into several wells upgradient of the plumes in an attempt to create a "flushing" affect of contaminated ground water, and the remaining treated ground water would be discharged to the Northern Tributary via the current outfall. The pumping system would be designed to capture all contaminated ground water at the Plant property technically practicable, as approved by EPA during Remedial Design. Additionally, this alternative attempts to capture and treat as much contaminated ground water as soon as possible in order to minimize the time required to effect total aquifer remediation. However, the time for aquifer restoration may only be shortened for the downgradient, more dilute portions of the aquifers, and not for the portions near the source areas.

Ground water would be treated on-Plant using air stripping and carbon adsorption of contaminants in the air stream. The first stage of ground water treatment consists of air stripping in a packed column on the Plant Site. In air stripping, the volatile organic hydrocarbon contaminants in extracted ground water trickling down through the packed column are vaporized into air flowing up through the column. Carbon treatment of the effluent air stream from the column is the second stage of treatment. This involves passing the air stream through activated charcoal which adsorbs the hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed and the effluent air stream must be periodically monitored to make sure the carbon is functioning. About five tons per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of off-site as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the current NPDES permit if possible. If a modified permit is required, during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

Off-Plant Alternative 1 - No Action

| | |
|---|---|
| Capital Cost | $ 0 |
| Annual O&M Cost | $ 37,700 |
| Present Worth | $ 635,240 |
| Months to Implement | 0 |

The no action alternative for off-Plant ground water assumes that no remedial actions will occur except for quarterly ground water monitoring and annual sampling and analysis of residential wells for 30 years. This alternative relies on natural environmental attenuation mechanisms such as dispersion and degradation to decrease maximum VOC concentrations to below MCLs with time. Evaluation of this alternative is required by the National Contingency Plan.

Off-Plant Alternative 2 - Limited Action/Institutional Controls

| | |
|---|---|
| Capital Cost | $ 1,339,663 |
| Annual O&M Cost | $ 39,400 |
| Present Worth | $ 2,001,040 |
| Months to Implement | 6 |

This limited action/institutional controls alternative for off Plant ground water assumes that alternate water supplies are extended to certain residents between the Site and Rock Creek, ground water monitoring would be performed quarterly for the 30-year project life, residential wells will be sampled and analyzed annually for the 30-year project life, and ground water use restrictions may be implemented.

Off-Plant Alternative 3A - MM Ground water Extraction with Aqueous Phase Carbon Adsorption Treatment

| | |
|---|---|
| Capital Cost | $ 1,573,265 |
| Annual O&M Cost | $ 118,150 |
| Present Worth | $ 3,473,350 |
| Months to Implement | 24 |

Contaminated ground water would be removed by extraction wells and treated off-Plant by aqueous phase carbon adsorption. The off-Plant extraction well system will be designed so that all contaminated ground water leaving the Site will be contained, as technically practicable, but the capture zone of the network will not be designed to fully extend to the Plant property to avoid drawing the highly contaminated ground water off-Plant. The actual extent of the capture zone would be approved by EPA during the Remedial Design.

The extracted ground water would be pumped through a bed of activated charcoal, which would adsorb the volatile organic hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed of properly and the effluent water must be periodically monitored to make sure the carbon unit is functioning adequately. About two hundred pounds per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of off-site as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via outfall. An NPDES permit would be required, and during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

This alternative is intended to capture off-Plant contaminated ground water for treatment and discharge and to remediate the off-Plant ground water.

Off-Plant Alternative 3B - MM Ground water Extraction with Air Stripping Treatment and Carbon Adsorption

| | |
|---|---|
| Capital Cost | $ 1,580,055 |
| Annual O&M Cost | $ 118,500 |
| Present Worth | $ 3,486,890 |
| Months to Implement | 24 |

Contaminated ground water would be removed by extraction wells and treated off-Site using air stripping and treatment of the air stream by carbon adsorption. The off-Plant extraction well system would be designed so that all contaminated ground water leaving the Site will be contained, as technically practicable, but the capture zone of the network will not be designed to fully extend to the Plant property to avoid drawing the highly contaminated ground water off-Plant. Since contaminants are in dissolved form and since the ground water is not expected to be in contact with DNAPLs, this pumping system should clean up the off-Plant ground water. The actual extent of the capture zone would be approved by EPA during the Remedial Design.

Ground water would be treated on-Plant using air stripping and carbon adsorption of contaminants in the air stream. The first stage of ground water treatment consists of air stripping in a packed column on the Plant Site. In air stripping, the volatile organic hydrocarbon contaminants in extracted ground water trickling down through the packed column are vaporized into air flowing up through the column. Carbon treatment of the effluent air stream from the column is the second stage of treatment. This involves passing the air stream through activated charcoal which adsorbs the hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed and the effluent air stream must be periodically monitored to make sure the carbon is functioning. About two hundred pounds per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of off-Plant as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via a new outfall. An NPDES permit would be required, and during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

This alternative is intended to capture off-Plant contaminated ground water for treatment and discharge and to remediate the off-Plant ground water to health based levels (MCLs/MCLGs).

Off-Plant Alternative 4 - Aquifer Restoration

Capital Cost $ 4,728,811

Annual O&M Cost $ 173,740 to 137,640

Present Worth $ 7,183,730

Months to Implement 24

Ground water would be extracted from wells located parallel to the centerlines and extremities of the shallow and deep off-Plant plumes. Alternative 4 includes several reinjection wells that would attempt to develop a flushing effect in the aquifer both on-Plant and off-Plant. This alternative attempts to capture and treat as much contaminated ground water as soon as possible in order to minimize the time required to effect total aquifer remediation. It would achieve the same objectives as alternatives 3A and 3B, but would achieve them sooner.

The extracted ground water would be pumped through a bed of activated charcoal, which will adsorb the volatile organic hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed of and the effluent water must be periodically monitored to make sure the carbon is functioning. About four hundred pounds per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of off-Site as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via a new outfall. An NPDES permit would be required, and during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

This alternative is intended to capture off-Plant contaminatedground water for treatment and discharge and to remediate the off-Plant ground water.

Site-Wide Alternative 1A - Site-Wide Extraction System with On-Site Peroxidation/UV Catalysis Treatment

Capital Cost $ 3,099,843

Annual O&M Cost $ 507,430

Present Worth $ 11,003,060

Months to Implement 24

This alternative consists of two separate capture zones for the on Plant and off-Plant ground water. "Capture Zone 1" consists of an area where ground water flows to the on-Plant pumping wells where it is collected. The pumping system would be designed to capture all contaminated ground water at the Plant property technically practicable as approved by EPA during Remedial Design. A second set of extraction wells will be placed near the edge of the contaminant plume (Figure 8 - Appendix B) and in the path of natural ground water flow from the Plant. Pumping rates in this set of extraction wells will be designed so that "Capture Zone 2" does not fully extend to the other capture zone. The off-Plant extraction well system would be designed so that all contaminated ground water leaving the Site will be contained, as technically practicable, but the capture zone of the network will not be designed to fully extend to the Plant property to avoid drawing the highly contaminated ground water off-Plant. A zone of slow moving water (Stagnation Zone) between the capture zones will result, but the pumping rates of the two systems can be varied to move the stagnation zone periodically so that the ground water in this zone is collected by the extraction wells. Any contaminated ground water escaping the onPlant wells should flow to the off-Plant extraction wells. The systems would be designed to try to capture all contaminated ground water and to remediate offPlant ground water. Extracted off-Plant ground water would be pumped to the Plant through a piping system and treated with the on-Plant ground water in a common treatment system.

Extracted ground water would be treated on-Plant by the peroxidation/UV catalysis process. This process involves the use of the strong oxidizing chemical hydrogen peroxide to convert undesirable chemical species by addition of oxygen. The process reduces the carbon in the aliphatic hydrocarbon chains, breaking down carbon-hydrogen and carbon-halogen bonds. Ultraviolet (UV) is used as a catalyst in the peroxidation process. As a result, complex and resistant chemical species can either be fully degraded to basic components such as carbon dioxide and water, or broken down to simpler, more easily degradable molecules. The discharged water would be periodically monitored for contaminants at a frequency determined by EPA during Remedial Design.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the current NPDES permit if possible. If a modified permit is required, specific discharge criteria will be established by the PADER during the Remedial Design. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume. This alternative captures most of the on-Plant VOCs for on-Plant treatment and disposal.

Site-Wide Alternative 1B - Site-Wide Extraction System with On-Site Air-Stripping Treatment and Carbon Adsorption

| | |
|---|---|
| Capital Cost | $ 2,119,710 |
| Annual O&M Cost | $ 141,930 |
| Present Worth | $ 4,403,730 |
| Months to Implement | 24 |

This alternative consists of two separate capture zones for the onPlant and off-Plant ground water. "Capture Zone 1" consists of an area where ground water flows to the on-Plant pumping wells where it is collected. The pumping system would be designed to capture all contaminated ground water at the Plant property technically practicable as approved by EPA during Remedial Design. A second set of extraction wells will be placed near the edge of the contaminant plume (Figure 8 - Appendix B) and in the path of natural ground water flow from the Plant. Pumping rates in this set of extraction wells will be designed so that "Capture Zone 2" does not fully extend to the other capture zone. The off-Plant extraction well system would be designed so that all contaminated ground water leaving the Site will be contained, as technically practicable, but the capture zone of the network will not be designed to fully extend to the Plant property to avoid drawing the highly contaminated ground water off-Plant. A zone of slow moving water (Stagnation Zone) between the capture zones will result, but the pumping rates of the two systems can be varied to move the stagnation zone periodically so that the ground water in this zone is collected by the extraction wells. Any contaminated ground water escaping the onPlant wells should flow to the off-Plant extraction wells. The systems would be designed to try to capture all contaminated ground water and to remediate offPlant ground water.

Extracted off-Plant ground water would be pumped to the Plant through a piping system and treated with the on-Plant ground water in a common treatment system.

Ground water would be treated on-Plant using air stripping and carbon adsorption of contaminants from the air stream. The first stage of ground water treatment consists of air stripping in a packed column on the Plant property. In air stripping, the volatile organic hydrocarbon contaminants in extracted ground water trickling down through the packed column are vaporized into air flowing up through the column. Carbon treatment of the effluent air stream from the column is the second stage of treatment. This involves passing the air stream through activated charcoal which adsorbs the hydrocarbons. Eventually, the carbon becomes saturated with contaminants and must be disposed and the effluent air stream must be periodically monitored to make sure the carbon is functioning. About four tons per year of spent carbon would be regenerated at a RCRA permitted facility or disposed of off-Site as a hazardous waste in accordance with RCRA regulations.

The treated ground water would be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the current NPDES permit if possible. If a modified permit is required, during the design of the ground water treatment system, specific discharge criteria will be established by the PADER. The system would continue to operate until non-zero MCLGs and MCLs in ground water are reached throughout the plume.

## VIII. Comparative Analysis of Remediation Alternatives

In this section the five on-Plant, five off-Plant, and two Sitewide remediation alternatives are compared to each other using the nine criteria that EPA uses in the decision making process.

Overall Protection of Human Health and the Environment: The best alternatives for overall protection of human health and the environment are onPlant Alternatives 3A and 3B, off-Plant Alternatives 3A and 3B, and SiteWide Alternatives 1A and 1B. These on-Plant alternatives and the onPlant component of the Site-Wide alternatives prevent the migration of highly contaminated ground water off-Plant and will eventually remediate the on-Plant ground water. The off-Plant alternatives 3A, 3B and the off-Plant components of the site-wide alternatives will prevent migration of moderately contaminated ground water from the area served by the water line and will clean up the off-Plant ground water. The accelerated aquifer restoration alternatives (on-Plant/offPlant 4) have a slightly lower ranking for this criterion than the other treatment alternatives, because the reinjection of ground water might spread contamination in unpredictable directions. These alternatives could also draw contaminated ground water off-Plant spreading the on-Plant highly contaminated plume. On-Plant Alternative 2 was rated poor because VOC-impacted ground water will continue to migrate off-Plant. Off-Plant Alternative 2 was rated as fair because of the extension of an alternative water supply to potentially affected residences. Alternatives that are not protective of human health and the environment include on-Plant Alternative 1 and Off-Plant Alternative 1, the no action alternatives.

Compliance with ARARs:

Only the aquifer remediation alternatives 4 might comply with the PADER ARAR to actively remediate on-Plant ground water to background. EPA plans to waive this ARAR on the basis of technical impracticability and presenting a greater risk to human health and the environment. The appropriate cleanup level will be set by non-zero MCLGs and MCLs.

Both the federal and state Safe Drinking Water Acts set minimum standards for drinking water supplied by municipal wells called Maximum Contaminant Levels (MCLs), which are enforceable federal standards. Maximum Contaminant Level Goals (MCLGs) are usually lower levels than MCLs that EPA attempts to achieve if possible. The ground water at the Plant Site is considered a Class IIA aquifer and non-zero MCLGs and MCLs are exceeded for both on-Plant and offPlant ground water. The no action alternatives would not comply with the state standards as set forth in 25 PA Code, Chapter 109 Subchapter B) or the federal standards (40 C.F.R. Part 141.61). Off-Plant and on-Plant alternatives 2 would also not comply with these regulations since contaminants would still escape from the Site and would continue to exceed MCLs. EPA normally takes action when MCLs are exceeded in a Class IIA aquifer. All other on-Plant and off-Plant alternatives would comply with this ARAR.

All of the Alternatives except the no action alternatives will discharge treated ground water to the northern tributary and would comply with the Water Quality Criteria (25 PA Code, SS93.1, through 93.9) or obtain a waiver from the State

All of the Alternatives except the no action alternatives will have air emissions from the carbon adsorber and would comply with the requirements set forth in 25 PA Code S127.12(a)(5), which requires that emissions be reduced to a minimum through Best Available Technology as defined in 25 PA Code S121.1). The alternatives would also comply with RCRA requirements of Subpart AA (Air Emission Standards for Process Vents) of the federal RCRA regulations, 40 C.F.R. 264.1032 are relevant and appropriate for the air stripping operations under the selected remedy. Under this ARAR, total organic emissions from the carbon adsorber must be less than 1.4 kg/hr (3 lb/hr) and 2800 kg/yr (3.1 tons/yr). These alternatives would also comply with the TBC OSWER Directive 9355.0-28 which requires control of hydrocarbon emissions in excess of 15 pounds per day in ozone non-attainment areas.

All of the Alternatives except the no action alternatives would discharge treated ground water to a stream (Northern Tributary) and would comply with the NPDES Regulations (25 PA Code, SS92.31, 92.41 and 92.55). These regulations give design, discharge and monitoring requirements for the stripper discharge. On-Plant alternative 3A might have difficulty complying with the NPDES permit because some compounds are resistant to UV oxidation.

On-Plant ground water is above the TCLP level (500 ppb) (25 PA Code Chapter 261 Subchapter C and 40 C.F.R. S261.24) and must be managed as a hazardous waste.

All of the alternatives except the no action alternatives and onPlant alternative 3A would produce treatment residuals (spent carbon) that must be managed as a RCRA hazardous waste. A scoping estimate of the amount of carbon disposed is about four tons per year. These residuals must be managed in compliance with applicable sections of the PA Solid Waste Act, 35 P.S. SS6018.101 through 6018.1003, which follow: 25 PA Code Part 262 Subparts A (relating to hazardous waste determination and identification numbers), B (relating to manifesting requirements for off-site shipments of spent carbon or other hazardous wastes), C (relating to pre-transportation of hazardous waste requirements), and with respect to operations at the Site generally, with the substantive requirements of 25 PA Code 264 Subparts B-D, I (in the event that hazardous waste generated as part of the remedy is managed in containers), J (in the event that hazardous waste is managed, treated or stored in tanks). The alternative implemented will also comply with the RCRA Land Disposal Restrictions set forth at 40 C.F.R. Part 268.1 to 268.5 related to the management of hazardous wastes (including spent carbon from air stripping) generated as part of the remedy.

All of the alternatives evaluated except the no action alternatives require additional wells. Wells shall be constructed as provided in 25 PA Code chapter 107.

Long-Term Effectiveness and Permanence: Long-term effectiveness and permanence is achieved in its highest degree with off-Plant and on-Plant Alternatives 3A and 3B and the Site wide alternatives. For these alternatives the plumes are contained, VOCs are removed and destroyed in the treatment processes, and on-Plant deed restrictions, which would abate the risks posed by use of ground water, will be put in place. On-Plant and off-Plant Alternatives 4 rank slightly lower for this criteria because injection could spread contamination to unexpected areas. Alternatives that do not fully address long-term effectiveness and permanence include the no action alternatives (on and off-Plant alternative 1) and the limited action/institutional controls alternatives (on and off-Plant alternative 2).

Reduction of Mobility, Toxicity or Volume Through Treatment: This criterion addresses the statutory preference for remedies that employ treatment as a principal element of the alternative. All alternatives except for the no action involve some aspect of reduction of mobility, and toxicity. OnPlant Alternative 3A involves the destruction of volatiles with ozone and peroxide. Some compounds such as TCA are resistant to this technology. Carbon adsorbs and reduces the mobility of the volatiles and when regenerated, the volatiles are ultimately destroyed reducing their toxicity. All alternatives except Alternatives 1 (no action) and on-Plant 3A use some form of carbon adsorption which is proven, simple and reliable. On-Plant and off-Plant alternatives 1 (no action) will not satisfy this requirement.

Short-Term Effectiveness: On-Plant and off-Plant Alternatives 2 can be implemented more quickly than on-Plant and off-Plant alternatives 3 and the Site wide alternatives, but some contaminants will still escape from the Site. The remainder of the alternatives present minimal construction and community risks if work proceeds according to the OSHA standards. Off-Plant Alternative 4 could be delayed by the large number of wells that would be placed on a large number of different properties. This could present severe access problems and community resentment. Alternatives that do not meet the requirements for short-term effectiveness include on-Plant and off-Plant Alternative 1. With these alternatives, VOCs can still travel from on-Plant to offPlant affected areas or from off-Plant to further off-Plant areas that are presently unaffected by VOCs.

Implementability: The implementability criterion relates to the technical and administrative feasibility of an alternative. Off-PlantAlternative 4 was rated lower for this criterion because of the potential administrative problems with obtaining additional property easements and increased technical difficulty during operations. Technically, the reinjection (flushing) aspect of this alternative will probably be difficult to achieve because of the variable permeabilities of the aquifers. The amount of off-Plant property construction required for this alternative could also hinder its implementation. On-Plant Alternative 4 has a better rating because it is assumed on-Plant activities will be much easier to implement than off-Plant activities. A potential minor issue that could be considered when comparing off-Plant Alternatives 3A and 3B relates to the physical structure of the treatment unit. The off-Plant air-stripper tower, required by Off-Plant Alternative 3B, could result in minor aesthetic impacts and some minor operational and security concerns. An offPlant carbon adsorption treatment unit, off-Plant Alternative 3A, should be less obtrusive. The Site-Wide Alternatives 1A and 1B are superior to the off-Plant alternatives because no treatment facility would be built and operated offPlant; therefore, aesthetic impacts might be improved and no additional treatment discharge outfall to the North Tributary would be needed. The best alternatives for implementability are on-Plant Alternatives 1 and 2 and off-Plant Alternative 1. The major component of these alternatives is monitoring ground water, which should be easily implemented. On-Plant Alternative 2 does include operation of the existing interim air stripper with modifications and on-Plant deed restrictions, but implementability problems for these elements of on-Plant Alternative 2 are assumed to be minor.

Services and materials are readily available for all of the evaluated alternatives.

Cost: The preliminary total costs developed, include capital costs and operation and maintenance costs for a 30-year project life. Oneon-Plant alternative along with one off-Plant alternative would be combined to formulate an acceptable Site-wide alternative. Note that On-Plant Alternative 4, Aquifer Restoration, must be combined with Off-Plant Alternative 4, Aquifer Restoration, because of synergistic effects, and costs much more than the other alternatives ($ 13 million). An alternative to combining off-Plant /on-Plant alternatives would be to select one of the already-developed Site-wide alternatives. The estimated costs of these Site -wide alternatives have been rated by comparing their total costs to the total costs of combined on-Plant and offPlant medium-specific alternatives. The total estimated cost of the Site-wide alternatives is $11,003,060 for Site-Wide Alternative 1A and $4,403,730 for Site-Wide Alternative 1B. A combination of On-Plant Alternative 3B with either Off-Plant Alternative 3A or 3B would achieve the same objectives and would have a total estimated cost of approximately $5,712,000.

STATE ACCEPTANCE:

The Commonwealth of Pennsylvania does not concur with the Selected Alternative.

COMMUNITY ACCEPTANCE:

EPA believes that the community is generally supportive of the selected remedy. The only written comments received on the Proposed Plan were from the Commonwealth of Pennsylvania and the Westinghouse Electric Corporation. No comments were made in opposition to the preferred alternative at the public meeting and the comments from Westinghouse's contractor were also supportive. Community Acceptance is addressed in more detail in the Responsiveness Summary (Appendix D).

## IX. THE SELECTED ALTERNATIVE

### General Description and Selection Rationale

Since the hydrogeology at the Site is so complicated, the EPA Site hydrogeologist consulted with several other EPA hydrogeologists and an expert on the Gettysburg geological formation, Mr. Charles Wood (U.S. Geological Service), during the review of the Remedial Investigation. The hydrogeologists consulted recommended placing wells in the center of the contaminated ground water plume if EPA decided to pump and treat the aquifer. The hydrogeologists also warned against trying to actively remediate the entire plume, because the wells in the more dilute portions of the plume could draw water from the center of the plume and spread the contamination.

The Selected Alternative for the contaminated ground water at the Westinghouse Plant Site is Site-Wide alternative 1B. The conceptual design is shown in figure 8-Appendix B. The remedial concept is to pump and treat the very contaminated ground water in the center of the plume, on Plant property, in accordance with the advice given by the hydrogeologists. This is shown as "Capture Zone 1" in figure 8 (Appendix B) and represents an area where ground water is drawn to the on-Plant pumping wells where it is collected. A second set of extraction wells will be placed near the edge of the contaminant plume (Figure 8 - Appendix B) in the path of natural ground water flow from the Plant. Pumping rates in this set of extraction wells shall be designed so that "Capture Zone 2" shown on figure 8 does not fully extend to the other capture zone to avoid drawing the more heavily contaminated ground water under the Plant property. A zone of slow moving water (Stagnation Zone) between the capture zones will result, but the pumping rates of the two systems will be varied to move the stagnation zone periodically, at an interval and rate to be determined by EPA, during remedial design, so that the ground water in this zone is collected by the extraction wells. Any contaminated ground water escaping the Capture Zone 1 wells should flow to the Capture Zone 2 wells.

Extracted off-Plant ground water shall be pumped back to a common treatment Plant located on the Plant property. The preferred alternative shall remove contaminants from the extracted ground water by air stripping, and capture them from the effluent air stream using carbon adsorption. Spent carbon will be handled as a hazardous waste and will be sent for treatment or disposal at an off-Plant permitted RCRA facility.

The treated ground water shall be discharged to the Northern Tributary (figure 2-Appendix B) via the current outfall under the existing NPDES permit if possible, or a modified NPDES permit if necessary.

The Commonwealth of Pennsylvania requires that contaminated ground water be actively remediated to background (25 PA Code Sections 264.90264.100 and in particular, 264.97(i), (j), and 264,100(a)(9)). When EPA chooses active remediation, EPA must be able to design a system that can accomplish the performance standard in a reasonable and finite time frame. EPA can not actively remediate the contaminated ground water plume to background, and thus waives the background ARAR, for two reasons: 1. compliance with this requirement is technically impracticable from an engineering perspective, and 2. compliance with this requirement will result in greater risk to human health and the environment. The presence of DNAPLs in the fractured bedrock under the Plant property prohibits active remediation to background. Accordingly, the on-Plant extraction wells must contain the plume within the Plant property (Capture Zone 1) until non-zero MCLGs and MCLs in on-Plant ground water are reached. Since the contaminants in the off-Plant portion of the ground water plume (Capture Zone 2) have been transported in solution, it might be possible to reach a background level in a reasonable but indefinite timeframe in that Capture Zone. However, the relatively high pumping rates needed to actively remediate all off-Plant ground water would probably draw contaminated ground water and possibly DNAPLs to the off-Plant area, thereby creating a greater risk to human health and the environment. Accordingly, the off-Plant extraction wells (Capture Zone 2) must contain the off-Plant plume within the area served by the water lines until non-zero MCLGs and MCLs are reached.

This alternative also includes the installation of additional monitoring wells, ground water monitoring quarterly for two years and annually afterwards, annual residential well sampling and analysis, and deed restrictions that prevent use of ground water on the Westinghouse property.

The remedy is cost effective and would take advantage of existing stripper capacity at the Site. The remedy is implementable and avoids the potential problems of off-Plant alternative number 4 created by the large number of properties which would be involved in the construction of this remedy. The selected remedy will take advantage of the existing NPDES permit which may require some modification. Public acceptance is good since relatively few residents (compared to off-Plant alternative 4) would be adversely impacted by the remedy and since the remedy is merely an expanded version of an existing actions being taken at the Plant.

The capital cost is about $2,119,000; the operations and maintenance cost is about $142,000 annually; and the Present Worth of the selected alternative over 30 years is about $4,400,000. The major capital cost elements of the selected remedial action are shown below, and the details of the scoping estimate are contained in Appendix B of the Feasibility Study which is available in the administrative record. The selected alternative can be implemented in about 24 months.

WESTINGHOUSE ELECTRIC-PLANT SITE
GETTYSBURG, PENNSYLVANIA
SITE-WIDE ALTERNATIVE 1B
GROUNDWATER EXTRACTION & ONSITE AIR STRIPPING

Performance Standards

The performance standards for each component of the selected remedy are described in turn:

Ground Water Cleanup Levels: The cleanup level for each contaminant of concern in the ground water shall be the non-zero MCLG if one exists, the MCL for that contaminant (the federal ARAR for public drinking water supplies under the Safe Drinking Water Act). The incremental risk of cancer from full domestic use of ground water once these levels are reached should be less than 3 x 10[-6] based on EPA's current understanding of toxicology and site conditions.

Area of Attainment: The well systems shall be designed to capture all ground water, contaminated with COI above non-zero MCLGs and MCLs, to the extent that it is technically practicable, as determined by EPA, and to remediate the off-Plant ground water as quickly as possible considering the limitations previously discussed.

On-Plant extraction wells: Ground water shall be extracted using multiple extraction wells, the exact location, extraction rate and number of which shall be determined by EPA, during the design of the ground water recovery system. The system shall be designed to capture all on-Plant ground water contaminated with COI volatile organic hydrocarbons above non-zero MCLGs and MCLs to the extent practicable as determined by EPA. The extraction wells shall operate until such time as EPA determines that the cleanup level for each contaminant (non-zero MCLGs, MCLs) in the ground water has been achieved to the extent technically practicable throughout the entire on-Plant area of ground water contamination.

Off-Plant extraction wells: Ground water shall be extracted using multiple extraction wells, the exact location, extraction rate and number of which shall be determined by EPA, during the design of the ground water recovery system. The system shall be designed to capture all off-Plant ground water contaminated with volatile organic hydrocarbons above non-zero MCLGs and MCLs to the extent practicable as determined by EPA. The well system shall be designed to clean up the off-Plant ground water as rapidly as possible within the limitation of the requirement that the capture zone of the system shall not extend to the on-Plant ground water. The extraction wells shall operate until such time as EPA and the PADER determine that the clean up level (non-zero MCLGs, MCLs) for each contaminant in the ground water has been achieved to the extent technically practicable throughout the entire off-Plant area of ground water contamination.

Monitoring Wells: A sufficient number of monitoring wells shall be installed, as determined by EPA, to verify the performance of the remedial action. The wells shall be sampled quarterly for the first two years and semiannually thereafter until samples have reached non-zero MCLGs and MCLs. Once these levels have been reached, these wells shall be sampled for twelve consecutive quarters and if contaminants remain at this level, the operation of the extraction system shall be shutdown. Semi-annual monitoring of the ground water shall continue for five years. If subsequent to an extraction system shutdown, monitoring shows the ground water concentrations of any contaminant of concern to be above non-zero MCLGs or MCLs the system shall be restarted and continued until the levels have once more been attained for twelve consecutive quarters. Semi-Annual monitoring shall continue until EPA and the PADER are convinced that contaminants have reached stable levels below non-zero MCLGs and MCLs.

Air Stripper: Extracted ground water shall be treated using a packed column air stripper. Flow rates and air stripper dimensions and effluent water contaminant levels shall be determined by EPA and the PADER, during the remedial. Since the treated ground water shall be discharged to the Northern Tributary under an NPDES permit, the specific discharge criteria shall be established by the PADER during the Remedial Design of the remedy. The stripper must be designed to at least achieve these levels subject to EPA approval.

Carbon Adsorber: Contaminants in the effluent air from the stripping unit shall be captured by a carbon adsorption unit, the dimensions of which shall be determined during the remedial design and subject to EPA and PADER approval. The air stripping tower must reduce emissions to the minimum attainable level through the use of the Best Available Technology (BAT), 25 PA Code S127.12(a)(5).

Deed Restriction: A deed restriction shall be placed on the Westinghouse Plant property that will prevent any use of Plant ground water until EPA and the PADER have determined that the Plant ground water has reached non-zero MCLGs and MCLs.

Remedy Implementation: Prior to installation of the off-Plant extraction wells, additional monitoring wells shall be installed to the east of the Plant to define the extent of the contaminant plume in that direction, and additional wells to the east of the existing wells shall be installed to define the width of the plume to the north and the south. The number and location of these wells shall be approved by EPA.

Five Year Review: Because DNAPLs will remain on-Plant as a source of future ground water contamination, Five Year Reviews shall be conducted after the remedy is implemented to assure that the remedy continues to protect human health and the environment until all performance standards have been met as determined by EPA.

## X. STATUTORY DETERMINATIONS

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

### Protection of Human Health and the Environment

The selected remedy will be protective of human health and the environment by eliminating the threat posed by hazardous substances at the Westinghouse Elevator Co. Plant Site. These hazardous substances currently pose a threat to human health due to potential exposure to ground water at the Site. Implementation of this remedy would effectively eliminate the potential risk to human health which may result from exposure to ground water from the Site and will eventually restore ground water at the Site to beneficial uses.
Because the selected remedy would result in hazardous substances remaining on-Site (DNAPLs), 5-year site reviews, pursuant to Section 121(c) of CERCLA, 42 U.S.C. S9621(c), would be required to monitor the effectiveness of this alternative.

The Selected Remedy will control risks from domestic use of the highly contaminated on-Plant drinking water by the implementation of a deed restriction on the use of ground water. The Selected Remedy will also control the migration of the contaminants to off-Plant residential wells using extraction wells to create a capture zone that will prevent or substantially reduce the movement of ground water from the Plant property.

The Selected Remedy will use extraction wells to prevent the further migration of off-Plant ground water to areas not served by the public water line and will remediate the off-Plant ground water to non-zero MCLGs and MCLs. The extraction wells must operate until these levels have been achieved for both on-Plant and off-Plant ground water.

The selected remedy will not pose any unacceptable short-term risks or cross-media impacts to the Site, the workers, or the community. The selected remedy will be readily implementable.

### Compliance with ARARs

The selected remedy will attain all applicable or relevant and appropriate requirements for the Site except the Pennsylvania ARAR requiring remediation of ground water to background levels. These requirements are shown in Appendix A

The Commonwealth of Pennsylvania requires that contaminated ground water be actively remediated to background (25 PA Code Sections 264.90264.100 and in particular, 264.97(i), (j), and 264,100(a)(9). When EPA chooses active remediation, EPA must be able to design a system that can accomplish the performance standard in a reasonable and finite time frame. EPA can not actively remediate the contaminated ground water plume to background, and thus waives the background ARAR, for two reasons: 1. compliance with this requirement is technically impracticable from an engineering perspective, and 2. compliance with this requirement will result in greater risk to human health and the environment. EPA believes that DNAPLs in fractured bedrock will continue to contaminate the on-Plant ground water for decades. A limited onPlant pump and treatment system has been in operation intermittently at the Plant since 1984 and has produced only limited reductions in contamination. Accordingly, the on-Plant extraction wells must contain the plume within the Plant property (Capture Zone 1) until non-zero MCLGs and MCLs in on-Plant ground water are reached. Since the contaminants in the off-Plant portion of the ground water plume (Capture Zone 2) have been transported in solution, it mightbe possible to reach a background level in a reasonable but indefinite timeframe in that Capture Zone. However, the relatively high pumping rates needed to actively remediate all off-Plant ground water would probably draw contaminated ground water and possibly DNAPLs to the off-Plant area, thereby creating a greater risk to human health and the environment. Accordingly, the off-Plant extraction wells (Capture Zone 2) must contain the off-Plant plume within the area served by the water lines until non-zero MCLGs and MCLs are reached. The Off-Plant extraction system shall, however, be designed to remediate the offPlant ground water as quickly as possible without spreading the contamination. EPA is waiving this state ARAR not to avoid taking action for the on-Plant ground water, but as a basis for selecting plume containment, instead of active remediation with set standards, that must be reached in a finite time period.

Cost Effectiveness

The capital cost of the Preferred Alternative is about 2.1 million dollars, the annual operations and maintenance is about 140 thousand dollars, producing a total Present Worth cost of about 4.4 million dollars.

The selected alternative is the most cost effective of the remedies that are adequately protective of public health and which comply with ARARs. The selected remedy will take advantage of the existing treatment system already in operation. If the existing stripper does not have sufficient capacity to treat the extracted ground water required by the remedial design, a second stripper can be added in parallel with the existing stripper to increase capacity while still using the existing equipment.

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

EPA has determined that the selected remedial action represents 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 that are protective of human health and the environment and meet ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of long-term effectiveness; reduction in toxicity, mobility, or volume through treatment; state and community acceptance; and the CERCLA preference for treatment.

The selected remedy addresses the long-term, threats posed by the Site contaminants at the Westinghouse Elevator Co. Plant Site. The remedy is protective of human health and the environment, meets ARARs, and is cost-effective. Treatment as a principal element is provided for in the onsite treatment of extracted ground water prior to discharge.

## XI. EXPLANATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Westinghouse Elevator Plant Site was released in April 1992. The Proposed Plan described the alternatives studied in detail in the Feasibility Study, and EPA reviewed all written and verbal comments submitted during the comment period and at the public meeting. The only significant change between the Proposed Plan and the ROD is a change in the ground water contamination levels that must be achieved before the ground water remedy is considered completed. EPA waived the Commonwealth's ARAR which requires all ground water to be cleaned up to background levels. Although EPA waived this ARAR because active remediation over a finite time frame is not possible, EPA proposed containing the ground water plume until background is reached. Additional legal review has been conducted since the Proposed Plan was issued and EPA now believes that since the Commonwealth's ARAR is waived, the appropriate cleanup levels that must be achieved by the remedy are non-zero MCLGs and MCLs.

The frequency of monitoring well analysis was changed during the comment period from annual monitoring to semi-annual monitoring to provide greater protection of the public and to consider changes in contaminant concentrations due to seasonal variations.

APPENDIX A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

WESTINGHOUSE PLANT SITE

Chemical Specific ARARs

Relevant and Appropriate Requirements

1) State drinking water standards as set forth in 25 PA Code Chapter 109, Subchapter B. These standards are established pursuant to the authority of the PA Safe Drinking Water Act of 1984, 35 P.S. S721.1 etseq.

2) Maximum Contaminant Levels for drinking water from public supplies as set forth in 40 C.F.R. SS141.12 and 141.61). These standards are established pursuant to the authority of the Safe Drinking Water Act (42 U.S.C. SS300f300j-26).

3) Maximum Contaminant Level Goals (MCLGs). Non-Enforceable federal standards for drinking water from public supplies as set forth in 40 C.F.R. S141.50.

To Be Considered

1) Pennsylvania Water Quality Criteria (25 PA Code 93.1 through 93.9) as related to stripper discharge levels. Surface water standards related to the use of surface water for drinking and for drinking and consumption of fish from the surface water. This criteria is established pursuant to the Clean Streams Act, 35 P.S. 691.1 et seq.

Location Specific ARARs

1) No location specific ARARs have been identified.

Action Specific ARARs

Applicable ARARs

1) Emissions Reduction from Stripper/Adsorber. To the extent that new point source air emissions result from the implementation of the Remedial Alternative, 25 PA Code S127.12(a)(5) is applicable, requiring that emissions be reduced to the minimum obtainable levels through the use of Best Available Technology (BAT), as defined in 25 PA Code S121.1.

2) NPDES Discharge requirements as set forth in 25 PA Code SS92.31, 92.41, and 92.55 include design, discharge and monitoring requirements for the stripper discharge. These requirements are established pursuant to the PA Clean Streams Law, 35 P.S. S691.1 et seq.

3) RCRA Requirements. The ground water collection and treatment operations will constitute treatment of hazardous waste. The ground water contains listed hazardous waste and on-plant ground water is a characteristic for TCE hazardous waste for TCE. Treatment will result in the generation of contaminated treatment residuals including spent carbon. The remedy to be implemented will comply with the applicable requirements of 25 PA Code Part 262 Subparts A (relating to hazardous waste determination and identification numbers), B (relating to manifesting requirements for Off-site shipments of spent carbon or other hazardous wastes), C (relating to transporters of hazardous waste), and with respect to operations at the site generally, with the substantive requirements of 25 PA Code 264 Subparts B-D, I (in the event that hazardous waste generated as part of the remedy is managed in containers), J (in the event that hazardous waste is managed, treated or stored in tanks).

On-Plant ground water is above the TCE level (500 ppb) that qualifies for handling groundwater as a hazardous waste as specified in 25 PA Code Chapter 261 Subchapter C and 40 C.F.R. S261.24.

4) Land Disposal Restrictions set forth at 40 C.F.R. Part 268.1 to 268.5 related to the management of hazardous wastes (including spent carbon from air stripping) generated as part of the remedy.

5) The Pennsylvania ARAR for ground water for hazardous substances is that all ground water be remediated to "background" quality as specified by 25 PA Code Sections 264.90-264.100 and in particular by PA Code Sections 264.97(i), (j), and 264.100(a)(9). The Commonwealth also maintains that the requirement to remediate to background is also found in other legal authorities.

6)  Regulations concerning well drilling as set forth in 25 PA Code Chapter 107. These regulations are established pursuant to the Water Well Drillers License Act, 32 P.S. S645.1 et seq.

Relevant and Appropriate Requirements

1)  RCRA requirements of Subpart AA 40 C.F.R. 264.1032 (Air Emission Standards for Process Vents) of the Federal RCRA regulations, 40 C.F.R. are relevant and appropriate for the air stripping operations under the selected remedy.  Under this ARAR, total organic emissions from the carbon adsorber must be less than 1.4 kg/hr (3 lb/hr) and 2800 kg/yr (3.1 tons/yr).

To Be Considered

Pennsylvania's Ground Water Quality Protection Strategy, dated February 1992.

Water Quality Toxics Strategy, 25 PA Code Chapter 16, for water quality guidance.

EPA OSWER Directive 9355.0-28, Control of Air Emissions From Superfund Air Strippers at Superfund Ground Water Sites.

PADER "Air Quality Permitting Criteria For Remediation Projects Involving Air Strippers and Soil Decontamination Units" Guidance Manual.

EPA's Ground Water Protection Strategy which is used to classify aquifers based on their use.

Appendix B

Appendix C

TABLE 4-6

SUMMARY OF ANALYTICAL RESULTS[a] ABOVE QUANTITATION LIMITS
SEDIMENT SAMPLES - PHASE I

| PARAMETERS[b] | UNITS[c] | SAMPLE DESIGNATION[d] SD-1 | SD-1 DUP | SD-2 | SD-3 |
|---|---|---|---|---|---|
| TAL Inorganics | | | | | |
| Cyanide | mg/kg | --[e] | -- | 0.07 | 0.11 |
| Aluminum | mg/kg | 16200 | 12600 | 17200 | 17600 |
| Barium | mg/kg | 94 | 110 | 99 | 168 |
| Beryllium | mg/kg | -- | -- | 1.2 | 0.76 |
| Cadmium | mg/kg | 0.94 | 1.1 | -- | -- |
| Calcium | mg/kg | 54200 | 41700 | 2660 | 2200 |
| Chromium | mg/kg | 42J | 40J | 40J | 35J |
| Cobalt | mg/kg | 17 | 22 | 17 | 18 |
| Copper | mg/kg | 66J | 77J | 38J | 20J |
| Iron | mg/kg | 28400 | 26300 | 39800 | 39800 |
| Magnesium | mg/kg | 15700 | 23400 | 9540 | 5240 |
| Manganese | mg/kg | 1220 | 1320 | 1030 | 1320 |
| Mercury | mg/kg | 0.06J | 0.11J | -- | -- |
| Nickel | mg/kg | 22 | 26 | 25 | 20 |
| Potassium | mg/kg | 722 | 728 | 593 | 687 |
| Sodium | mg/kg | 235 | 221 | 185 | -- |
| Vanadium | mg/kg | 38 | 35 | 59 | 70 |
| Zinc | mg/kg | 391 | 477 | 157 | 67J |
| Arsenic | mg/kg | 6 | 13 | 26 | 11 |
| Lead | mg/kg | 60 | 137 | 32 | 35J |
| Selenium | mg/kg | -- | 2 | -- | -- |
| Moisture | % by wt | 36.3 | 54.7 | 19.1 | 34.5 |
| TCL Volatiles | | | | | |
| Acetone | ug/kg | 16[*] | -- | -- | 46[*][f] |
| Methylene Chloride | ug/kg | -- | -- | -- | 11[*] |
| TCL Semivolatiles | | | | | |
| Butyl Benzyl Phthalate | mg/kg | -- | -- | -- | 1.7J[g] |
| Di-n-octyl Phthalate | mg/kg | -- | -- | -- | 1.3J |
| Bis-(2-ethylhexyl) phthalate | mg/kg | -- | 0.73 | -- | -- |
| Naphthalene | mg/kg | 0.68 | 2.0 | -- | -- |
| 2-Methylnaphthalene | mg/kg | -- | 1.5 | -- | -- |
| Acenaphthene | mg/kg | 2.6 | 6.8 | -- | -- |
| Dibenzofuran | mg/kg | 2.0 | 5.1 | -- | -- |
| Fluorene | mg/kg | 3.4 | 8.4 | -- | -- |
| Phenanthrene | mg/kg | 41 | 110 | 0.46 | -- |
| Anthracene | mg/kg | 6.0 | 23 | -- | -- |
| Fluoranthene | mg/kg | 47 | 125 | 0.66 | -- |
| Pyrene | mg/kg | 46 | 103 | 0.70 | -- |
| Benzo(a) Anthracene | mg/kg | 17 | 46 | -- | -- |
| Chrysene | mg/kg | 22 | 56 | 0.46 | -- |
| Benzo(b) fluoranthene | mg/kg | 31 | 74 | 0.66 | -- |
| Benzo(a) pyrene | mg/kg | 17 | 41 | -- | -- |
| Indeno (1,2,3-cd) Pyrene | mg/kg | 11 | 26 | -- | -- |
| Dibenzo (a,h) Anthracene | mg/kg | 2.6 | 5.0 | -- | -- |
| Benzo (ghi) Perylene | mg/kg | 5.1 | 24 | -- | -- |
| TCL Pesticides/PCBs | ug/kg | -- | -- | -- | -- |

<Footnotes>
a. Results are reported on a dry-weight basis. Dry weight = As received value + D where D=(100-moisture content) + 100. b. Target Compound List (TCL) parameters not listed were not detected in the samples above quantitation. Refer to Appendix E for a complete listing of analytical results and quantitation limits. c. "mg/kg" indicates milligrams per kilogram or parts per million (ppm); "ug/kg" indicates micrograms per kilogram or parts per billion (ppb); and "umhos/cm" means micromhos/cm; and " C" indicates degrees centigrade. d. Samples collected December 13 through 18, 1988 and January 16, 1989 by Rizzo Associates personnel. e. "--" indicates parameter was analyzed for but was not detected in the sample above limits. Refer to Appendix E for quantitation limits. f. "*" indicates this compound was detected on the method blank. g. "J" indicates this value is an estimate. </footnotes>