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EPA Superfund
Record of Decision:

KENTUCKY AVENUE WELL FIELD
EPA ID: NYD980650667
OU 03
HORSEHEADS, NY
09/30/1996

RECORD OF DECISION

KENTUCKY AVENUE WELLFIELD

HORSEHEADS, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
NEW YORK, NEW YORK

SEPTEMBER 1996

DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Kentucky Avenue Wellfield
Operable Unit 3
Horseheads, Chemung County, New York

Statement of Basis and Purpose

This decision document presents the selected remedial actions for the Kentucky Avenue Wellfield Site (the "Site"), Operable Unit No. 3, located in the Town and Village of Horseheads and the Village of Elmira Heights, New York. The remedial actions were chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedy for the Site. The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy.

The information supporting this remedial action decision is contained in the administrative record for the Site. A copy of the administrative record index is attached (see Appendix III).

Assessment of the Site

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

Description of the Selected Remedy

The remedial actions described in this document address the third of three operable units (OUs) planned for the Site.

The major remedial component of the first operable unit (OU1) ROD, dated November 30, 1986, called for the connection of residences using private drinking water wells to the public water supply.

The second operable unit (OU2) ROD, dated September 28, 1990, called for an interim remedy to restore the Kentucky Avenue Well as a public drinking water supply well and contain the contamination within the aquifer via ground-water extraction and treatment.

The third operable unit (OU3) remedy will address conditions present at the Westinghouse Facility and a related industrial drainageway and pond, known locally as Koppers Pond.

The major components of the selected remedy for OU3 include the following:

Westinghouse Facility - Disposal Area F

Performance of additional sampling and analysis prior to remedy implementation to better delineate the horizontal and vertical extent of contaminated soils and waste materials and to characterize and classify such materials for off-Site disposal and/or treatment further.

Excavation of all waste materials and soils containing trichloroethylene (TCE), polycyclic aromatic hydrocarbons (PAHs) and arsenic above cleanup objectives established for said contaminants.

Transportation of contaminated soils and waste materials to permitted waste management facilities (e.g., a RCRA hazardous waste incinerator, a RCRA hazardous waste landfill or a industrial landfill).

Performance of confirmatory sampling and subsequent backfilling of the excavated areas with clean soil.

Westinghouse Facility - Former Runoff Basin Area

Design and testing of an enhanced Soil Vapor Extraction (SVE) system using either dual-phase SVE or SVE with air sparging, depending on site-specific characteristics, to extract VOCs above and below the water table for treatment.

Construction and operation of the enhanced SVE treatment system for removal and treatment of VOCs from soil to meet the cleanup levels established in this ROD. The exact location, depth, and number of SVE wells will be determined during remedial design and testing.

Transportation (piping) of recovered ground water to the water treatment facility constructed as part of the ground-water remedy for OU2 for treatment.

Implementation of a monitoring program to assess the effectiveness of SVE treatment in attaining established cleanup levels in soil and Federal and State drinking water standards for ground water.

Industrial Drainageway

Excavation of sediments containing Polychlorinated Biphenyls (PCBs) from the industrial drainageway above the cleanup level of 1.0 part per million for PCBs.

Placement and operation of diversion pumping and necessary erosion and sedimentation controls during excavation.

Performance of confirmatory sampling.

Transportation of contaminated sediments to off-Site permitted waste management facilities for disposal.

Reshaping the flow channel using clean soil, as needed.

Additionally, the EPA believes that further ecological investigations are warranted at Koppers Pond and will conduct a supplemental study in that area to assess the need for remedial action.

Based on the findings of the remedial investigation for OU3, the EPA has also determined that no further ground-water treatment beyond that specified for the OU2 interim remedy is necessary as a response action for OU3. The interim remedy, as set forth in the 1990 ROD and the approved remedial design report for OU2, will therefore, become the final remedy for restoring the aquifer to its beneficial use as a drinking water aquifer at the Site.

Declaration of Statutory Determinations

The selected remedies meet the requirements for remedial actions set forth in CERCLA 121, 42 U.S.C. 9621: (1) they are protective of human health and the environment; (2) they attain a level or standard of control of the hazardous substances, pollutants and contaminants, which at least attain the legally applicable or relevant and appropriate requirements (ARARs) under Federal and State laws, (3) they are cost-effective; (4) they utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable; and (5) they satisfy the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at a site.

<IMG SRC 0296280>

RECORD OF DECISION
DECISION SUMMARY

Kentucky Avenue Wellfield Site
Operable Unit 3
Horseheads, Chemung County, New York

September 1996

United States Environmental Protection Agency
Region II
New York, New York

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DECISION SUMMARY

KENTUCKY AVENUE WELLFIELD
OPERABLE UNIT 3
HORSEHEADS, NEW YORK

SITE NAME, LOCATION AND DESCRIPTION

The Kentucky Avenue Wellfield Site (Site) is located within the Village and Town of Horseheads and the Village of Elmira Heights in the County of Chemung in the State of New York. As shown in the attached Figure 1 (Appendix I), the Site includes the Kentucky Avenue Well (KAW), a public drinking-water supply well located east of New York Route 14 and approximately one mile south of the intersection of New York Routes 14 and 17, and the Westinghouse Electric Corporation's (Westinghouse's) former Industrial and Governmental Tube Division facility (Facility). The Site also includes the contaminated portion of the underlying aquifer, known locally as the Newtown Creek Aquifer.

The Site lies at the confluence of two major river valleys which are bounded by mountains. In the vicinity of the Site, residential and commercial areas occupy more than half of the overall valley floor. The area has extensive industrial developments and is crossed by major transportation routes, including highways and freight railroad lines. As of the 1990 census, the population of the Town of Horseheads was 19,936; the Village of Horseheads was 6,802; and the Village of Elmira Heights was 4,359. Chemung County reported a population of 95,195. Since 1970, the population of Chemung County has declined at a rate of 0.2 to 0.3 percent per year.

The Westinghouse Facility is approximately 59 acres and is bounded by New York Route 17 to the north, New York Route 14 to the east, Conrail railroad tracks to the south and property of the New York State Electric and Gas Company to the west. Immediately north of Route 17 are commercial properties (hotels and restaurants), followed by residences. Across the railroad tracks to the south, along Philo Road, are residences and light industrial facilities.

The Facility is characterized by areas of grass lawn, pavement and buildings. The ground surface in the vicinity of the Facility has little relief and slopes very gently to the east and northeast.

Surface runoff from precipitation is routed by shallow swales and captured by surface-water runoff drains at various locations around the main plant building. A large portion of the runoff is routed through two plant outfall flumes and ultimately flows to the industrial drainageway. The main plant building covers approximately 16 acres in the eastern portion of the property and includes two wastewater treatment plants. Treated wastewater (process and non-contact cooling water) is discharged to the industrial drainageway via the two permitted outfalls at the Facility at an average flow rate of 1 to 2 million gallons per day (see Figure 2, Appendix I).

The industrial drainageway begins at the outlet of an underground pipe (located at the Chemung Street outfall) approximately 1,500 feet southeast of the Westinghouse Facility. It is a 7 to 10-foot wide open ditch which extends approximately 2,200 feet to the southeast until discharging into Koppers Pond. The industrial drainageway is bounded to the west by the Conrail tracks and by the Chemung County highway maintenance department to the east. Virtually all of its base flow consists of the industrial wastewater discharges received from the Westinghouse Facility via its underground piping (see Figure 3, Appendix I).

The area surrounding the industrial drainageway is characterized as having little relief and is poorly drained. Numerous areas adjacent to the drainageway contain standing water and marsh-features. Jurisdictional wetlands include the industrial drainageway, Koppers Pond, and 2.7 acres of emergent wetland adjacent to the Pond.

Koppers Pond covers approximately seven acres and is bounded by the old Horseheads Landfill to the north and northeast, the Conrail tracks to the west and an area of the KAW to the south (see Figure 3). The Pond is approximately 3 to 6 feet deep and discharges into an outlet stream to the south, which ultimately drains to Newtown Creek.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The KAW is part of the Elmira Water Board (EWB) public-water supply system. It was constructed in 1962 and provided approximately 10 percent of the potable water produced by the EWB until its closure in 1980, following the discovery of elevated levels of Trichloroethylene (TCE).

Contamination of the KAW with TCE was first detected in May 1980 during an inventory of local wells initiated by the New York State Department of Health (NYSDOH). Further ground-water sampling in the area by the Chemung County Health Department (CCHD) in July 1980 revealed elevated levels of TCE at the KAW and several private residences and commercial facilities. This finding led to the closing of the KAW in September 1980 by the EWB. In July 1982, the Site was proposed for inclusion on the Superfund National Priorities List (NPL). The Site was placed on the NPL in September 1983.

The analysis of ground-water samples collected from private drinking-water wells by the United States Environmental Protection Agency (EPA), the New York State Department of Environmental Conservation (NYSDEC), the NYSDOH, and the CCHD through 1985 revealed TCE and other volatile organic compounds (VOCs) throughout the Newtown Creek Aquifer. The analytical results also revealed that TCE levels exceeded permissible drinking water standards established by the NYSDOH. Based on such findings, the EPA connected 49 residences with contaminated drinking water wells to the public-water supply in 1985 and 1986.

In 1986, a remedial investigation and feasibility study (RI/FS) were conducted by the NYSDEC under a cooperative agreement with the EPA to determine the nature and extent of ground-water contamination at the Site. The results confirmed the presence of a contaminant plume in the vicinity of the KAW and extending approximately one mile beyond the KAW to the southern limit of the study area. The ground water contained several VOCs, including TCE at concentrations up to 340 parts per billion (ppb), trans-1,2-d- ichloroethylene (DCE), a degradation product of TCE, and inorganic chemicals (i.e., metals) at concentrations exceeding Federal and New York State (NYS) drinking water standards.

Based on the results of that 1986 RI/FS, the EPA issued the first Record of Decision (ROD) on November 30, 1986. The 1986 ROD called for the following: (1) the installation and sampling of ground-water monitoring wells in the vicinity of the Sullivan Street Wellfield, a second wellfield owned by the EWB and located south of the KAW; (2) identification of all residences using private drinking water wells within the area of ground-water contamination for connection to the public water supply; and, (3) initiation of a supplemental RI/FS to determine the nature and extent of contamination at the Site and to identify the primary sources of contamination in the Newtown Creek Aquifer. The identification of source areas would allow development of an effective program of source control and contaminated ground-water migration control.

In accordance with the 1986 ROD, the EPA and the NYSDEC conducted the following actions at the Site:

1. The NYSDEC installed monitoring wells upgradient of the Sullivan Street Wellfield in July 1989 to monitor ground-water quality. Analysis of ground-water samples collected from those wells in January 1990 indicated that TCE was present in excess of Federal and NYS drinking water standards. The public water supply at the Sullivan Street Wellfield was also found to be contaminated by TCE at levels exceeding such standards. In April 1990, the EPA published an Explanation of Significant Differences to the 1986 ROD announcing its intention to design and construct a ground-water treatment facility at the Sullivan Street Wellfield. This treatment facility was constructed and operational by mid-1994.

2. The EPA connected an additional 46 residences and three commercial properties which were using private drinking water wells in the affected area of ground-water contamination to the public water supply. Overall, a total of 95 residences and three commercial properties were connected to public water supplies between 1985 and 1994.

3. The EPA completed the supplemental RI/FS at the Site in February 1990. Based on the results, the

EPA concluded the following:

the primary source of TCE contamination at and near the KAW was the Westinghouse Facility;

the Facet Enterprises, Inc. (Facet) facility and LRC Electronics, Inc. (LRC) facility were contributory sources of contamination to the aquifer, but such contamination had not impacted the KAW; and,

the sediments in the industrial drainageway were contaminated by inorganic chemicals, possibly as a result of the permitted industrial discharges originating from the Westinghouse Facility.

The Facet facility, which is located downgradient of the KAW, is another NPL Superfund site being remediated under the direct oversight of the EPA. The LRC facility is located northeast of the KAW and is being remediated under the direct oversight of the NYSDEC.

Based on the results of the 1990 RI/FS, the EPA issued a second ROD on September 28, 1990 selecting an interim ground-water remedy, which consisted of the following: (1) restoration of the KAW as a public drinking water supply; (2) prevention of further spreading of contaminated ground water within the Newtown Creek Aquifer by pumping of the KAW and the installation of ground-water recovery wells between the KAW and the Facility; (3) construction of two water-treatment facilities, one located near the KAW and the other located between the KAW and the Facility, to treat recovered ground water to Federal and NYS drinking water standards; and, (4) a long-term monitoring program to monitor contaminant migration and evaluate the effectiveness of the remedy.

The 1990 ROD designated that remedy as an interim remedy because it did not address the source areas which were contributing to ground-water contamination. The 1990 ROD also called for an additional FI/FS to address source control at the Facility, which would result in a final remedy for restoring the Newtown Creek Aquifer to its beneficial use as a drinking water aquifer. Additionally, the study was to address the health threat posed by the contaminated sediments present in the industrial drainageway and Koppers Pond.

On June 28, 1991, the EPA issued a unilateral administrative order under Section 106(a) of CERCLA, 42 U.S.C. 9606, to Westinghouse directing it to implement the remedy set forth in the 1990 ROD. The remedial design was completed in June 1996 and remedial construction activities began in September of this year.

On August 6, 1991, the EPA and Westinghouse entered into an administrative order on consent for Westinghouse to perform an RI/FS at its Facility, the industrial drainageway, and Koppers Pond consistent with the mandates of the 1990 ROD. The results of that RI/FS are presented in the OU3 ROD.

On September 27, 1995, the EPA and Westinghouse entered into a second administrative order on consent for Westinghouse to perform a removal action at its Facility. The removal was conducted in late 1995 and early 1996. The results are presented herein (see section on Removal Action, below).

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The 1996 RI report, FS report, and the Proposed Plan for OU3 were released to the public for comment on August 28, 1996. These documents were made available to the public at two information repositories maintained at the Town of Horseheads Town Hall, located at 150 Wygant Road, Horseheads, New York and the NYSDEC office, located at 50 Wolf Road, Albany, New York. The EPA issued a press release to the local media on August 27, 1996 to announce the start of the public comment period, the date of the public meeting, and availability of the above-referenced documents. A flyer containing such information was also sent to all parties on the EPA's Site mailing list on August 28, 1996. A notice of availability for the above-referenced documents was also published in the Star Gazette on August 29, 1996. The public comment period established in these documents was from August 28, 1996 to September 26, 1996.

On September 11, 1996, the EPA held a public meeting at the Village of Horseheads Town Hall to present the Proposed Plan to local officials and interested citizens and to answer any questions concerning such Plan and other details related to the RI and FS reports. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF RESPONSE ACTION

As with many Superfund sites, the problems at this Site are complex. As a result, the EPA has divided the remedial work into three discrete segments or operable units (OUs). The remedies selected for these three OUs have been, or will be, implemented separately.

The OUs are defined as follows:

OU1 - Nature and Extent of Contamination

The major remedial component of the first operable unit (OU1) ROD, dated November 30, 1986, called for the connection of residences using private drinking water wells to the public water supply.

OU2 - Source Identification

The second operable unit (OU2) ROD, dated September 28, 1990, called for an interim remedy to restore the Kentucky Avenue Well as a public drinking water supply well and prevent the spreading of contamination within the Newtown Creek Aquifer via ground-water extraction and treatment.

OU3 - Source Control

The remedy selected in this OU3 ROD will address the two areas of soil contamination at the Facility and the sediment contamination in the industrial drainageway. Because each of the areas to be remediated differs with respect to the nature and extent of contamination, general physical characteristics, and location, they will be addressed by separate response actions.

The primary objectives of these actions are as follows:

1. Remediate the sources of ground-water contamination at the Facility to compliment the interim ground-water remedy selected by the EPA in the 1990 ROD for OU2;

2. Prevent exposure to contaminated soil at the Facility; and,

3. Minimize health threats posed by exposure to contaminated sediment in the industrial drainageway and consumption of contaminated fish from Koppers Pond. The contaminated sediment in the industrial drainageway is believed to be a source of the polychlorinated biphenyls (PCBs) present in the fish.

The purpose of OU3 was also to determine the final remedy for aquifer restoration at the Site. However, based on the findings of the 1996 RI/FS, no further ground-water treatment beyond that specified in the 1990 ROD for the interim ground-water remedy is warranted as a response action for OU3. Therefore, the interim remedy will become the final ground-water remedy for the Site (see section on Selected Remedy, below). It is noted that since the issuance of the 1990 ROD, the EPA has signed a ROD for the Facet site which calls for the recovery and treatment of contaminated ground water originating from that facility.

Based on an initial screening of ecological risk associated with Koppers Pond, the EPA determined that further investigation of the environmental conditions in the Pond and the outlet stream south of the Pond are warranted. The EPA plans on conducting this investigation as part of a supplemental ecological study.

SUMMARY OF SITE CHARACTERISTICS

This section summarizes the findings of the 1996 RI. A summary of the analytical data collected for OU3, listed by area and medium, can be found in Table 2 of Appendix II for the contaminants of concern identified by the EPA. The results of the 1996 RI indicated the following:

Westinghouse Facility

Over the years of manufacturing production, various Facility operations, including machining, electroplating, and chemical cleaning, generated solid and liquid wastes. Such plant wastes included TCE and TCE-related still-bottoms and degreaser sludges. The solid and liquid wastes were disposed at several locations on the Facility property until 1975. These on-Site waste disposal areas and several other areas of potential concern at and near the Facility were investigated during the RI.

Magnesium Chip Burial Area

Westinghouse plant records indicated that from 1973 to 1975, ignitable and reactive magnesium chips and titanium turnings were first containerized in 30-gallon drums. The 30-gallon drums were then placed in 55-gallon drums that were subsequently filled with concrete and buried in an 8-foot by 215-foot trench located at the northern portion of the Facility and within approximately 400 feet of New York Route 17. It was estimated that approximately 200 drums were buried in this area.

Ground-Penetrating Radar (GPR) surveys and subsequent trenching activities confirmed the presence of drums within a narrow trench at a depth of 2 to 4 feet. The drums were intact and did not appear to have impacted the surrounding soils. Analysis of soil samples collected from depths between 1 and 8 feet revealed low levels of several semi-volatile organic compounds (SVOCs), including PAHs, PCBs and metals. Magnesium concentrations were below those found in background soils generally in the area at the Site.

A total of 179 55-gallon drums were removed from the Magnesium Chip Burial Area and sent off-Site for disposal as part of the removal action conducted by Westinghouse in 1995 (see section on Removal Action, below).

Calcium Fluoride Sludge Disposal Areas Nos. 1 and 2

Two of the ten areas investigated at the Facility included the two calcium fluoride sludge disposal areas located at the north end of the West Parking Lot. The materials placed at these disposal areas included sludges from the treatment of hydrofluoric acid wastewaters at a former fluoride treatment operation.

One soil boring in Area No. 1 and two soil borings in Area No. 2 revealed a white powdery material at depths between 3 and 7 feet. Analytical results revealed the white material to contain high levels of cadmium and several other metals. Subsequent analyses using the toxicity characteristic leaching procedure (TCLP) revealed the material to exhibit the characteristics of a RCRA hazardous waste because of leachable cadmium. Other chemicals detected in the soils at depths between 2 and 12 feet included PAHs, PCBs and metals at low concentrations. No TCE was detected in soil samples from these two areas.

Approximately 1,240 tons of the white, powdery material and soil mixed with such material were excavated from the two Calcium Fluoride Sludge Disposal Areas and sent off-Site for disposal as part of the removal action conducted by Westinghouse in 1995 (see section on Removal Action, below).

Former Runoff Basin Area

The Former Runoff Basin Area is a storm-water runoff basin consisting of an oval-shaped depression located north and west of the main plant building. It is approximately 0.7 acre in areal extent and is currently covered by lawn, asphalt pavement and small man-made structures. A 7,500-gallon above-ground tank used for storing chlorinated solvents was located in this area at one time.

The GPR survey did not indicate the presence of any buried objects in this area. TCE was detected in 43 of 59 subsurface soil samples, with a maximum concentration of 79,000 parts per billion (ppb), and maximum depth of 12 feet. The water table was encountered at a depth between 8 and 11 feet. The soils containing the highest concentrations of TCE are proximal to the former location of the 7,500-gallon storage tank.

Additionally, TCE was detected at concentrations of 4 and 6 ppb in ground-water samples collected from the shallow and deep portions of the aquifer. Dibenzofuran, PAHs, PCBs and metals were also present at low concentrations.

The soil and ground-water sample results confirmed that the Former Runoff Basin Area is a source of TCE contamination in ground water.

Disposal Area F

Plant records indicated that between 1971 and 1974, TCE-related still bottoms and degreaser sludges were disposed in shallow (2 to 3 feet deep) trenches covering an area about 75 feet by 100 feet. Subsurface trenching activities to a depth between 11 and 12 feet encountered various waste-like materials, including a coal slag or tar-like material at the surface, coal-like material at a depth of approximately 2 feet, amber beads, a dark brown and black sand and pea gravel, and a layer of white, powdery material suspected of being waste pumice.

Several VOCs, SVOCs and metals were detected in soil samples collected at Disposal Area F. TCE was primarily detected in soil and waste materials at the northern portion of the disposal area from depths between 1 foot and 2.5 feet and at a maximum concentration of 20,000 ppb. Ground water was encountered at depths between 11 feet and 12.5 feet.

PAHs were also detected in surface soil samples, including fluoranthene (700 parts per million or ppm), pyrene (610 ppm), benzo(b)fluoranthene (420 ppm), benzo(a)pyrene (310 ppm) and benzo(a) anthracene (290 ppm). Arsenic was detected in surface and subsurface soils, with the maximum concentration (18.9 ppm) in a soil sample collected from a depth of 1.0 foot.

The soil sample results, along with the soil-gas and ground-water headspace survey results from the MW-10 Area (see section on MW-10 Area findings, below) confirmed that Disposal Area F is a contributing source of TCE contamination to ground water.

Former Coal Pile Area

Plant records indicated that during the 1960s, TCE and TCE-related still bottoms and degreaser sludges were placed on the coal at the Facility power house fuel pile.

The GPR survey did not indicate the presence of any buried objects at the Former Coal Pile Area. Twenty-one boreholes were drilled to evaluate subsurface conditions. Analysis of fifteen soil samples collected at depths between 2 and 10 feet revealed low concentrations of several VOCs, including toluene (13 ppb) and TCE (6 ppb), SVOCs, PCBs and several metals. Ground water was encountered at depths between 8 and 11 feet.

Based on these findings, the Former Coal Pile Area does not appear to be a significant source of TCE contamination in ground water.

MW-10 Area

Monitoring well MW-10 is located approximately 250 feet hydrologically downgradient of Disposal Area F, and ground-water samples from this well have historically revealed the presence of TCE. The purpose of conducting the soil-gas and ground-water headspace surveys was to determine whether the TCE contamination at MW-10 was originating at Disposal Area F, another upgradient source, or whether additional sources were present in the immediate vicinity of the MW-10 Area.

Soil-gas and ground-water headspace samples collected between Disposal Area F and MW-10 at depths between 7 and 12 feet confirmed that TCE (98 ppb) in soil gas was originating from Disposal Area F. Analytical results of three ground-water grab samples collected from the survey boreholes at the MW-10 Area were consistent with the TCE concentrations found in the soil-gas and ground-water headspace surveys.

Analysis of soil samples collected at a depth of approximately 3 feet at the MW-10 Area revealed the presence of TCE (32 ppb) and other VOCs, PAHs, PCBs and several metals at concentrations below remedial action objectives (RAOs) (see section on RAOs, below).

The results of the soil sample analyses and the soil-gas and ground-water headspace surveys indicate that Disposal Area F is the source of the TCE contamination in ground water at the MW-10 Area. No other source of TCE was identified upgradient of Disposal Area F or in the immediate vicinity of the MW-10 Area.

Soil Pile

Soil removed from previous on-site construction activities was stockpiled south of the West Parking Lot. A soil-gas survey conducted at depths of 5 and 10 feet in the Soil Pile did not detect any VOCs. Analysis of soil samples collected from a depth of 0 to 2 feet revealed low concentrations of VOCs, SVOCs, PCBs and several metals. TCE (0.008 ppm) was below the established RAO of 0.8 ppm for TCE. SVOCs included the following PAHs: benzo (a) anthracene (1.9 ppm), benzo (b) fluoranthene (1.5 ppm) and benzo(a)pyrene (1.2 ppm). The 1.2 ppm level for benzo(a)pyrene exceeded the RAO of 0.78 ppm. The maximum PCB concentration was 3.2 ppm. Manganese was detected at a concentration of 1,220 ppm.

The PCB and PAH contaminated sediments at the Soil Pile were removed and transported off-Site for disposal as part of the removal conducted by Westinghouse in 1995. The remaining uncontaminated soil was used as backfill material at the two Calcium Fluoride Sludge Disposal Areas after the removal of materials was conducted in those areas (see section on Removal Action, below).

Area Southwest of the West Parking Lot

A 1970s memorandum from a former plant environmental officer suggests that plant wastes may have been disposed of at this area. Soil-gas and ground-water headspace surveys detected low concentrations of TCE (<10 ppb) at six survey locations. Analysis of ten (10) soil samples collected from a depth of 3 to 4 feet revealed low levels of VOCs, SVOCs, PCBs and several metals, including arsenic at 10.5 ppm.

Based on these findings, this area does not appear to represent a significant source of TCE in ground water.

Surface-water Runoff Drains

Site reconnaissance identified 31 surface-water runoff (storm) drains present at the Facility. Since concrete or cobbles lined five of these drains, only the other 26 were investigated during the RI. The soil in these drains were found at depths between 4 and 6 feet and each drain had a manhole cover. The drains were investigated to determine if they serve as receptors or conduits for liquid waste materials to reach the underlying soil and ground water.

Analyses of 26 soil samples collected from depths of 5 to 15 feet showed concentrations of various VOCs, SVOCs, pesticides and metals. The most frequently detected VOC was toluene (13 of 26 samples) at a maximum concentration of 270 ppb. TCE was also detected, but at very low concentrations. SVOCs detected included PAHs, phthalates and phenols. Fluoranthene (810 ppm), pyrene (650 ppm) and phenanthrene (630 ppm) were detected at the highest concentrations. Eighteen pesticides and two PCBs were detected, with PCB levels all less than 1.0 ppm. Twenty-two inorganics were detected, with twelve of these detected in all 26 samples, including lead (421 ppm) and zinc (422 ppm).

Based on these findings, it does not appear that the surface-water runoff drains act as conduits for TCE or other VOCs to leach to ground water. The PAHs present are believed to be the result of storm water runoff across the large areas of asphalt pavement at the Facility.

New York Route 17

An area of NYSDOT right-of-way for New York Route 17, which is beyond the Facility property, was investigated based on an anonymous source which reported witnessing an alleged disposal of 350 to 500 fifty-five gallon drums in this area during construction of New York Route 17.

The results of soil-gas and ground-water headspace analyses from depths between 19 and 35 feet at twenty-two locations beneath New York Route 17 revealed low levels of VOCs, including tetrachloroethane (14 ppb), total xylenes (11 ppb), benzene (6 ppb) and TCE (<3 ppb). Benzene and total xylenes are associated with petroleum and petroleum product derivatives. Such levels are believed to be too low to represent a source of contamination to the ground water. No buried drums were encountered during this investigation.

Ground Water

The results of a hydrogeologic investigation conducted by Westinghouse at its Facility in 1987 and 1988 revealed the presence of TCE and several other VOCs and metals in ground water beneath the eastern and southern portions of the Facility. Based on that investigation and the results of the EPA's 1990 RI/FS for OU2, the EPA concluded that the Facility was the primary source of TCE contamination in the aquifer at the KAW. Additionally, as discussed above, the purpose of OU3 was to evaluate options for source control at the Facility and final restoration of the Newtown Creek Aquifer. Therefore, evaluation of the ground water was included as part of the RI/FS for OU3 to identify contaminant source areas and determine what further remedial efforts, in addition to the interim ground-water remedy selected for OU2, were warranted for ground water.

Ground-water samples were collected for analysis from twenty-seven (27) Facility monitoring wells and one Facility production well in 1994 and/or 1995. Analytical results confirmed that several VOCs, including TCE (120 ppb), 1,1,1-trichloroethane (8.5 ppb), 1,2-dichloroethene (4 ppb) and chloromethane (140 ppb), have contaminated the shallow and deep portions of the ground-water aquifer beneath the Facility. The highest TCE concentrations were detected in wells located along the southern portion of the property. Isoconcentration contour maps define the distribution of TCE in both the shallow and deep aquifer zones as narrow, elongated plumes originating from the vicinity of Disposal Area F and extending eastward, in a downgradient direction, through the MW-10 Area and beyond the southeast corner of the Facility.

Analysis of ground-water samples collected from the on-Site monitoring wells also revealed several metals, including chromium, nickel and cadmium at concentrations exceeding Federal and NYS drinking water standards. However, the metals are believed to be attributable to particulate matter either in the aquifer (clays) or in the well screen as a result of artifacts of well construction. An analysis of ground-water samples from a downgradient plant production well (SW-5) for both total metals (unfiltered samples) and dissolved metals (filtered samples) revealed concentrations below such standards. Therefore, although metals are present in ground water beneath the Facility, they do not appear to be migrating off-site.

Based on the findings of the RI/FS, the EPA has determined that ground-water treatment is not warranted beyond that specified for the OU2 interim remedy in the 1990 ROD, the 1991 administrative order, and the approved remedial design for OU2. Therefore, the interim remedy is deemed by the EPA to be the final remedy for restoring the Newtown Creek Aquifer to its beneficial use as a drinking water aquifer at the Site.

Industrial Drainageway and Koppers Pond

Surface Water and Sediments

The industrial drainageway and Koppers Pond were investigated as part of OU3 because the results of the 1990 RI/FS for OU2 revealed that several metals, primarily cadmium, were present in the sediments of the industrial drainageway at levels which posed a health risk from direct contact exposure. Additionally, because TCE had historically been a permitted discharge parameter at varying levels in the treated wastewaters released to the industrial drainageway from the Facility, the industrial drainageway was considered as a possible migration pathway for TCE to impact ground water at the KAW (i.e., surface water to ground water). Surface-water and/or sediment samples were collected for analysis from twenty (20) locations within the industrial drainageway system, including the underground piping between the drainageway and the Facility, Koppers Pond and the outlet stream south of Koppers Pond.

Surface-water samples contained several VOCs, including TCE (8 ppb) and toluene (44 ppb), SVOCs, pesticides and metals. The metals included cadmium (20 ppb), chromium (28 ppb), copper (55 ppb), and lead (345 ppb) from samples collected in the open drainageway. The current permitted discharge limit for TCE at the Facility wastewater treatment plants is 11 ppb.

The sediment samples contained elevated concentrations of several VOCs, SVOCs, pesticides, PCBs, and metals.

The VOCs included toluene (38 ppb), carbon disulfide (27 ppb) and TCE (25 PPB).

The 1994 sediment samples, which were collected from a depth of 0-2 feet, contained PCBs (total) at concentrations ranging up to 8.6 ppm, with the highest concentrations found in the samples collected from the upstream portion of the industrial drainageway (sample locations 6-12; see Figure 3). The highest concentration of PCBs detected in the sediments collected from Koppers Pond was 1.6 ppm. PCBs were not detected in the sediment samples collected from the outlet stream south of Koppers Pond. PCBs were also not detected in any surface-water samples collected from this area.

The 1995 sediment samples, which were collected from a depth of 0 to 6 inches, contained lower levels of PCBs than that of the 1994 samples. The highest PCB concentration detected in samples collected from the industrial drainageway and Koppers Pond was 1.2 ppm.

The metals detected in the sediment samples included cadmium (1,055 ppm), chromium (378 ppm), copper (870 ppm), lead (1,810 ppm), nickel (213 ppm) and zinc (10,775 ppm). The highest concentrations were from sediment samples collected from the industrial drainageway. The metals concentrations in sediment samples collected from Koppers Pond and the outlet stream south of Koppers Pond were generally an order of magnitude lower than those concentrations found in samples from the industrial drainageway.

Based on these findings, a source of PCB contamination in the industrial drainageway is believed to be from the Facility, where PCBs have been detected in soil samples collected from most of the areas investigated during the RI. The highest PCB concentration found at the Facility was 3.2 ppm in a soil sample collected from the Soil Pile. Because the Soil Pile was generated as part of previous construction activities believed to be associated with plant expansions in 1987 and 1988, the precise source of the Soil Pile is not known.

Elevated concentrations of metals in the industrial drainageway sediments and surface water are believed to be the direct result of previous and ongoing permitted discharges from the Facility.

Additionally, unauthorized releases from a currently unknown source at the Facility are believed to have also impacted the sediments and surface water in the industrial drainageway. Beginning in the Spring of 1995, local citizens and representatives of Federal and NYS regulatory agencies have observed a significant amount of a whitish-brown material floating in the industrial drainageway. Analysis of this material revealed elevated concentrations of several metals, including lead (14,600 ppm), cadmium (334 ppm), and chromium (294 ppm). No PCBs were detected in this material.

Subsequent sampling and analysis of the whitish-brown material by the NYSDEC in September 1995 indicated elevated levels of several metals, including lead (5,800 ppm), zinc (6,220 ppm), chromium (347 ppm), and cadmium (116 ppm). Samples obtained and analyzed by the NYSDEC in June 1996 also contained lead (2,300 ppm), copper (1,100 ppm), aluminum (11,000 ppm), chromium (200 ppm), and cadmium (180 ppm).

The NYSDEC is currently conducting an investigation to identify the possible source(s) of such ongoing releases. As part of that investigation, a Facility operator has agreed to perform an investigation of its wastewater treatment plant operations under the direct oversight of the NYSDEC.

Fish

Analyses of fish samples (carp and large mouth bass species) collected at Koppers Pond by the NYSDEC in 1988 revealed concentrations of total PCBs at approximately 4.0 ppm, which exceeded the Food and Drug Administration (FDA) limit of 2.0 ppm for total PCBs in fish. Based on such data, the NYSDOH issued a fish consumption health advisory for Koppers Pond recommending that the consumption of carp be limited to one meal per month for the general population and avoiding fish consumption for women of child bearing years and children under the age of fifteen (see NYSDOH Health Advisory Chemicals in Sport Fish and Games). In light of such findings, fish-tissue-sample analysis was included as part of the RI for the industrial drainageway and Koppers Pond.

White sucker and carp species were collected by an electroshocking technique at Koppers Pond in June 1995. All fish samples collected were relatively small (approximately 6-9 inches). Thirteen fish-tissue samples were prepared by filleting and removal of skin. The samples were analyzed for EPA's Target Compound List (TCL) and Target Analyte List (TAL)chemicals.

The fish-tissue analyses revealed concentrations of VOCs, PCBs and metals. The VOCs included carbon disulfide (589 ppb), acetone (474 ppb), and toluene (11 ppb).

The PCB (Aroclor 1254) levels ranged up to 0.54 ppm. Fifteen metals were also detected, including arsenic at a maximum concentration of 0.1 ppm.

REMOVAL ACTION

Based on the preliminary findings during the RI, the EPA and Westinghouse entered into an administrative order on consent on September 27, 1995 for Westinghouse to remove the buried 55-gallon drums containing magnesium chips and titanium turnings waste from the Magnesium Chip Burial Area and hazardous soils at the two Calcium Fluoride Sludge Disposal Areas containing a white material having characteristics of a RCRA hazardous waste. The buried drums and hazardous soils constituted a release and/or threat of release to the environment and therefore were removed from the Facility as part of an expedited response action.

In late 1995 and early 1996, Westinghouse excavated and sent off-Site for disposal the following materials:

A total of 179 55-gallon drums (284.9 tons) were removed from the Magnesium Chip Burial Area, opened to confirm that the wastes were encased in concrete, and sent off-Site for proper disposal;

At the two Calcium Fluoride Sludge Disposal Areas, approximately 1,240 tons of the white, powdery material and soil mixed with such material were excavated and sent off-Site for disposal as RCRA hazardous waste; and,

Four truck loads of soil containing PCBs and PAHs were removed from the Soil Pile area and taken off-Site for disposal, with the remaining uncontaminated soil used to backfill other areas excavated during the removal.

Confirmation soil sampling and analysis confirmed that the residual soils at the excavations of the two Calcium Fluoride Sludge Disposal Areas and the Magnesium Chip Burial Area met the EPA's established risk-based cleanup objectives.

SUMMARY OF SITE RISKS

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

Based on the results of the RI, the EPA conducted a baseline human health risk assessment and screening level ecological risk assessment to evaluate potential risks to human health and the environment associated with OU3 at the Site assuming current conditions. Those risk assessments focused on contaminants which are likely to pose significant risks to human health and the environment in the soil at the Facility and the sediment, surface water, and fish in the Industrial Drainageway and Koppers Pond. A summary of the contaminants of concern identified in sampled media is listed in Table 1 and the contaminant levels used for the human health risk calculations are listed in Table 2 (see Appendix II).

Human Health Risk Assessment

The EPA's baseline human health risk assessment for OU3 estimated the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to Site contaminants under current and future land-use conditions. The exposure routes evaluated included: (1) ingestion, dermal contact and inhalation of untreated soils; (2) ingestion and dermal contact of surface water and sediments; and, (3) ingestion of fish from Koppers Pond. Specifically, human receptors evaluated for exposure to contaminated soils at the Facility were site workers, employees and on-site construction workers in present and potential future industrial land use scenarios. Such exposures were also evaluated for adult and child residents in the potential future residential land use scenario. At the industrial drainageway and Koppers Pond, area residents (teenage trespassers) were evaluated for exposure to contaminated surface water and sediment, and area residents (adults) were evaluated for exposure to contaminated fish in present and future residential land use scenarios. These potential exposure pathways are listed in Table 3 (Appendix II).

Although a future residential land use scenario is included in the assessment for the Facility, the property is currently industrial and zoned for industrial uses only. Additionally, it is not anticipated that the industrial setting will change in the foreseeable future. Therefore, the remedial alternatives discussed in this ROD for the Facility address only those risks associated with the present and future industrial land use settings (see section on Summary of Remedial Alternatives, below).

To quantitatively assess the potential carcinogenic and noncarcinogenic health risks associated with the exposure scenarios considered in this assessment, estimates of chronic and subchronic daily intakes are developed. Daily intake levels are expressed as the amount of a substance taken into the body (milligrams) per unit body weight (kilograms) per unit of time (day), or mg/kg/day. It is averaged over a lifetime for carcinogens and the period of exposure for noncarcinogens. Because of the uncertainty associated with any estimate of exposure concentration, the daily intakes were calculated using the upper confidence level (UCL) (i.e., the 95 percent UCL) on an arithmetic average, which was derived from actual Site data. In cases where the 95 percent UCL exceeded the maximum detected concentration, the maximum detected concentration was used in the calculations.

Potential carcinogenic risks were evaluated using cancer slope factors (SFs) developed by the EPA for the contaminants of concern. SFs have been developed by the EPA's Carcinogenic Risk Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of (mg/k/-day)-1, are multiplied by the estimated daily intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. The SFs for the contaminants of concern at OU3 are presented in Table 4 (Appendix II).

For known or suspected carcinogens, the EPA considers excess upper-bound individual lifetime cancer risks in the range of 10-4 to 10-6 to be acceptable. These risk levels indicate that an individual has approximately a one-in-ten-thousand to one-in-a-million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the site.

Noncarcinogenic risks were assessed by comparing expected daily intake levels (chronic and subchronic) with oral and inhalation reference doses (RfDs). RfDs are estimates of daily exposure levels or intake levels for humans which are likely to be without an appreciable risk of harmful effects over a lifetime (including sensitive individuals). The estimated daily intake level of a single contaminant from an environmental medium (e.g., the amount of a chemical ingested from contaminated drinking water) is compared to the contaminant's RfD to derive a hazard quotient. A hazard index (HI) is obtained by adding the individual hazard quotients for all contaminants across all media that impact a particular receptor population. The RfDs for the contaminants of concern at OU3 are presented in Table 5 (Appendix II).

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential effects of exposure to multiple contaminants within a single medium or across media.

In accordance with the EPA's guidelines for evaluating the potential toxicity of complex mixtures of chemicals, it was assumed that the toxic effects of site-related contaminants would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual contaminants of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

The summing of carcinogenic risks and noncarcinogenic HI values calculated for each of the potential exposure pathways identified for specific receptor groups and media are shown in Tables 6 and 7 (Appendix II). The only carcinogenic risks which exceed the upper-bounds of the EPA's 10-4 to 10-6 target risk range occur for site workers and employees potentially exposed to contaminated soil at Disposal Area F and area residents exposed to contaminated fish from the industrial drainageway and Koppers Pond. The only noncarcinogenic HI which exceeded the EPA's target value of one, assuming the future land use at the Westinghouse Facility remains industrial, is from the ingestion of contaminated fish from the industrial drainageway and Koppers Pond by area residents.

Carcinogenic risk as a result of ingestion of surface soil by present and potential future site workers/employees at Disposal Area F is estimated to be 5.1 x 10-4. The cancer risk is attributable primarily to carcinogenic PAHs (i.e., benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)anthracene and Indeno(1,2,3-cd)pyrene) and arsenic.

The carcinogenic risk related to ingestion of contaminated fish from the industrial drainageway and Koppers Pond by area residents (adults) was estimated to be 3.8 x 10-4. This risk exceeds the EPA's 10-4 to 10 6 target risk range and is attributed to PCBs (Aroclor 1254) and arsenic. The HI calculated for fish ingestion by an adult is 6.9, which exceeds the EPA's target level of 1.0. This value is also attributed to Aroclor 1254 and arsenic.

Noncarcinogenic HI values calculated for several other areas at the Facility also exceed the EPA's 1.0 target level for a resident child exposed to contaminated soil in a potential future residential land use scenario. However, as stated above, the land use is expected to remain industrial for the foreseeable future. Therefore, the remedial actions selected in this ROD for the Facility address only those risks associated with the present and future industrial land use settings (see section on Summary of Remedial Alternatives, below).

All other areas and environmental media investigated during the RI presented health risks which were below or within the EPA's 10-4 to 10-6 target risk range for carcinogens or below the EPA's HI target level of one for noncarcinogenic health hazards.

Screening Level Ecological Risk Assessment

To assess the effect of Site-related contaminants on the ecosystems in the industrial drainageway and Koppers Pond, the EPA performed a screening-level ecological risk assessment. The initial step of this assessment was to screen contaminant concentrations detected in the sediment, surface-water and fish samples against ecological screening criteria, Federal Ambient Water Quality Criteria, and NYSDEC Ambient Water Quality Standards established, in part, for the protection of aquatic and terrestrial wildlife and their habitats.

Following ecological screening, ecological risk characterization (modeling) was performed using three contaminants of concern (i.e., cadmium, lead and Aroclor 1254) along with Site-specific biological species/habitat information. Two receptor species identified at the Site, the great blue heron and racoon, were selected for risk modeling. The potential exposure pathways used for those receptor species were the ingestion of contaminated fish and ingestion of surface water and sediment. To perform the exposure assessment, the EPA estimated exposure point concentrations (daily doses) based on the sediment, surface water, and fish fillet data obtained during the 1996 RI and published bioaccumulation factors.

Ecological screening revealed that several contaminants, primarily cadmium, chromium, copper, lead, nickel, zinc, and PCBs, are present in the sediment and/or surface water at levels which may have an adverse effect on aquatic and terrestrial wildlife.

Additionally, Aroclor 1254 levels detected in fish tissue samples exceeded the NYS whole-body fish criteria for PCBs and indicate that the contaminant is bioaccumulating at levels known to be associated with adverse ecological effects.

Aroclor 1254, cadmium and lead dosage calculations performed for the great blue heron and racoon, when compared to known reference doses for toxicity, also revealed that estimated daily doses of such contaminants are at or exceed levels which cause adverse ecological effects in organisms.

Field observations revealed a fairly diverse wildlife community around Koppers Pond, but the aquatic habitat appeared to be stressed. Koppers Pond appeared to be depauperate of fauna. No small fish, tadpoles or newts were observed in the Pond and no benthic organisms were sighted in the industrial drainageway, nor in the sediment samples collected from the industrial drainageway, the Pond, and outlet stream south of the Pond.

In light of the findings of the screening level ecological risk assessment and field observations, the EPA has determined that further field investigations are warranted to assess the extent of environmental impacts to Koppers Pond and the outlet stream south of the Pond. The EPA plans to conduct such an investigation as part of a supplemental study. Upon completion of this supplemental study, the EPA will assess the need for remedial action in those areas.

Discussion of Uncertainties in Risk Assessment

The procedure and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and,
- toxicological data.

Uncertainty in environmental sampling arises, in part, from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the contaminants of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the contaminants of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the baseline human health risk assessment provides upper-bound estimates of the risks to populations near the Site, and it is highly unlikely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, in presented in the EPA's baseline human health risk assessment report for OU3.

The greatest carcinogenic risks at the Site revealed during OU3, assuming the future land use at the Facility remains industrial, is associated with the ingestion of soil at Disposal Area F by site workers and employees and ingestion of fish from the industrial drainageway and Koppers Pond by area residents (adults). Additionally, significant noncarcinogenic effects from the ingestion of fish by area residents has also been established.

In light of the above, the EPA has determined that actual or threatened releases of hazardous substances form this Site, if not addressed by implementing the response actions selected in this ROD, may present a potential threat to public health, welfare, or the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment. The primary objectives of these actions are to control the source(s) of contamination at the Site and to reduce and minimize the migration of contaminants into Site media, thereby minimizing any health and ecological impacts.

The following RAOs were established for OU3:

Preventing direct contact with contaminated soil;

Preventing the leaching of contaminants into ground water; and,

Preventing contact with contaminated sediment and limiting the availability of contaminants for uptake by fish, thereby serving to reduce the health threat posed by fish consumption.

Soil

The RAO is to prevent direct contact with soils that pose an unacceptable risk (i.e., carcinogenic risk greater than the EPA's 10-4 to 10-6 target risk range or a noncarcinogenic HI greater than one) under the present and future industrial land use scenarios. In order to determine which areas at the Facility require soil remediation, cleanup goals were established for those contaminants of concern identified in the EPA's baseline human health risk assessment for each area investigated. The cleanup goals or concentrations are calculated such that the carcinogenic risk posed by the soil residual contaminant levels after cleanup are no greater than 1 x 10-6.

Based on such calculations, the only potential source area at the Facility having soil contamination levels that exceed the established risk-based cleanup goals is Disposal Area F. The contaminants of concern which exceed such goals are four PAHs and arsenic. The calculated risk-based RAOs for the PAHs are as follows:

Benzo(a)anthracene	7.80 ppm
Benzo(a)pyrene	0.78 ppm
Benzo(b)fluoranthene	7.80 ppm
Indeno(1,2,3-cd)pyrene	7.80 ppm

Because the risk-based cleanup goal for arsenic is below the background level at the Site, it cannot be achieved. A background level of 26.5 ppm for arsenic was calculated based on data from 16 soil samples collected at depths between 0 to 2 feet and 10 to 12 feet along the perimeter of the Facility. However, because of anomalies in the background data, this value was above the normal background range for arsenic in New York (3 to 12 ppm), as described by the NYSDEC Technical and Administrative Guidance Memorandum (TAGM). Therefore, the EPA decided to use the maximum background value provided by the TAGM (12 ppm) as a more conservative cleanup goal.

Soil at several other potential source areas, in addition to Disposal Area F, has arsenic levels higher than the risk-based cleanup goal calculated for arsenic, but such levels are below the established cleanup goal of 12 ppm.

Under the future industrial setting, there are no instances in which the HI associated with exposure to surface soil at the Facility exceeds the EPA's target level of one.

Based on the EPA's baseline human health risk assessment for OU3, no RAOs are required for subsurface soil as a result of or threat posed by direct-contact exposure.

Ground Water

The EPA did not quantitatively evaluate human health risks associated with the ground-water pathway in its baseline human health risk assessment for OU3 because such an assessment was previously completed by the EPA for OU2. The carcinogenic risk calculated for the ground-water pathway in that risk assessment was 1 x 10-3 for the reasonable maximum exposure, which exceeded the EPA's target risk range of 10-4 to 10-6. The chemicals which were the primary contributors to said risk were TCE, vinyl chloride, and arsenic. The interim ground-water remedy selected for OU2 was to mitigate such health risk by achieving Federal and NYS drinking water standards at the tap.

Based on the findings of the RI for OU3, no further ground-water treatment beyond that selected as part of the OU2 interim remedy was deemed to be necessary as a response action for OU3. Therefore, RAOs were not developed for ground water at OU3.

Although RAOs were not developed for ground water, soil remediation was necessary as a source control effort to compliment the 1990 ground-water remedy for OU2. Therefore, RAOs have been developed for those soils identified in the RI as contributing to the contamination in ground water beneath the Facility. TCE is present in the soils at Disposal Area F and the Former Runoff Basin Area at concentrations which have the potential to leach to ground water. To prevent further leaching of TCE from soils to ground water, an RAO of 0.8 ppm was calculated for TCE based on a soil leaching model contained in the EPA's 1994 Technical Background Document for Soil Screening Guidance. For comparison, the NYSDEC's established cleanup goal for TCE in soil is 0.7 ppm, as defined in the TAGM.

Sediment

Based on the EPA's baseline human health risk assessment for OU3, the RAO for sediment in the industrial drainageway and Koppers Pond is to prevent exposure to PCBs through fish consumption and direct contact with sediment. For mitigating such human health threats, a RAO of 1.0 ppm PCB (total) is established for the sediment. The 1.0 ppm level is consistent with the EPA and the NYSDEC TAGM guidance for PCB cleanup levels in residential areas. Remedial efforts would be focused on the industrial drainageway sediment because PCB concentrations exceeded the 1.0 ppm RAO. PCB levels in the sediment in Koppers Pond were less than or approximately equal to the RAO. However, to ensure that the RAOs for the Pond are met, sampling will be performed for PCBs as part of the additional ecological investigation planned by the EPA for Koppers Pond and the outlet stream south of the Pond. Upon completion of that investigation, additional RAOs will be calculated, if necessary, to address any environmental impacts.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA mandates that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute establishes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances, pollutants and contaminants at a site.

The FS report evaluates twelve remedial alternatives for addressing the contamination associated with OU3 at the Site, four each for Disposal Area F, the Former Runoff Basin Area and the industrial drainageway. Because each of the areas to be remediated differs with regard to the nature and extent of contamination, general physical characteristics, and location, the EPA is not selecting one remedial alternative for the entire operable unit, rather a specific remedial action for each area of contamination.

The remedial alternatives evaluated for OU3 are described below. It should be noted that the numerical designation of several alternatives in this ROD differ from those used for the same alternatives contained in the FS Report.

Also, the time periods referenced below for implementation of the remedial alternatives does not reflect that period of time required to negotiate with the responsible party, design the remedy, and procure any contracts which are necessary to implement the remedy.

Disposal Area F

Alternative 1A - No Action

Capital Cost:	0
O & M Cost:	0
Present-Worth Cost:	0
Time to Implement:	None

CERCLA requires that the "No Action" alternative be considered as a baseline for comparison of other alternatives. The No Action alternative for Disposal Area F provides for no further effort to avoid exposure to soil or to control the leaching of contaminants to ground water. The access controls for the Facility (e.g., security guard and perimeter fence) would remain active. The existing, temporary fence around Disposal Area F would be left in place and the area would remain a vacant, unused portion of the plant site. The TCE present in soil would eventually leach into ground water and migrate to the OU2 ground-water recovery wells, where it would be extracted and treated.

Because this alternative, if selected, would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the area be reviewed every five years.

Alternative 2A (Option 1) - Containment with Asphalt Cover

Capital Cost:	$219,200
O & M Cost (per year):	$19,200
Present-Worth Cost:	$514,100
Time to Implement:	Less than 1 year

Under this containment alternative, Disposal Area F would be capped with a 40-mil (one mil = one-thousandth of an inch) thick Flexible Membrane Liner (FML), 6-inch subbase layer of fill and 6-inch layer of asphalt pavement. The paved area would cover approximately 0.8 acres of ground surface and could be used for parking. As a practical matter, the area proposed for asphalt covering is somewhat larger than the area containing waste materials because the asphalt cap would be extended to the existing asphalt parking lot at the Facility. Institutional controls would include a deed restriction to limit excavation work and further property use or development, long-term physical monitoring to minimize future worker contact and enforce the deed restriction, and long-term ground-water monitoring to determine the ongoing contribution of this area to TCE contamination in ground water.

Because this alternative, if selected, would result in contaminants remaining on-Site above health-based limits, CERCLA requires that the area be reviewed every five years.

Alternative 2A (Option 2) - Containment with Low-Permeability Cap

Capital Cost:	$606,300
O & M Cost (per year):	$34,200
Present-Worth Cost:	$1,114,000
Time to Implement:	Less than 1 year

This containment alternative involves placing a 6-foot thick multi-layer, low permeability cap over an approximate area of 29,200 square feet (0.67 acre). The components of the cap would include a 2-foot thick clay layer, 40 mil FML, 12-inch thick drainage layer with overlying geotextile filter fabric, 30-inch thick barrier-protection soil layer and 6 inches of topsoil. The capped area would be fenced, the deed restriction instituted and long-term physical and ground-water monitoring performed.

Because this alternative, if selected, would result in contaminants remaining on-Site above health-based limits, CERCLA requires that the Site be reviewed every five years.

Alternative 3A - Removal and Off-Site Disposal

Capital Cost: $549,000
O & M Cost (per year): $4,600
Present-Worth Cost: $619,600
Time to Implement: Less than 1 year

This alternative involves the excavation and off-Site disposal of approximately 1,100 cubic yards (1,600 tons) of contaminated waste materials. Prior to excavation, further sampling and analysis would be conducted to classify the waste material for off-Site disposal. PAH- and arsenic-contaminated soils are not listed RCRA hazardous waste and are not expected to exhibit the characteristics of a RCRA waste. Therefore, it may be possible to dispose of such waste in a permitted solid waste landfill. Waste materials containing TCE would require disposal in a RCRA permitted hazardous waste landfill, if classified as a listed RCRA hazardous waste. If TCE concentrations exceed Land Disposal Restriction (LDR) standards, treatment would be required in a permitted hazardous waste incinerator in advance of land disposal. For such materials, the treatment standard is 6.0 ppm. It is estimated that only 32 cubic yards (50 tons) or approximately 3 percent of the total volume (1,100 cubic yards) of waste material contain TCE at concentrations above the LDR standard.

The depth of excavation necessary to meet designated cleanup goals for TCE, PAHs and arsenic is estimated at approximately 2.0 - 2.5 feet. Following excavation, confirmatory sampling and analysis would be performed. With complete removal of the waste materials exceeding cleanup goals, institutional controls or post-remediation monitoring would not be required.

Alternative 4A - Physical Treatment by Soil Vapor Extraction

Capital Cost: $525,900
O & M Cost (per year): $4,600
Present-Worth Cost: $596,500
Time to Implement: Installation - less than 1 year
Operation - minimum period of 1 year

To address TCE contamination, a conventional SVE system would be installed using vertical air extraction wells in the area where TCE levels in soil exceed the cleanup goal of 0.8 ppm. These extraction wells would cause the movement of soil vapor and some ground water through the unsaturated soil towards the wells. The soil vapors withdrawn from those wells would be sent through an off-gas treatment system using granular activated carbon to remove TCE. Any ground water recovered with the soil vapor would be treated at the water treatment facility installed as part of the ground-water remedy for OU2. Because the TCE-contaminated soil is relatively near the surface (0-2.5 feet), a 40-mil FML would be placed over the treatment area (1,200 square feet) to minimize short-circuiting of air flow.

To address the PAH and arsenic contamination in the surface soil, a 2-foot cover of imported clean soil would be placed over the entire affected area to prevent direct-contact exposure pathways. The upper six inches would consist of topsoil.

The treatment and cover area would be fenced, deed restrictions instituted and long-term physical monitoring implemented. Long-term ground-water monitoring would be performed until SVE is completed and the cleanup goal for TCE is achieved.

Because this alternative, if selected, would result in the PAH and arsenic contamination remaining on-Site above health-based limits, CERCLA requires that the Site be reviewed every five years.

Based on pilot-scale SVE testing, it is estimated that one year of operation would be required to achieve TCE cleanup goals in soil.

Former Runoff Basin Area

Alternative 1B - No Action

Capital Cost:	0
O & M Cost:	0
Presnt-Worth Cost:	0
Time to Implement:	None

As stated above, the No Action alternative is considered as a baseline for comparison of other alternatives. The No Action alternative would provide no further efforts to address TCE leaching to ground water in this area. The access controls for the Facility (e.g., security guard and perimeter fence) would remain active and the asphalt pavement would be left in place. The TCE present in soil would continue to leach to ground water for eventual extraction and treatment by the ground-water recovery well system installed as part of the OU2 remedy.

Because this alternative, if selected, would result in contaminated soil remaining on-Site above health-based limits, CERCLA requires that the Site be reviewed every five years.

There are no capital or operation and maintenance costs associated with this No Action alternative and no time would be required for construction.

Alternative 2B - Removal and Off-Site Disposal

Capital Cost:	$1,261,800
O & M Cost:	$0
Present-Worth Cost:	$1,261,800
Time to Implement:	Less than 1 year

This alternative involves the excavation of approximately 750 cubic yards ot TCE-contaminated soil for off-site disposal at a RCRA hazardous waste landfill or treatment at a RCRA hazardous waste incinerator, depending on waste classification and LDRs. Any nonhazardous waste would be disposed at an off-Site solid waste landfill. Because of the depth of excavation (10 feet) and proximity of man-made structures, the sidewalls would require shoring with sheet piling. Underground utilities would be relocated or replaced prior to driving sheet piling, and construction dewatering would be performed since the ground-water table is at a depth of 8.5 feet. Ground water recovered from dewatering operations would be treated at the water treatment facility to be installed at the Facility as part of the ground-water remedy for OU2.

Confirmatory sampling and backfilling with clean soil will complete the remedial effort. Post remediation monitoring would not be required.

Alternative 3B (Option 1) - Physical Treatment by Dual-Phase Soil Vapor Extraction

Capital Cost:	$544,700
O & M Cost:	Included with capital costs
Present-Worth Cost:	$544,700
Time to Implement:	Installation - less than 1 year Operation - minimum period of 1 year

This alternative involves the installation of a "dual-phase" SVE system (DP-SVE) at the Former Runoff Basin Area because TCE contamination is present in soil below the water table. In a DP-SVE system, ground water and soil gas would be withdrawn through the same extraction wells and the water and air would then be separated for treatment. The air stream will be treated through an off-gas treatment system using granular activated carbon. The ground water would be treated at the water treatment facility installed as part of the OU2 remedy. The SVE treatment area would be approximately 55 feet by 75 feet, and the extraction wells would extend to a depth of 15 feet. The existing asphalt cover would provide a suitable low-permeability cover to limit short circuiting of air flow. Ground-water monitoring would be conducted until the DP-SVE operation is complete and the cleanup goals for TCE in soil are achieved.

Alternative 3B (Option 2) - Physical treatment by Soil Vapor Extraction with Air Sparging

Capital Cost:	$565,100
O & M Cost:	Included with capital costs
Present-Worth Cost:	$565,100
Time to Implement:	Installation - less than 1 year Operation - minimum period of 1 year

This alternative involves the use of SVE with air sparging (SVE-AS) to remove TCE from soil above and below the water table to the cleanup level of 0.8 ppm. The SVE-AS alternative is similar to Option 1, except that air sparging would treat the saturated soil in-situ, rather than extracting ground water for treatment at the OU2 treatment facility. With this process, air is injected under pressure into the soil below the water table. The air bubbles which form traverse horizontally and vertically through the water column. Dissolved TCE, when exposed to the air bubbles, volatilizes into the gas phase and is carried into the vadose zone where it is captured by the vapor extraction system. Although SVE-AS was not part of the pilot-scale SVE test, it is estimated that this system would operate for a period of one year to achieve the 0.8 ppm soil cleanup level for TCE.

Alternative 4B - Thermal Desorption Treatment

Capital Cost:	$763,200
O & M Cost:	0
Present-Worth Cost:	$763,200
Time to Implement:	Installation - less than 1 year Treatment - several week period

This alternative involves the excavation of TCE-contaminated soil and treatment on-Site through a transportable thermal desorption unit. Thermal desorption is a means to physically separate VOCs and some SVOCs from soil by heating the contaminated media between 200-1000°F and driving off water and volatile contaminants. Off-gases would be burned n an afterburner, condensed to reduce the volume to be disposed, or captured by a carbon treatment system.

Excavation would proceed as described in Alternative 2B and would include the provisions for utility relocation or replacement, excavation sidewall shoring, and construction dewatering.

The treated soil would be tested and, if found to meet cleanup objectives, returned to the excavation as backfill. Soil not meeting the cleanup objectives would be retreated.

Confirmatory sampling would be conducted to ensure that the contaminated soil requiring treatment is excavated and processed. Because thermal treatment involves removal of contaminants, post-remediation monitoring would not be required.

Industrial Drainageway

Alternative 1C - No Action

Capital Cost:	0
O & M Cost	0
Present-Worth Cost:	0
Time to Implement:	None

As stated above, the No Action alternative is considered as a baseline for comparison of other alternatives. The No Action alternative for the industrial drainageway sediment would provide no further efforts to reduce the availability of PCBs for direct-contact exposure by trespassers or uptake by fish which may be consumed. It is assumed that the existing NYSDOH fish consumption advisory for Koppers Pond and access controls placed by the current landowner of the pond area would remain in place.

Because this alternative, if selected, would result in the contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Alternative 2C - Limited Action

Capital Cost:	$268,200
O & M Cost (per year);	$13,800
Present-Worth Cost:	$480,100
Time to Implement:	Less than 1 year

The Limited Action alternative would involve supplementing the existing NYSDOH fish consumption advisory and access controls with a fence erected along both banks of the drainageway and around the perimeter of Koppers Pond. This fence would be an 8-foot high chain-link fence of approximately 7,600 feet in total length. Warning signs would be placed along the fence to prevent inadvertent access. Long-term physical monitoring would be performed to ensure the integrity of the fence.

Because this alternative would result in the contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Alternative 3C - Containment with Concrete Ditch Lining

Capital Cost:	$373,400
O & M Cost (per year):	$18,700
Present-Worth Cost:	$660,600
Time to Implement:	Less than 1 year

Under this alternative, the 1,500 lineal feet of the industrial drainageway from the Chemung Street outfall to the culvert beneath the railroad tracks would be lined with concrete. The method of liner placement would be determined during design, but could include either formed and poured concrete or a Fabriform lining system. The liner would be designed to conform with the existing shape of the flow channel so as to minimize the quantity of sediments requiring removal or regrading.

In constructing such lining, diversion pumping and necessary erosion and sedimentation controls would be emplaced to avoid spreading contaminated sediment to downstream locations.

Because this alternative would result in the contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Alternative 4C - Removal and Off-Site Disposal

Capital Cost:	$365,600
O & M Cost:	0
Present-Worth Cost:	$365,600
Time to Implement:	Less than 1 year

This alternative would involve the removal of sediment containing PCB concentrations above the cleanup objective of 1.0 ppm from the industrial drainageway for off-Site disposal in a permitted industrial waste landfill. The volume of sediment to be removed is estimated at 1,100 cubic yards. During excavation, diversion pumping and necessary erosion and sedimentation controls would be emplaced to avoid spreading contaminants to downstream locations. Following confirmatory sampling and analysis, the flow channel would be reshaped using clean off-Site borrow, as needed. Erosion controls (i.e., erosion control matting) would be emplaced before redirecting water flows through the channel. With removal of contaminants to cleanup goals, access controls or post-remediation monitoring would not be required.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, a detailed analysis of each remedial alternative is required. The detailed analysis consists of an assessment of the individual alternatives against each of nine evaluative criteria set forth in the NCP and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria must be satisfied by any alternative in order to be eligible for selection:

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

2. Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

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

5. Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation of the remedy.

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

7. Cost includes estimated capital and operation and maintenance (O&M) costs, both translated to a present-worth basis. The detailed analysis evaluates and compares the cost of the respective alternatives, but draws no conclusion as to the cost-effectiveness of such alternatives. Cost-effectiveness is determined in the remedy selection phase, when cost is considered along with the other balancing criteria.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. State acceptance indicates whether, based on its review of the RI/FS reports and Proposed Plan, the State concurs, opposes, or has no comment on the preferred alternative at the present time.

9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI and FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the alternatives evaluated for each of the three areas to be remediated, which is based upon the evaluation criteria noted above, is provided below.

Disposal Area F

Overall Protection of Human Health and the Environment

All of the alternatives proposed, with the exception of the No Action alternative, would provide adequate protection of human health by eliminating risks posed by the exposure to surface soils. Additionally, such alternatives address soil contamination as source control measures for complementing the OU2 ground-water remedy selected by the EPA for the protection of human health.

Alternatives 2A, Option 1 (Containment with Asphalt Cover) and Option 2 (Containment with Low-Permeability Cap) would provide engineering controls (capping) to reduce the risk of exposure to contaminated soil and institutional controls (fencing, deed restrictions and/or monitoring) to ensure cap integrity.

Alternative 3A (Removal and Off-Site Disposal) would eliminate the risk of exposure to contaminated surface soil. It would also be an effective source control measure in addressing TCE contamination in ground water.

Alternative 4A (Physical Treatment Using SVE) is a source control remedy to address TCE, but includes a capping component (soil cover) to address risks posed by exposure to surface soil.

Compliance with ARARs

The principal action-specific ARARs for Disposal Area F include RCRA requirements for the identification, transportation, treatment and disposal of hazardous waste (40 CFR Parts 261 thru 264 and Part 268) and the corresponding NYS hazardous waste requirements. Additionally, Federal and NYS requirements for air emissions are action-specific ARARs (6NYCRR Parts 200, 201, 211, 219 and 257; NYS Air Guide-1) because of the potential for gaseous and particulate air emissions to be generated during excavation and transportation of contaminated soil and SVE off-gassing.

As the source control and final aquifer restoration operable unit for the Site, the principal chemical-specific ARARs for the aquifer are Federal and NYS Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs). The cleanup goal for TCE-contaminated soil is established to prevent the leaching of TCE to ground water. It is anticipated that such source control measures, in combination with the OU2 ground-water remedy, would achieve MCLs and MCLGs within the aquifer.

No chemical- or location-specific ARARs address the soil contaminated with PAHs and arsenic at Disposal Area F.

Alternative 1A would not achieve the cleanup goals for contaminated soils and therefore would not comply with the chemical-specific ARARs for ground water. Since this alternative involves no remedial activities, it does not trigger any location- or action-specific ARARs.

Alternative 2A, Options 1 and 2, would not initially comply with the chemical-specific ARARs for ground water because contaminants at concentrations above the cleanup levels would remain in the soil. However, such options would reduce infiltration of precipitation and impede the leaching of contaminants to the underlying ground water. Therefore, ARARs may be achieved over time through natural attenuation (i.e., processes of volatilization and biodegradation) and by operation of the OU2 ground-water recovery wells and treatment system. Those ground-water recovery wells will be located directly downgradient of the contaminant plume originating at Disposal Area F. The low-permeability cap (Option 2) would be better than the asphalt pavement (Option 1) at preventing infiltration from occurring. Long-term ground-water monitoring would be implemented to comply with RCRA requirements.

Alternative 3A effectively removes TCE-contaminated soil to cleanup levels. It would also be an effective source control measure for complimenting the OU2 ground-water remedy and achieving ground-water ARARs more quickly. The excavated waste materials would be classified to meet RCRA action-specific ARARs and the corresponding NYS hazardous waste regulations for the identification, transportation, treatment and disposal of hazardous waste. Additionally, because of the potential for gaseous and particulate air emissions to be generated during the excavation or transportation of contaminated soils, provisions would be included to comply with Federal and State action-specific ARARs and guidance for air emissions.

Alternative 4A would achieve TCE cleanup levels in soil over time (at least one year) and therefore, be an effective source control measure for complimenting the OU2 ground-water remedy. Effective source control would enable the ground-water remedy to comply with ground-water ARARs more quickly. Long-term ground-water monitoring would be performed to comply with RCRA requirements. Provisions would also be included to comply with all State and Federal ARARs for air emissions, including the action-specific ARARs and guidance for SVE off-gassing.

Long-Term Effectiveness and Permanence

Alternative 1A would not provide long-term effectiveness because the contamination is not removed, treated or contained. Therefore, the current risks posed by exposure to such contamination remains the same.

Alternative 2A would provide limited long-term effectiveness because institutional controls and monitoring would be required to maintain the integrity of the asphalt cover or low permeability cap. Deed restrictions would be filed to prohibit development of land in this area. Long-term physical monitoring and maintenance would be required to ensure cap integrity. Long-term ground-water monitoring would be required to assess effectiveness of the remedy as a source control measure for complimenting the OU2 ground-water remedy and compliance with ground-water ARARs.

Alternative 3A would provide long-term effectiveness because the contaminants are permanently removed from the Site. It would eliminate the risks posed by direct-contact with soil and would be an effective and permanent source control measure for addressing ground-water contamination at Disposal Area F. No post-remediation physical monitoring would be required.

Alternative 4A would provide limited long-term effectiveness from direct contact with PAHs and arsenic because physical monitoring and maintenance would be required to maintain the integrity of the soil cover. However, the alternative would be effective as a source control measure because TCE would be removed from the soil. Ground-water monitoring would be performed during the period of SVE treatment.

Reduction of Toxicity, Mobility, or Volume Through Treatment

All of the alternatives other than the No Action alternative would provide some degree of reduction of the toxicity, mobility and volume through treatment. Alternative 2A, Options 1 and 2, rely solely on containment to reduce contaminant mobility. However, they would not reduce the toxicity or volume of the waste. Alternative 4A would effectively reduce the toxicity, mobility and volume of TCE by treatment, but it only reduces the mobility of the PAHs and arsenic in contaminated soil by relying on containment. Alternative 3A reduces the toxicity, mobility or volume of the TCE, PAHs and arsenic by its removal and off-Site treatment and disposal.

Short-Term Effectiveness

The No Action and containment alternatives (Alternatives 1A and 2A) have minimal potential for adverse short-term impacts because workers would not handle affected soil while performing remedial activities. Potential short-term impacts are associated with the alternatives for removal and off-Site disposal and physical treatment by SVE (Alternatives 3A and 4A), as a result of the direct contact of soil by workers and the potential for vapor and/or particulate emissions. Such impacts would be addressed through worker health and safety controls and air pollutioncontrols such as water sprays, dust suppressants, and tarps for covering truck loads during transportation. Additionally, a community air-monitoring program would be utilized to ensure public safety. It is estimated that all of the alternatives could be easily completed in one construction season. The SVE system, once constructed, would be operated for a period of at least one year to remediate soil to established cleanup levels.

Implementability

Each alternative would involve commonly used construction techniques and would be implementable from an engineering standpoint. Each alternative would also utilize commercially available products and accessible technologies. The SVE treatment alternative is performed in the ground and, therefore, is more difficult to control and assess. The estimate of one-year for the removal of 95 percent of TCE mass is based on limited pilot-scale testing and, therefore, the estimate could be longer in duration than the actual time period necessary to attain the established TCE cleanup goal (0.8 ppm) in soil. SVE would also require more extensive design than the other alternatives. RCRA permitted facilities are readily available for the off-Site disposal of hazardous wastes.

Cost

The capital, present-worth and O&M costs of the alternatives for Disposal Area F are summarized in Table 8. The present-worth of the remedial alternatives, including capital costs and, where appropriate, 30-year O&M costs range from $0 to $1,114,000. The No Action alternative involves no costs. The costs estimated for the Containment with Asphalt Cover, Removal and Off-Site Disposal and Physical Treatment by SVE alternatives are all comparable, ranging between $514,000 and $620,000. The costs for containment and SVE alternatives depend to some degree on the volume of affected materials, but the range in their projected costs are much less sensitive to volume than the Removal and Off-Site Disposal alternative. The costs associated with the removal alternative ($619,600) are directly proportional to the quantity of affected material requiring treatment. While efforts were made to perform a comprehensive study at Disposal Area F, such efforts did not fully delineate the horizontal extent of the affected area. Hence, there is the potential for the quantity of affected material, and therefore the cost of this alternative, to increase significantly.

The incineration costs associated with the Removal and Off-Site Disposal alternative is $63,000 and is based on an estimated volume of 32 cubic yards (50 tons), or approximately 3 percent, of the total volume (1,100 cubic yards) of waste material containing TCE at concentrations exceeding the treatment standard of 6.0 ppm.

The costs associated with the containment alternatives are $514,100 for the asphalt cap and $1,114,000 for the low-permeability cap. Those costs would be somewhat sensitive to a larger surface area of affected material. However, the area proposed to be covered by asphalt would extend well beyond the currently defined limit of Disposal Area F, and therefore the costs associated with an asphalt cover are not anticipated to change significantly. The larger area of asphalt covering is proposed as a practical matter because the asphalt cap would be extended to the existing asphalt parking lot at the Facility.

State Acceptance

The State of New York concurs with the selected remedy.

Community Acceptance

All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V).

Former Runoff Basin Area

Overall Protection of Human Health and the Environment

No exposure pathways under current or future industrial site use were associated with direct-contact pathways for the Former Runoff Basin Area. For the restoration of the ground-water aquifer as a safe drinking-water source, all of the alternatives, with the exception of the No Action alternative, would provide adequate protection of human health as source control measures for addressing ground-water contamination.

Alternatives 2B (Removal and Off-Site Disposal) and 4B (Thermal Desorption Treatment) would remove the contaminated soil above and below the water table which is accessible with conventional material-handling equipment. However, any contamination in the soil in close proximity to, or directly beneath, building foundations in the Former Runoff Basin Area, if present, would continue to leach to ground water.

Alternative 3B (Physical Treatment by Dual-Phase SVE or SVE with AS) would be designed to effectively remove contaminants from soil in all affected areas, including those near or beneath building foundations, to below cleanup objectives.

Compliance with ARARs

The principal action-specific ARARs for the Former Runoff Basin Area are RCRA requirements regarding the identification, transportation, treatment and disposal of hazardous waste (40 CFR Parts 261 thru 264 and Part 268) and the corresponding NYS hazardous waste requirements. Additionally, Federal and NYS requirements for air emissions are action-specific ARARs or guidance (6NYCRR Parts 200, 201, 211, 219 and 257; NYS Air Guide-1) because of the potential for gaseous and particulate air emissions to be generated during excavation, transportation and/or waste feed preparation of contaminated soil and SVE off-gassing.

As the source control and final aquifer restoration operable unit for the Site, the principal chemical-specific ARARs for ground water are Federal and MYS MCLs and non-zero MCLGs. The cleanup goal for TCE-contaminated soil is established to prevent the leaching of TCE to ground water. Such source control measures, in combination with the OU2 ground-water remedy, will be for achieving MCLs and MCLGs.

Alternatives 2B (Removal and Off-Site Disposal) and 4B (Thermal Desorption Treatment) would be somewhat effective in removing TCE-contaminated soil to cleanup levels, including the saturated soil affected below the water table, as they are source control measures for attainment of chemical-specific ground-water ARARs. However, these alternatives would not address soil contamination in close proximity to, and directly under, the building foundations at the Former Runoff Basin Area. Such contamination, if present, would remain in place and continue to leach to ground water.

Alternative 3B (Physical Treatment by Dual-Phase SVE or SVE with AS) would effectively remove TCE from all affected soil, including the soil in close proximity to, or directly under, the building foundations at the Former Runoff Basin Area. Extraction wells could be positioned to remove soil vapors and ground water from those areas for treatment, resulting in more effective source control and, ultimately, a shorter period of time for compliance with ground-water ARARs.

For Alternatives 2B and 4B, RCRA action-specific ARARs and the corresponding NYS hazardous waste regulations would be met for the identification, transportation, treatment and disposal of hazardous waste.

Additionally, because gaseous and/or particulate air emissions could be generated during the excavation, waste feed preparation and transportation of contaminated soil or the off-gassing during SVE operations, provisions would be included for Alternatives 2B, 3B and 4B to comply with Federal and NYS action-specific ARARs and guidance for air emissions.

Long-Term Effectiveness and Permanence

Each of the alternatives proposed for the Former Runoff Basin Area, except the No Action alternative, would provide long-term effectiveness and permanence by removing the contaminants from the soil. The alternatives for removal with off-Site disposal and thermal desorption treatment (Alternatives 2B and 4B) would provide permanent remedies, in that excavated soils would be permanently removed from the Site or treated on Site. However, these alternatives may not be effective at addressing any contamination, if present, in the soil near or beneath building foundations. The SVE treatment alternatives (Alternative 3B, Options 1 and 2) would provide permanent remedies for the contaminated soil both above and below the water table, including those areas near, and potentially below, building foundations.

Reduction of Toxicity, Mobility, or Volume Through Treatment

With the exception of the No Action alternative, each of the alternatives would reduce the toxicity, mobility, and volume of TCE in the soil at the Former Runoff Basin Area through treatment.

Short-Term Effectiveness

The No Action alternative would not result in any adverse short-term impacts. Potential short-term impacts would be associated with the other alternatives as a result of the direct contact with soil by workers and/or the generation of vapor and particulate air emissions. Such impacts would be addressed through worker health and safety controls, air pollution controls such as water spraying, dust suppressants, and tarps for covering waste during loading, transporting and waste feed preparation. The Thermal Desorption Treatment alternative is anticipated to have the potential for most significant releases of airborne contaminants during remediation. Site and community air monitoring programs would be implemented when conducting such activities to ensure protection of workers and the nearby community. It is estimated that all of the alternatives could be completed within one construction season.

Implementability

All of the alternatives would involve commonly used construction practices and would be implementable from an engineering standpoint. Each alternative would utilize commercially available products and accessible technologies.

The SVE treatment alternatives (Alternative 3B, Options 1 and 2) and Thermal Desorption Treatment alternative (Alternative 4B) require more extensive engineering design. The estimate of one-year for the removal of 95 percent of TCE mass is based on limited pilot-scale testing and, therefore, the estimate could be longer in duration than the actual time period necessary to attain the established TCE cleanup goal (0.8 ppm) in soil, especially since dual-phase SVE and air sparging were not part of the SVE tests.
Commercial-scale thermal desorption units exist and are in operation.

Cost

The capital, present-worth and O&M costs of the alternatives described for the Former Runoff Basin Area are summarized in Table 8. The present worth of such alternatives, including capital costs and, where appropriate, 30-year O&M costs, range between $0 and $1,261,800. There are no costs associated with the No Action alternative. The present-worth of the two SVE treatment alternatives are estimated at $544,700 for Dual-Phase SVE (Option 1) and $565,100 for SVE with air sparging (Option 2). The thermal desorption treatment alternative is somewhat more expensive at $763,200. The highest costs ($1,261,800) are associated with the removal and off-site disposal alternative, resulting mostly from costs related to incineration of TCE waste materials exceeding the LDR treatment standard of 6.0 ppm for TCE. It is estimated that approximately 33 percent of the 750 cubic yards of TCE-affected soil will be incinerated at a cost of $470,000.

State Acceptance

The State of new York concurs with the selected remedy.

Community Acceptance

All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V).

Industrial Drainageway

Overall Protection of Human Health and the Environment

Alternative 1C (No Action) is not protective of human health because it does not eliminate, reduce or control the contamination at the Site.

Alternative 2C (Limited Action) provides some level of protection at the industrial drainageway and Koppers Pond by establishing physical and institutional controls (e.g., fencing and warning signs) to reduce risks posed by ingestion of contaminated sediment and consumption of fish. It is also assumed that the NYSDOH fish advisory and access controls placed by current property owners would remain in place.

Alternative 3C (Containment with Concrete Lining) is protective. It would reduce the availability of contaminants for fish uptake in Koppers Pond and, along with such controls as fencing, warning signs and the existing NYSDOH health advisory, reduce the risk posed from fish consumption.

Alternative 4C (Removal and Off-Site Disposal) is protective. It would eliminate the risk of direct exposure to contaminated sediment in the industrial drainageway and minimize the availability of PCBs to aquatic life, thereby reducing the risk posed by fish consumption.

Compliance with ARARs

The principal location-specific ARARs for the industrial drainageway would include 40 CFR Part 6, Appendix A - Executive Order 11990 for the protection of wetlands, and NYS Freshwater Wetlands Act, Article 24 and Article 71, Title 23 requiring a wetlands assessment and restoration plan for wetlands impacted by contamination or remediation.

The EPA and U.S. Army Corps of Engineers regulations under the Clean Water Act which, in part, regulates the discharge of dredged or fill materials to the waters of the United States constitute important action-specific ARARs. Additionally, RCRA regulations regarding the identification, transportation, treatment and disposal of hazardous waste (40 CFR Parts 261 thru 264 and Part 268), and the corresponding NYS hazardous waste requirements may be action-specific ARARs for this alternative, depending on waste classification. Because of the potential for gaseous and/or particulate air emissions to be generated during excavation and transportation of contaminated sediments, Federal and NYS requirements for air emissions would also be action-specific ARARs (e.g., 6NYCRR Parts 200, 211, 219 and 257; NYS Air Guide-1).

Location-specific ARARs for the protection, delineation and assessment of wetlands would be achieved, as appropriate, under all of the alternatives proposed for the industrial drainageway, except the No Action alternative. Alternative 4C would comply with RCRA action-specific ARARs and corresponding NYS hazardous waste regulations for identification, transportation, treatment and disposal of hazardous waste. Finally, because of the potential for gaseous and particulate air emissions to be generated during the excavation and transportation of contaminated sediments, Alternative 4C would have to comply with Federal and State action-specific ARARs and guidance for air emissions.

Long-Term Effectiveness and Permanence

Alternative 1C (No Action) would not provide for long-term effectiveness and permanence. Over time, the PCB concentrations may only change as a result of natural sediment deposition processes, assuming no additional sourcing of PCB contamination to the industrial drainageway and Koppers Pond.

Alternative 2C (Limited Action) would provide marginal long-term effectiveness in that it restricts inadvertent access, but it does not eliminate the potential for trespassers and the impact on the Pond and the related aquatic life.

Alternative 3C would provide long-term effectiveness in minimizing the availability of PCB-contaminated sediment for direct human contact exposure and for availability to aquatic life. The lining would be designed for resistance to erosion and long-term stability. Long-term physical monitoring would be required to ensure the integrity of the liner.

Alternative 4C would permanently eliminate the PCB-contaminated sediments in the industrial drainageway for direct human contact exposure or availability to aquatic life.

Reduction of Toxicity, Mobility, or Volume Through Treatment

With the exception of the No Action and Limited Action alternatives, each alternative would reduce the toxicity, mobility, and volume of contaminants in the sediment through treatment or containment.

Short-Term Effectiveness

No Action and Limited Action alternatives would not require workers to handle contaminated sediment and would not involve construction work in a waterway. Potential short-term impacts would be associated with the alternatives for containment with concrete lining and removal and off-Site disposal. The containment option would involve move limited excavation and handling, but it would also include construction work in the drainageway. The removal alternative represents the most significant potential short-term impact because it would involve sediment excavation from within a waterway. The inherent impacts to workers would be addressed by compliance with a health and safety plan, including an air monitoring plan. Additionally, a community air-monitoring program would be implemented to monitor and control airborne particulates and vapors for ensuring public safety. Bypass pumping and erosion and sedimentation controls would also be necessary. It is estimated that these alternatives could be completed in one construction season.

Implementability

All of the alternatives would involve commonly used construction practices and would be implementable from an engineering standpoint. With the exception of No Action, all of the alternatives would require access to the properties for varying lengths of time. Additionally, the containment and removal alternatives would require permits by the U.S. Army Corps of Engineers. These access and permitting issues could delay implementation.

Cost

The capital, present-worth and O&M costs of the alternatives described for the industrial drainageway are summarized in Table 8. The present-worth of such alternatives, including capital and 30-year O&M costs, where appropriate, range from $0 to $660,000. There are no costs associated with the No Action alternative. The present-worth cost for the Limited Action alternative is $480,100, with an estimated capital cost of $152,000 for the 7,600 feet of fencing. The Removal and Off-Site Disposal alternative has a present-worth cost of $365,600. The most costly alternative proposed is the Containment with Concrete Lining alternative, with a present-worth of $660,000.

State Acceptance

The State of New York concurs with the selected remedy.

Community Acceptance

All comments submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V).

SELECTED REMEDY

After careful consideration of all reasonable alternatives, as well as all comments provided by interested parties during the public comment period, the EPA has selected Alternative 3A (Removal and Off-Site Disposal) for the contaminated soil at Disposal Area F; Alternative 3B (Physical Treatment by SVE) for the contaminated soil at the Former Runoff Basin Area; and Alternative 4C (Removal and Off-Site Disposal) for the contaminated sediment at the industrial drainageway. Said alternatives are appropriate for OU3 because they best satisfy the requirements of CERCLA and the NCP's nine evaluation criteria.

The combined present-worth cost for the three remedies selected for OU3 ranges between $1,530,000 and $1,550,000, depending on whether the Physical Treatment by SVE alternative for the Former Runoff Basin Area is ultimately designed as the Dual-Phase SVE (Option 1) or the SVE with AS (Option 2).

The Removal and Off-Site Disposal alternative is the most effective and permanent source control measure for TCE contamination at Disposal Area F. As an effective source control, such a remedy will compliment the ground-water remedy selected for OU2 and achieve the compliance with ARARs within the aquifer more quickly than the other remedial alternatives evaluated. Additionally, no long-term physical monitoring and maintenance will be necessary. The other alternatives would require such monitoring and maintenance to ensure the integrity of the asphalt cover, low-permeability cap, or soil cover and the institutional controls.

The Physical Treatment by SVE alternative is the most cost-effective and protective remedy for the Former Runoff Basin Area. It is also the only alternative which will address the contaminated soil near building foundations and underground utilities.

The Removal and Off-Site Disposal alternative is the most cost-effective and permanent remedy for addressing the PCB contaminated sediment in the industrial drainageway and limiting the availability of PCBs for uptake by fish and other aquatic life in Koppers Pond. However, for any cleanup at the industrial drainageway to be effective and permanent, the unauthorized releases to the industrial drainageway must be eliminated. Those releases are suspected to be contributing to the sediment contamination in the industrial drainageway and Koppers Pond. Without the elimination of such releases, the sediment in the industrial drainageway may be recontaminated with metals to levels which may, ultimately, result in an unacceptable human health risk. The selection of this alternative assumes that all future permitted discharges from the Facility will meet the discharge limits established by the NYS permitting authorities under the State Pollutant Discharge Elimination System program.

In light of the above, and as a practical matter, the preferred alternative for removal and off-Site disposal will be implemented after the NYSDEC completes its investigation as to the source(s) of the unauthorized releases to the industrial drainageway, and such releases are eliminated. The EPA and the NYSDEC will ensure that those sources, when identified, are addressed. In addition, once the remediation is conducted, the EPA and the NYSDEC will endeavor to ensure that the permanence of that cleanup effort is not impacted by any future unauthorized discharges to the industrial drainageway.

Specifically, the preferred alternatives will involve the following:

Disposal Area F

Performance of additional sampling and analysis prior to remedy implementation to delineate the horizontal and vertical extent of contaminated soil and waste materials and further characterize and classify such materials for off-Site disposal and/or treatment.

Excavation of all affected soil and waste material containing TCE, PAHs and arsenic at concentrations above the cleanup objectives established for such contaminants.

Transportation of affected soil to permitted waste management facilities (e.g., RCRA hazardous waste incinerator, RCRA hazardous waste landfill or industrial landfill).

Performance of confirmatory sampling and backfilling of excavation with clean soil.

Former Runoff Basin Area

Design and testing an enhanced SVE system using either dual-phase or air sparging, depending on site-specific characteristics, to extract VOCs above and below the water table for treatment.

Construction and operation of the enhanced SVE treatment system to meet the RAOs established in this ROD. The exact location and depth of the SVE wells will be determined during remedial design and testing.

Transportation (piping) and treatment of extracted ground water to the water treatment facility installed as part of the ground-water remedy for OU2 for treatment.

Implementation of a monitoring program to assess the effectiveness of SVE treatment in attaining TCE RAOs in soil and Federal and State drinking water standards for ground water.

Industrial Drainageway

Excavation of sediments containing PCBs from the industrial drainageway above the cleanup level of 1.0 part per million for PCBs.

Placement and operation of diversion pumping and necessary erosion and sedimentation controls during excavation.

Performance of confirmatory sampling.

Transportation of contaminated sediment to permitted waste management facilities for disposal.

Reshaping the flow channel using clean soil, as needed.

Additionally, the EPA believes that further ecological investigations are warranted at Koppers Pond and will therefore conduct a supplemental study in that area to assess the need for remedial action.

Ground-Water Remediation

As stated in the 1990 ROD for OU2, the final remediation goals for the Newtown Creek Aquifer are Federal and State drinking water standards (i.e., ARARs), based primarily upon the classification of the ground water as a potential drinking water source. The ground-water remedy selected in the 1990 ROD was designated by the EPA as an interim remedy because it provided for a source of drinking water which met such ARARs at the tap. The EPA estimated that said remedy would also attain all ARARs for the portion of the Newtown Creek Aquifer in the vicinity of the KAW over a period of approximately 30 years once source control measures were in place. Hence, the 1990 ROD designated OU3 to address source control at the Westinghouse Facility and make a determination as to any necessary final remedy for aquifer restoration.

Based on the findings of the RI for OU3, the EPA has determined that no further ground-water treatment beyond that specified for the OU2 interim ground-water remedy is necessary as a response action for OU3. The interim remedy, as set forth in the 1990 ROD and the approved remedial design report for OU2, will therefore become the final remedy for restoring the Newtown Creek Aquifer to its beneficial use as a drinking water aquifer at the Site.

Although this remedy is being designated as the final ground-water remedy for attaining all Federal and State drinking water standards in the Newtown Creek Aquifer, the EPA recognizes that achieving such standards may not be possible even with source control measures in place because of the difficulties associated with removing ground-water contaminants to drinking water standards. Therefore, the EPA will carefully monitor the performance of the remedy and ground-water quality to determine if it is successful in attaining the Federal and State drinking water standards.

It should be noted that the EPA's designation of the interim remedy as the final aquifer restoration remedy for the Site in this ROD should not be construed to imply that further modification to such remedy or any additional response actions for restoring the Newtown Creek Aquifer to drinking water standards can not be considered by the EPA in the future.

STATUTORY DETERMINATIONS

As previously noted, CERCLA mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA also establishes a preference for remedial actions which employ treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under Federal and State laws, unless a waiver can be justified.

For the reasons discussed below, the EPA has determined that the selected remedy meets the requirements of CERCLA.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The health risks associated with the contaminated soil at Disposal Area F and the contaminated sediment in the industrial drainageway will be eliminated by the removal and off-Site disposal of such media. The removal of contaminants from the soil at the Former Runoff Basin Area will address health risks associated with the ground-water exposure pathway by preventing the leaching of such contaminants to ground water. The removal of contaminated sediment will also reduce the availability of PCBs for uptake by fish in the industrial drainageway and Koppers Pond, thereby reducing the health risk associated with fish consumption.

Compliance with ARARs

The selected remedy will be in compliance with all ARARs. Action-specific ARARs identified for the selected remedy includes the RCRA regulations for identification, transportation, and the off-Site disposal and treatment of hazardous wastes (40 CFR Parts 261-264 and 268) and the corresponding NYS hazardous waste requirements; and air requirements for excavation of soils and operation of the SVE system at the Former Runoff Basin Area (6NYCRR Parts 200, 201, 211, 219 and 257; NYS Air Guide-1).

Location-specific ARARs identified for the selected remedy at the ndustrial drainageway include 40 CFR Part 6, Appendix A - Executive Order 11990 for the protection of wetlands, NYS Freshwater Wetland Act, Articles 24 and 71, Title 23 (which requires a wetlands assessment and restoration plan), and the EPA and U.S. Army Corps of Engineers regulations under the Clean Water Act which regulates the discharge of dredged or fill materials to waters of the U.S.

Chemical-specific ARARs for ground water are the Federal and State MCLs and nonzero MCLGs. The source control measures at Disposal Area F and the Former Runoff Basin, in combination with the ground-water remedy selected for OU2, will allow compliance with all ground-water ARARs for that portion of the aquifer within the hydraulic influence of the pumping wells at the Westinghouse Facility. Additionally, the combined effect of such source control measures and operation of the OU2 ground-water remedy will also help accelerate the attainment of the chemical-specific ARARs within the aquifer between the Westinghouse Facility and the KAW. In the 1990 ROD, the EPA estimated a 30-year period for aquifer restoration within the vicinity of the KAW after source control measures are in place.

Cost-Effectiveness

Each of the alternatives underwent a detailed cost analysis to develop costs to the accuracy of +50 to -30 percent. In that analysis, capital and O&M costs have been estimated and used to develop present worth costs. In present-worth analysis, annual costs were calculated for thirty years (estimated life of an alternative) using a five percent discount rate and based on 1996 costs.

The selected alternative for the Former Runoff Basin Area and the industrial drainageway are the least costly remedies that achieve all the goals of the response actions. The estimated cost of the selected remedy for Disposal Area F is also less than the other alternatives, with the exception of the Containment with Asphalt Cover alternative. However, the selected Removal and Off-Site Disposal remedy provides a greater degree of permanence. Additionally, the containment alternative would require institutional controls and monitoring to ensure the integrity of the asphalt cover.

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

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. As stated above, the removal and off-Site disposal of contaminated soil and sediment provides the greater degree of permanence than the other alternatives evaluated. Additionally, the treatment of VOCs at the Former Runoff Basin Area by SVE is also a permanent solution.

Overall, the selected remedy is considered to include the most appropriate solutions to contamination addressed in OU3 because they provide the best balance of trade-offs among the alternatives with respect to the nine evaluative criteria.

Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for treatment to reduce the toxicity, mobility, or volume of the contaminants at the Site.

DOCUMENTATION OF SIGNIFICANT CHANGE

There are no significant changes from the preferred alternatives presented in the Proposed Plan.

APPENDIX 1

FIGURES

<IMG SRC 0296280A>
<IMG SRC 0296280B>
<IMG SRC 0296280C>

APPENDIX II

TABLES

TABLE 1

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
CHEMICAL CONTAMINANTS OF CONCERN (COCs)1

SURFACE WATER	SEDIMENTS	FISH
Acetone	Benzo(a)anthracene	Aroclor-1254
Trichloroethylene	Benzo(b)fluoranthene	Arsenic
alpha-BHC	Benzo(a)pyrene	
beta-BHC	Dibenz(a,h)anthracene	
Antimony	Aroclor-1248	
Arsenic	Aroclor-1254	
Barium	Aroclor-1260	
Cadmium	Arsenic	
Mercury	Beryllium	
	Cadmium	
	Manganese	
	Thallium	
	Zinc	

SURFACE SOILS

Soil Pile	Area Southwest of the West Parking Lot	MW-10 Area	Fluoride Disposal Area #1	Fluoride Disposal Area #2
Benzo(a)anthracene	Not sampled	Not sampled	Benzo(a)anthracene	Benzo(a)anthracene
Benzo(b)fluoranthene			Benzo(a)pyrene	Benzo(b)fluoranthene
Benzo(a)pyrene			Dieldrin	Benzo(a)pyrene
Dibenz(a,h)anthracene			Aroclor-1254	Indeno(1,2,3-cd)pyrene
Aroclor-1254			Aluminum	Aluminum
Aroclor-1260			Arsenic	Arsenic
Aluminum			Barium	Barium
Arsenic			Manganese	Manganese
Barium			Nickel	Nickel
Beryllium			Vanadium	Vanadium
Cadmium				Zinc
Manganese				
Mercury				
Nickel				
Thallium				
Vanadium				

Former Coal Pile	Former Runoff Basin	Disposal Area F	Magnesium Chip Burial
Not sampled	Not sampled	Trichloroethylene	Benzo(a)pyrene
		Benzo(a)anthrancene	Aroclor-1242
		Benzo(b)fluoranthene	Aluminum
		Benzo(a)pyrene	Arsenic
		Dibenzofuran	Barium
		Fluoranthene	Nickel
		Indeno(1,2,3-cd)pyrene	Vanadium
		Pyrene	
		Dieldrin	

Aroclor-1254
Aluminum
Arsenic
Barium
Cadmium
Manganese
Mercury
Vanadium

TABLE 1

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
CHEMICAL CONTAMINANTS OF CONCERN (COCs)1

SUBSURFACE SOILS

Soil Pile	Area Southwest of the West Parking Lot	MW-10 Area	Fluoride Disposal Area #1	Fluoride Disposal Area #2
Not sampled	Aroclor-1254	Benzo(a)pyrene	Benzo(a)pyrene	Benzo(a)pyrene
	Aluminum	Aroclor-1254	Aroclor-1260	Aluminum
	Arsenic	Aroclor-1260	Antmony	Arsenic
	Barium	Aluminum	Arsenic	Barium
	Beryllium	Arsenic	Beryllium	Beryllium
	Manganese	Barium	Cadmium	Cadmium
	Nickel	Cadmium	Manganese	Manganese
	Thallium	Manganese	Nickel	
	Vanadium	Nickel	Thallium	
		Vanadium	Vanadium	
		Zinc		

Former Coal Pile	Former Runoff Basin	Disposal Area F	Magnesium Chip Burial
Benzo(a)pyrene	Trichloroethylene	Trichloroethylene	Benzo(a)anthracene
Aroclor-1242	Dibenzofuran	Benzo(a)anthracene	Benzo(b)fluoranthene
Aroclor-1254	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(a)pyrene
Aluminum	Benzo(b)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Antimony	Benzo(a)pyrene	Dibenz(a,h)anthracene	Aroclor-1242
Arsenic	Fluoranthene	Indeno(1,2,3-cd)pyrene	Aroclor-1260
Barium	Indeno(1,2,3-cd)pyrene	Pyrene	Aluminum
Beryllium	Pyrene	Heptachlor Epoxide	Arsenic
Cadmium	Aroclor-1242	Aluminum	Barium
Manganese	Aroclor-1254	Arsenic	Manganese
Nickel	Aluminum	Barium	Nickel
Vanadium	Antimony	Vanadium	Vanadium
	Arsenic		
	Cadmium		
	Manganese		
	Vanadium		
	Zinc		

1) Other detected contaminants without toxicity values (e.g., lead and cobalt) were qualitatively evaluated.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

THE SOIL PILE - SURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)anthracene	7/7	36-1900	ug/kg	2186	1900
Benzo(b)fluoranthene	7/7	58-1500	ug/kg	1571	1500
Benzo(a)pyrene	7/7	36-1200	ug/kg	1475	1200
Dibenz(a,h) anthracene	4/7	76-390	ug/kg	562	390
Aroclor-1254	7/7	24-790	ug/kg	651	651
Aroclor-1260	5/7	90-2400	ug/kg	10193	2400
Aluminum	7/7	5150-14600	mg/kg	10429	10429
Arsenic	6/7	2.2-5.1	mg/kg	4.5	4.5
Barium	7/7	85-208	mg/kg	184	184
Beryllium	1/7	0.48-0.48	mg/kg	0.39	0.39
Cadmium	2/7	0.53-1.1	mg/kg	0.77	0.77
Manganese	7/7	600-1220	mg/kg	1172	1172
Mercury	4/7	0.1-0.87	mg/kg	0.98	0.87
Nickel	7/7	12.4-38.7	mg/kg	30	30
Thallium	1/7	0.19-0.19	mg/kg	0.73	0.19
Vanadium	7/7	10-22.3	mg/kg	17	17

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

FLUORIDE DISPOSAL AREA NO. 1 - SURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)anthracene	1/1	170-170	ug/kg	NA	170
Benzo(a)pyrene	1/1	80-80	ug/kg	NA	80
Dieldrin	1/1	15-15	ug/kg	NA	15
Aroclor-1254	1/1	580-580	ug/kg	NA	580
Aluminum	1/1	11400-11400	mg/kg	NA	11400
Arsenic	1/1	2.7-2.7	mg/kg	NA	2.7
Barium	1/1	77.4-77.4	mg/kg	NA	77.4
Manganese	1/1	677-677	mg/kg	NA	677
Nickel	1/1	23.2-23.2	mg/kg	NA	23.2
Vanadium	1/1	17.6-17.6	mg/kg	NA	17.6

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations
NA - The 95% UCL cannot be calculated with only one sample.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

FLUORIDE DISPOSAL AREA NO. 2 - SURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)anth-racene	2/2	140-730	ug/kg	2467633	730
Benzo(b)fluor-anthene	2/2	190-450	ug/kg	3043	450
Benzo(a)pyrene	2/2	160-650	ug/kg	245884	650
Indeno(1,2,3-cd)pyrene	2/2	83-370	ug/kg	211042	370
Aluminum	2/2	6940-7880	mg/kg	8815	7880
Arsenic	2/2	2.9-4.4	mg/kg	7.25	4.4
Barium	2/2	88.9-136	mg/kg	226	136
Manganese	2/2	498-616	mgkg	745	616
Nickel	2/2	12.5-18.2	mg/kg	28.5	18.2
Vanadium	2/2	12.8-12.9	mg/kg	12.98	12.9
Zinc	1/1	359-359	mg/kg	NA	359

* This value represents the 95 % upper confidence limit on the arithmetic means.

** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for 95% UCL calculations.
NA - The 95% UCL can not be calculated with only one sample.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

DISPOSAL AREA F - SURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Trichloro-ethylene	3/4	77-20000	ug/kg	3.6E+14	20000
Benzo(a)anth-racene	4/4	935-290000	ug/kg	4.3E+12	290000
Benzo(b)fluor-anthene	4/4	1470-420000	ug/kg	1.56E+11	420000
Benzo(a)pyrene	4/4	860-310000	ug/kg	6.47E+12	310000
Dibenzofuran	4/4	107-33000	ug/kg	9.26E+11	33000
Fluoranthene	4/4	1900-700000	ug/kg	8.66E+12	700000
Indeno(1,2,3-cd)pyrene	4/4	600-13000	ug/kg	3.00E+10	13000
Pyrene	4/4	1450-610000	ug/kg	1.61E+13	610000
Dieldrin	2/3	12-170	ug/kg	7.72E+14	170
Aroclor-1254	1/3	43.5-43.5	ug/kg	2721	43.5
Aluminum	3/3	2160-5665	mg/kg	17955	5665
Arsenic	3/3	13.6-18.9	mg/kg	21.3	18.9
Barium	3/3	34.4-118	mg/kg	973	118
Cadmium	1/3	1.18-1.18	mg/kg	2.08	1.18
Manganese	1/1	470.5-470.5	mg/kg	NA	470.5
Mercury	3/3	0.26-0.74	mg/kg	3.68	0.74
Vanadium	3/3	4.6-14.5	mg/kg	89	14.5

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

FLUORIDE DISPOSAL AREA NO. 2 - SURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)pyrene	1/1	90-90	ug/kg	NA	90
Aroclor	1/1	120-120	ug/kg	NA	120
Aluminum	1/1	5450-5450	mg/kg	NA	5450
Arsenic	1/1	7.2-7.2	mg/kg	NA	7.2
Barium	1/1	93.5-93.5	mg/kg	NA	93.5
Nickel	1/1	9.7-9.7	mg/kg	NA	9.7
Vanadium	1/1	15.4-15.4	mg/kg	NA	41.5

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.
NA - The 95% UCL can not be calculated with only one sample.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

THE AREA SOUTHWEST OF THE WEST PARKING LOT
SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Aroclor 1254	1/7	95-95	ug/kg	51.9	51.9
Aluminum	7/7	10300-14050	mg/kg	13339	13339
Arsenic	7/7	3.8-10	mg/kg	8.7	8.7
Barium	7/7	99-192	mg/kg	171	171
Beryllium	3/7	0.5-0.84	mg/kg	0.67	0.67
Manganese	7/7	617-1200	mg/kg	1044	1044
Nickel	7/7	21.4-31.5	mg/kg	29	29
Thallium	1/7	0.34-0.34	mg/kg	0.6	0.34
Vanadium	7/7	16.6-24.2	mg/kg	22.8	22.8

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

THE MW-10 AREA - SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)pyrene	3/7	37-140	ug/kg	1007	140
Aroclor-1254	1/7	68-68	ug/kg	39	39
Aroclor-1260	1/7	31-31	ug/kg	23	23
Aluminum	7/7	5550-13200	mg/kg	11874	11874
Arsenic	7/7	3-12.3	mg/kg	8.1	8.1
Barium	7/7	73.2-109	mg/kg	103	103
Cadmium	1/7	3.5-3.5	mg/kg	1.9	1.9
Manganese	7/7	566-800	mg/kg	746	746
Nickel	7/7	17-27.4	mg/kg	24	24
Vanadium	7/7	10.6-21.1	mg/kg	19	19

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

FLUORIDE DISPOSAL AREA 1 - SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)pyrene	3/14	59-330	ug/kg	254	254
Aroclor-1260	2/14	50-83	ug/kg	41	41
Antimony	2/14	4.57-45.1	mg/kg	8.4	8.4
Arsenic	14/14	1.1-24.2	mg/kg	10.6	10.6
Beryllium	3/14	0.43-0.55	mg/kg	0.43	0.43
Cadmium	3/13	1.7-936	mg/kg	150	150
Manganese	14/14	278-1560	mg/kg	1885	1560

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

FLUORIDE DISPOSAL AREA NO. 2 - SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)pyrene	3/14	59-330	ug/kg	254	254
Aroclor-1260	2/14	50-83	ug/kg	41	41
Antimony	2/14	4.57-45.1	mg/kg	8.4	8.4
Arsenic	14/14	1.1-24.2	mg/kg	10.6	10.6
Beryllium	3/14	0.43-0.55	mg/kg	0.43	0.43
Cadmium	3/13	1.7-936	mg/kg	150	150
Manganese	14/14	278-1560	mg/kg	1885	1560

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

THE FORMER COAL PILE AREA - SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)pyrene	3/15	28-87	ug/kg	219	87
Aroclor-1242	2/15	80-120	ug/kg	37.7	37.7
Aroclor-1254	4/15	17-24	ug/kg	19	19
Aluminum	15/15	5440-10300	mg/kg	8598	8598
Antimony	1/15	5.75-5.75	mg/kg	3.6	3.6
Arsenic	15/15	1.7-7.85	mg/kg	5.3	5.3
Barium	15/15	40.8-113	mg/kg	89	89
Beryllium	3/15	0.31-0.87	mg/kg	0.4	0.4
Cadmium	1/15	0.76-0.76	mg/kg	0.59	0.59
Manganese	8/8	277-791	mg/kg	631	631
Nickel	15/15	12.7-31.7	mg/kg	20.9	20.9
Vanadium	15/15	9-15.9	mg/kg	13.4	13.4

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

THE FORMER RUNOFF BASIN - SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Trichloro-ethylene	43/59	1-79000	ug/kg	637	637
Dibenzofuran	12/32	28-32000	ug/kg	493	493
Benzo(a)anthra cene	20/32	20-120000	ug/kg	1246	1246
Benzo(b)fluor-anthene	20/32	22-110000	ug/kg	1270	1270
Benzo(a)pyrene	20/32	21-95000	ug/kg	827	827
Fluoranthene	22/32	36-210000	ug/kg	1949	1949
Indeno(1,2,3-cd)pyrene	17/32	58-80000	ug/kg	687	687
Pyrene	22/32	48-200000	ug/kg	2121	2121
Aroclor-1242	1/20	3500-3500	ug/kg	189	189
Aroclor-1254	6/20	15-110	ug/kg	75	75
Aluminum	20/20	1570-13470	mg/kg	9646	9646
Antimony	2/20	0.74-1.8	mg/kg	3.9	1.8
Arsenic	20/20	0.64-13.6	mg/kg	8	8
Cadmium	1/20	382-382	mg/kg	6.3	6.3
Manganese	13/13	244-1040	mg/kg	704	704
Vanadium	20/20	3.2-22	mg/kg	16	16
Zinc	20/20	25.6-1160	mg/kg	155	155

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

DISPOSAL AREA F - SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Trichloro-ethylene	43/59	1-11000	ug/kg	3200	3200
Benzo(a)anthracene	23/31	40-24000	ug/kg	8008	8008
Benzo(b)fluor-anthene	22/31	32-33000	ug/kg	7541	7541
Benzo(a)pyrene	23/31	30-24000	ug/kg	6869	6869
Dibenz(a,h) anthracene	4/31	96-7300	ug/kg	827	827
Indeno(1,2,3-cd)pyrene	20/31	48-14000	ug/kg	2871	2871
Pyrene	23/31	72-49000	ug/kg	16591	16591
Heptachlor Epoxide	1/17	0.58-0.58	ug/kg	3.6	0.58
Aluminum	17/17	3010-15300	mg/kg	8279	8279
Arsenic	17/17	1.3-15.3	mg/kg	5.9	5.9
Barium	17/17	44.6-168	mg/kg	124	124
Vanadium	17/17	5.3-18.6	mg/kg	13	13

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

THE MAGNESIUM CHIP BURIAL AREA
SUBSURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)anthracene	2/6	34-810	ug/kg	1350	810
Benzo(b)fluor-anthene	2/6	35-995	ug/kg	1872	995
Benzo(a)pyrene	2/6	24-500	ug/kg	1150	500
Indeno(1,2,3-cd)pyrene	1/6	385-385	ug/kg	284	284
Aroclor-1242	1/6	69-69	ug/kg	47	47
Aroclor-1260	1/6	95-95	ug/kg	65	65
Aluminum	6/6	6360-11600	mg/kg	9968	9968
Arsenic	6/6	1.5-6.4	mg/kg	8.5	6.4
Barium	6/6	56.4-98.4	mg/kg	95	95
Manganese	4/4	409-622	mg/kg	564	564
Nickel	6/6	14.1-22.8	mg/kg	21	21
Vanadium	6/6	9.7-18.3	mg/kg	16	16

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

INDUSTRIAL DRAINAGEWAY AND KOPPERS POND
SURFACE SOIL

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Acetone	2/13	10-710	ug/kg	1678	710
Trichlor-ethylene	9/13	1-8	ug/kg	19	8
alpha-BHC	3/13	0.14-0.22	ug/kg	0.07	0.07
beta-BHC	1/13	0.28-0.28	ug/kg	0.046	0.046
Antimony	10/14	5.5-14.8	mg/kg	7.1	7.1
Arsenic	5/14	1.58-3.4	mg/kg	1.8	1.8
Barium	14/14	197-696	mg/kg	526	526
Cadmium	6/14	1.68-200	mg/kg	58	58
Mercury	1/4	4.4-4.4	mg/kg	0.2	0.2

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

INDUSTRIAL DRAINAGEWAY AND KOPPERS POND
SEDIMENTS

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Benzo(a)anthracene	13/16	20-3425	ug/kg	2731	2731
Benzo(b)fluor-anthene	16/16	22-2700	ug/kg	2906	2208
Benzo(a)pyrene	15/16	21-2225	ug/kg	2208	2225
Dibenz(a,h)-anthracene	5/16	120-500	ug/kg	359	359
Aroclor-1248	3/16	56-439	ug/kg	210	210
Aroclor-1254	12/16	36-7100	ug/kg	15632	7100
Aroclor-1260	9/16	51-952	ug/kg	662	662
Arsenic	12/14	3.6-31.5	mg/kg	9.6	9.6
Beryllium	2/15	0.68-1.0	mg/kg	0.53	0.53
Cadmium	13/15	1.57-1055	mg/kg	84430	1055
Manganese	15/15	137-1470	mg/kg	830	830
Thallium	2/15	0.38-16.4	mg/kg	2.3	2.3
Zinc	15/15	71.6-10755	mg/kg	20138	10755

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 2

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
SUMMARY OF CONTAMINANTS OF CONCERN

INDUSTRIAL DRAINAGEWAY AND KOPPERS POND
FISH TISSUE

Contaminant of Concern	Freq. of Detects/# of Samples	Range of Detections min - max	units	95% UCL*	Conc. Used in the RA **
Aroclor-1254	11/13	64-537	ug/kg	331	331
Arsenic	3/5	0.04-0.1	mg/kg	0.3	0.04

* This value represents the 95 % upper confidence limit on the arithmetic mean.
** This value represents either the maximum concentration or the 95% UCL; whichever is smaller. See Appendix A of the Risk Assessment for the 95% UCL calculations.

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
PRESENT-USE SCENARIOS:					
Surface Soil					
	Facility AOCs: Soil Pile	Area Residents (Trespassers)	Ingestion	Yes	The facility is currently used for manufacturing and is likely to remain so for the near future. The facility is completely surrounded by a chain link fence with some minor institutional controls to prevent entry to the grounds. Each of the AOCs is within the fenced facility, except the soil piles area, which is outside of, but adjacent, to the fence. The inhalation of particulates is not likely to be a significant exposure pathway given the limited exposure time. No VOCs were selected as COCs.
			Dermal Contact	Yes	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
	Facility AOCs: (Magnesium Chip Burial Area. Disposal Area F. Fluoride Disposal Area No. 1, Fluoride Disposal Area No. 2, Former Runoff Basin, Former Coal Pile Area, MW10 Area, and Area SW of West Parking Lot)	Area Residents (Trespassers)	Ingestion	No	The facility is currently used for manufacturing and is likely to remain so for the near future. The facility is completely surrounded by a chain link fence with some minor institutional controls to prevent entry to the grounds. Each of the AOCs is within the fenced facility, except the soil piles area, which is outside of, but adjacent, to the fence.
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
	Facility AOCs: (Magnesium Chip Burial Area, Disposal Area F, Fluoride Disposal Area No. 1, Fluoride Disposal Area No. 2, Former Runoff Basin, Former Coal Pile Area, MW10 Area, Soil Pile, and Area SW of West Parking Lot)	Residents	Ingestion	No	At present, the facility is an operational area and does not serve as a residential area.
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
	Facility AOCs: (Magnesium Chip Burial Area and Disposal Area F)	Site Workers (Employees)	Ingestion	Yes	Site workers perform lawn maintenance activities in these two areas and workers may come in direct contact with soils. The inhalation of particulates is not likely to be a significant exposure pathway given the limited exposure time. VOCs are not a primary class of COCs.
			Dermal Contact*	Yes	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	

Facility AOCs: (Fluoride Disposal Area No. 1, Fluoride Disposal Area No. 2, Former Runoff Basin, Former Coal Pile Area, MW10 Area, Soil Piles Area, and Area SW of West Parking Lot)	Site Workers (Employees)	Ingestion Dermal Contact* Inhalation of Particulates Inhalation of VOCs	No No No No	These areas are covered by pavement and/or workers do not perform regular activities in these areas.

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
PRESENT-USE SCENARIOS CONT'D:					
Surface Soil	Facility AOCs: (Magnesium Chip Burial Area. Disposal Area F. Fluoride Disposal Area No. 1, Fluoride Disposal Area No. 2, Former Runoff Basin, Former Coal Pile Area, MW10 Area, Area SW of West Parking Lot)	Construction Workers	Ingestion	No	Construction work involving excavation activity is not currently in progress at the facility
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
Subsurface Soil	Facility AOCs: (Magnesium Chip Burial Area. Disposal Area F. Fluoride Disposal Area No. 1, Fluoride Disposal Area No. 2, Former Runoff Basin, Former Coal Pile Areas, piles area, which is outside of, but adjacent, to the fence. MW10 Area. Soil Pile, and Area SW of West Parking Lot)	Area Residents (Trespassers)	Ingestion	No	construction work involving excavation activity is currently in progress at the facility.
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
		Residents	Ingestion	No	At present, the facility is an operational area and does not serve as a residential area.
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
		Site Workers (Employees)	Ingestion	No	Maintenance work involving excavation activity is not currently in progress at the facility.
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
		Construction Workers	Ingestion	No	Construction work involving excavation activity is not currently in progress at the facility.
			Dermal Contact	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	

Surface Water Runoff Drains				
	Area Residents (Trespassers)	Ingestion	No	A majority of the surface water runoff drains are located within the fenced and guarded portion of the facility. Each drain is covered by a manhole. Exposure to the soils in the bottom of the drains would require site access, lifting of the manhole cover, and descending to depths of 4 to 6 ft bgs. Therefore, this pathway is not considered likely to occur.
		Dermal Contact	No	
		Inhalation of Particulates	No	
		Inhalation of VOCs	No	
	Site Workers (Employees)	Ingestion	No	No utilities are located in the drains and no other activity requires workers to enter the drains.
		Dermal Contact*	No	
		Inhalation of Particulates	No	
		Inhalation of VOCs	No	

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
PRESENT-USE SCENARIOS CONT'D:					
Groundwater	Facility and Within Study Area	Residents	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	Groundwater within OU III is not a potable source as the contaminated facility supply wells are out of service. Potable water for use in OU III is currently obtained from public water supply wells outside this operable unit. Therefore, the exposure pathway is incomplete.
		Site Workers (Employees)	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	Groundwater within OU III is not a potable source as the contaminated facility supply wells are out of service. Potable water for use in OU III is currently obtained from public water supply wells outside this operable unit. Therefore, the exposure pathway is incomplete.
		Construction Workers	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	Groundwater within OU III is not a potable source as the contaminated facility supply wells are out of service. Potable water for use in OU III is currently obtained from public water supply wells outside this operable unit. Therefore, the exposure pathway is incomplete.
Surface Water	Industrial Drainageway and Pond	Area Residents (Trespassers)	Ingestion Dermal Contact Inhalation of VOCs	Yes Yes No	Trespassers may ingest and dermally contact surface water in the drainageway and pond located outside the fenced facility during recreational activities. Exposure to VOCs released from surface water into ambient air will be qualitatively evaluated.
Sediment	Industrial Drainageway and Pond	Area Residents (Trespassers)	Ingestion Dermal Contact* Inhalation of Particulates	Yes Yes No	Trespassers may ingest and dermally contact sediment in the drainageway and pond located outside the fenced facility. These areas are not expected to dry out, therefore no suspended particulates are likely to be released.

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
FUTURE-USE SCENARIOS:					
Surface Soil					
	Facility AOCs: (Magnesium Chip Burial Area, Disposal Area F, Fluoride Disposal Area No. 1, Fluoride Disposal Area No. 2, and Soil Pile;	Area Residents (Trespassers)	Ingestion	No	If the site is residentially developed in the future, risks to trespassers would be negligible in comparison to risks to residents.
			Dermal Contact*	No	
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	
	No surface soil data collected: Area SW of West Parking Lot MW-10 Area Former Coal Pile Former Runoff Basin)	Residents	Ingestion	Yes	The facility is likely to remain as a manufacturing facility; however, this use could change in the future. It is theoretically possible that residential development could occur. Exposure to suspended soil particulates may occur if pavement and ground cover are removed. VOCs are not a primary class of COCs.
			Dermal Contact*	Yes	
			Inhalation of Particulates	Yes	
			Inhalation of VOCs	No	
		Site Workers (Employees)	Ingestion	Yes	If the facility continues to be use as a manufacturing facility, site workers may continue to perform various activities throughout the facility during the course of a normal work day. Exposure to suspended soil particulates may occur if pavement and ground cover are removed. VOCs are not a a primary class of COCs.
			Dermal Contact*	Yes	
			Inhalation of Particulates	Yes	
			Inhalation of VOCs	No	
		Construction Workers	Ingestion	Yes	Future construction activities may occur on the facility
			Dermal Contact*	Yes	Potential exposure is expected to be short-term (i.e., 6 months).
			Inhalation of Particulates	Yes	
			Inhalation of VOCs	No	VOCs are not a primary class of COCs.

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
FUTURE-USE SCENARIOS CONT'D:					
Subsurface Soil					
	Facility AOCs:				
	(Magnesium Chip Burial Area,	Area Residents	Ingestion	No	During potential future construction work (i.e., excavation activity),
	Disposal Area F.	(Trespassers)	Dermal Contact*	No	area residents are assumed to come in contact with a negligible
	Fluoride Disposal Areas No. 1,		Inhalation of Particulates	No	amount of subsurface soil as compared to a construction worker.
	Fluoride Disposal Areas No. 2,		Inhalation of VOCs	No	
	Former Runoff Basin Area,				
	MW10 Area,	Residents			
	Soil Pile and,		Ingestion	No	During potential future construction work (i.e., excavation activity),
	Area SW of West Parking Lot)		Dermal Contact*	No	residents are assumed to come in contact with a negligible
			Inhalation of Particulates	No	amount of subsurface soil as compared to a construction worker.
			Inhalation of VOCs	No	
		Site Workers	Ingestion	No	During potential future construction work (i.e., excavation activity),
		(Employees)	Dermal Contact*	No	site workers are assumed to come in contact with a negligible
			Inhalation of Particulates	No	amount of subsurface soil as compared to a construction worker.
			Inhalation of VOCs	No	
		Construction Workers	Ingestion	Yes	Future construction activities may occur at the facility.
			Dermal Contact*	Yes	Potential exposure is expected to be short-term (i.e., 6 months).
			Inhalation of Particulates	Yes	
			Inhalation of VOCs	No	
Surface Water Runoff Drains					
		Area Residents	Ingestion	No	A majority of the surface water runoff drains are located within
		(Trespassers)	Dermal Contact	No	the fenced and guarded portion of the facility. Each drain is
			Inhalation of Particulates	No	covered by a manhole. Exposure to the soils in the bottom of
			Inhalation of VOCs	No	the drains would require site access, lifting of the manhole cover, and climbing to depths of 4 to 6 ft bgs. Therefore, this pathway is not considered likely to occur.
		Site Workers	Ingestion	No	No utilities are located in the drains and no other activity
		(Employees)	Dermal Contact	No	requires workers to enter the drains.
			Inhalation of Particulates	No	
			Inhalation of VOCs	No	

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
FUTURE-USE SCENARIOS CONT'D:					
Groundwater					
	Facility and Within Study Area	Residents	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower) (Adults Only)	No No No	If OU III is residentially developed in the future, the potential exists for new residential wells to be installed in the chemically contaminated aquifer beneath OU III. However, risks are likely to be similar to those estimated for OU if groundwater (i.e., in the range of 10-3 to 10-4).
		Site Workers	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	If OU III is commercially developed in the future, the potential exists for new commercial wells to be installed in the chemically contaminated aquifer beneath OU III. However, risks calculated for residential exposure for OU it would be higher than risks for a site workers.
		Construction Workers	Ingestion Dermal Contact (Shower) Inhalation of VOCs (Shower)	No No No	If OU III is commercially developed in the future, the potential exists for new commercial wells to be installed in the chemically contaminated aquifer beneath OU III. However, risks calculated for residential exposure for OU it would be higher than risks for a construction worker.

TABLE 3

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
POTENTIAL EXPOSURE PATHWAYS

Matrix	Area of Concern	Receptor Population(s)	Exposure Route(s)	Retained for Quantitative Analysis	Justification
Surface Water					
	Industrial Drainageway and Pond	Area Residents (Trespassers)	Ingestion	Yes	Trespassers may ingest and dermally contact surface water in the drainageway and pond located outside the fenced facility.
			Dermal Contact	Yes	
			Inhalation of VOCs	No	Exposure to VOCs released from surface waters into the ambient air will be qualitatively evaluated.
Sediment					
	Industrial Drainageway and Pond	Area Residents (Trespassers)	Ingestion	Yes	Trespassers may ingest and dermally contact sediment in the drainageway and pond located outside the fenced facility.
			Dermal Contact*	Yes	
			Inhalation of Particulates	No	These areas are not expected to dry out, therefore no suspended particulates are likely to be released.

* The dermal contact pathway for soil and sediment at the site can only be quantitatively evaluated for PCBs and cadmium as only these chemicals have established dermal absorption factors (PCBs = 6%
and cadmium = 1%). All other chemicals will be qualitatively discussed.

TABLE 4

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
TOXICITY VALUES FOR POTENTIAL CARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

COCs	CARCINOGENS: SLOPE FACTORS (SF) Oral SF (mg/kg-day)-1		Inhalation SF (mg/kg-day)-1	Weight - of - Evidence
Volatile Organics				
Acetone	-		-	D
Trichloroethylene	1.1E-02	(3)	-	B2
Semivolatile Organics				
Benzo(a)anthracene	7.3E-01	(3)	-	B2
Benzo(a)pyrene	7.3E+00		-	B2
Benzo(b)fluoranthene	7.3E-01	(3)	-	B2
Dibenz(a,h)anthracene	7.3E+00	(3)	-	B2
Dibenzofuran	-		-	D
Fluoranthene	-		-	D
Indeno(1,2,3-cd)pyrene	7.3E-01	(3)	-	B2
Pyrene	-		-	D
Pesticides/PCBs				
alpha BHC	6.3E+00		6.3E+00	B2
beta BHC	1.8E+00		1.8E+00	C
Dieldrin	1.6E+01		1.6E+01	B2
Heptachlor Epoxide	9.1E+00		9.1E+00	B2
PCBs (Aroclors)	7.7E+00		-	B2

TABLE 4

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
TOXICITY VALUES FOR POTENTIAL CARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

COCs	CARCINOGENS: SLOPE FACTORS (SF) Oral SF (mg/kg-day)-1	Inhalation SF (mg/kg-day)-1	Weight - of - Evidence
Inorganics			
Aluminum	-	-	D
Antimony	-	-	D
Arsenic	1.75E+00	1.5E+01	A
Barium	-	-	D
Beryllium	4.3E+00	8.4E+00	B2
Cadmium	-	6.3E+00	B1
Manganese(water)	-	-	-
Mercury	-	-	D
Nickel (sol. salt)	-	-	-
Silver	-	-	D
Thallium	-	-	D
Vanadium	-	-	-
Zinc (and compounds)	-	-	D

NOTES:
(1) All toxicity values obtained from IRIS unless otherwise noted.
(2) Toxicity values obtained from HEAST Annual FY-1994.
(3) EPA Environmental Criteria and Assessment Office
USEPA WEIGHT - OF - EVIDENCE:
A - Human Carcinogen
B1 - Probable Human Carcinogen. Limited human data are available.
B2 - Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals and inadequate or no evidence in humans.
C - Possible Human Carcinogen
D - Not Classifiable as to human carcinogenicity.
E - Evidence of noncarcinogenicity for humans.

TABLE 5

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

COCS	NONCARCINOGENS: REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg/day)	Uncertainty Factor	Inhalation RfD (mg/kg/day)	Uncertainty Factor
Volatile Organics				
Acetone	1 0E-01	1000	-	-
Trichloroethylene	6 0E-03 (3)	3000	-	-
Semivolatile Organics				
Benzo(a)anthracene	-	-	-	-
Benzo(a)pyrene	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-
Dibenz(a,h)anthracene	-	-	-	-
Dibenzofuran	4.0E-03 (3)	-	-	-
Fluoranthene	4.0E-02	3000	-	-
Indeno(1,2,3-cd)pyrene	-	-	-	-
Pyrene	3.0E-02	3000	-	-
Pesticides/PCBs				
alpha BHC	-	-	-	-
beta BHC	-	-	-	-
Dieldrin	5.0E-05	100	-	-
Heptachlor Epoxide	1.3E-05	1000	-	-
PCBs (Aroclors)	-	-	-	-
Aroclor 1242	-	-	-	-
Aroclor 1248	-	-	-	-
Aroclor 1254	2.0E-05	300		
Aroclor 1260	-	-	-	-

TABLE 5

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RESPONSE RELATIONSHIP (1)

COCS	NONCARCINOGENS: REFERENCE DOSES (RfD)					
	Oral RfD (mg/kg/day)		Uncertainty Factor	Inhalation RfD (mg/kg/day)		Uncertainty Factor
Inorganics						
Aluminum	1.0E+00	(3)	-	-		-
Antimony	4.0E-04		1000	-		-
Arsenic	3.0E-04		3	-		-
Barium	7.0E-02		3	1.4E-04	(2)	1000
Beryllium	5.0E-03		100	-		-
Cadmium (food)	1.0E-3		10	-		-
Cadmium (water)	5.0E-04		10	-		-
Manganese (water)	2.3E-02	(4)	3	1.4E-05		1000
Mercury	3.0E-04	(2)	1000	8.6E-05(2)		30
Nickel (sol. salt)	2.0E-02		300	-		-
Silver	5.0E-03		3	-		-
Thallium	8.0E-05		3000			
Vanadium	7.0E-03	(2)	100	-		-
Zinc (and compounds)	3.0E-01		3	-		-

NOTES:
- Calcium, iron, magnesium, potassium and sodium are considered essential nutrients and will not be quantitatively evaluated in the risk assessment.

(1) All toxicity values obtained from IRIS unless otherwise noted.
(2) Toxicity values obtained from HEAST Annual FY-1994.
(3) EPA Environmental Criteria and Assessment Office.
(4) Revised oral RfD for manganese. Derived by adjusting the food-based RfD of 0.14 mg/kg/day for 50% intake of manganese from diet and applying a safety factor of three.

TABLE 5

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RELATIONSHIP (1)

COCS	NONCARCINOGENS: REFERENCE DOSES (RfD)			
	Oral RfD (mg/kg/day)	Uncertainty Factor	Inhalation RfD (mg/kg/day)	Uncertainty Factor
Volatile Organics				
Acetone	1.0E+00	100	-	-
Trichloroethylene	-	-	-	-
Semivolatile Organics				
Benzo(a)anthracene	-	-	-	-
Benzo(a)pyrene	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-
Dibenz(a,h)anthracene	-	-	-	-
Dibenzofuran	-	-	-	-
Fluoranthene	4.0E-01	300	-	-
Indeno(1,2,3-cd)pyrene	-	-	-	-
Pyrene	3.0E-01	300	-	-
Pesticides/PCBs				
alpha BHC	-	-	-	-
beta BHC	-	-	-	-
Dieldrin	5.0E-05	100	-	-
Heptachlor Epoxide	1.3E-05	100	-	-
PCBs (Aroclors)	-	-	-	-
Aroclor 1242	-	-	-	-
Aroclor 1248	-	-	-	-
Aroclor 1254	-	-		
Aroclor 1260	-	-	-	-

TABLE 5

KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
CHRONIC TOXICITY VALUES FOR POTENTIAL NONCARCINOGENIC HEALTH EFFECTS
DOSE - RELATIONSHIP (1)

COCS	NONCARCINOGENS: REFERENCE DOSES (RfD)					
	Oral RfD (mg/kg/day)		Uncertainty Factor	Inhalation RfD (mg/kg/day)		Uncertainty Factor
Inorganics						
Aluminum	-		-	-		-
Antimony	4.0E-04		1000	-		-
Arsenic	3.0E-04		3	-		-
Barium	7.0E-02		3	1.4E-03	(2)	1000
Beryllium	5.0E-03		100	-		-
Cadmium	-		-	-		-
Manganese (water	2.3E-02	(4)	3	-		-
Mercury	3.0E-04	(2)	1000	8.6E-05	(2)	30
Nickel (sol. salt)	2.0E-02		300	-		-
Silver	5.0E-03		3	-		-
Thallium	8.0E-04		300			
Vanadium	7.0E-03	(2)	100	-		-
Zinc (and compounds)	3.0E-01		3	-		-

NOTES:
- Calcium, iron, magnesium, potassium and sodium are considered essential nutrients and will not be quantitatively evaluated in the risk assessment.

(1) All toxicity values obtained from IRIS unless otherwise noted.
(2) Toxicity values obtained from HEAST Annual FY-1994.
(3) EPA Environmental Criteria and Assessment Office.
(4) Revised oral RfD for manganese. Derived by adjusting the food-based RfD of 0.14 mg/kg/day for 50% intake of manganese from the diet and applying a safety factor of three.

TABLE 6
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING CARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL CANCER RISK	FOR SCENARIOS WITH TOTAL RISK > 10-4 CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO RISK (Risk > 10-6)
PRESENT/FUTURE-USE SCENARIOS				
SURFACE SOIL				
Soil Pile	Area Residents	Ingestion	2.4E-07	..
	(Trespassers)	Dermal Contact	1.8E-07	..
	Children (12-17 years)	Total Carcinogenic Risk =	4.2E-07	..
Disposal Area F	Site Workers	Ingestion	5.1E-04	Carcinogenic PAHs
	Adults	Dermal Contact	1.4E-07	..
		Inhalation of Particulates	3.5E-07	..
		Total Carcinogenic Risk =	5.1E-04	Carcinogenic PAHs
Magnesium Chip Burial Area	Site Workers	Ingestion	2.4E-06	..
	Adults	Dermal Contact	3.8E-07	..
		Inhalation of Particulates	1.3E-07	..
		Total Carcinogenic Risk =	2.9E-06	..
SURFACE WATER				
Industrial Drainage Way and Pond	Area Residents	Ingestion	2.8E-07	..
(All Compounds)	(Trespassers)	Dermal Contact	3.2E-10	..
	Children (12-17 years)	Total Carcinogenic Risk =	2.8E-07	..
Industrial Drainage Way and Pond	Area Residents	Ingestion	9.7E-08	..
(Excluding SPDES Compounds)	(Trespassers)	Dermal Contact	8.9E-11	..
	Children (12-17 years)	Total Carcinogenic Risk =	9.7E-08	..
SEDIMENT				
Industrial Drainage Way and Pond	Area Residents	Ingestion	1.1E-06	..
(All Compounds)	(Trespassers)	Dermal Contact	3.5E-07	..
	Children (12-17 years)	Total Carcinogenic Risk =	1.5E-06	..
Industrial Drainage Way and Pond	Area Residents	Ingestion	8.9E-07	..
(Excluding SPDES Compounds)	(Trespassers)	Dermal Contact	3.5E-07	..
	Children (12-17 years)	Total Carcinogenic Risk =	1.2E-06	..
FISH				
Industrial Drainageway and Pond	Area residents	Ingestion	3.8E-04	Aroclor-1254, Arsenic

TABLE 6
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING CARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL CANCER RISK	FOR SCENARIOS WITH TOTAL RISK > 10-4 CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO RISK (Risk > 10-6)
FUTURE-USE SCENARIOS				
SURFACE SOIL				
Soil Pile	Residents	Ingestion	2.2E-05	..
	Adults	Dermal Contact	3.4E-05	..
		Inhalation of Particulates	2.7E-07	..
		Total Carcinogenic Risk =	5.6E-05	..
	Residents	Ingestion	5.3E-05	..
	Children (0-6 years)	Dermal Contact	9.8E-06	..
		Inhalation of Particulates	3.1E-07	..
		Total Carcinogenic Risk =	6.2E-05	..
	Resident (30 year combined)	Total Carcinogenic Risk =	1.2E-04	..
	Site Workers	Ingestion	8.3E-06	..
	(Employees)	Dermal Contact	9.6E-06	..
		Inhalation of Particulates	8.8E-08	..
		Total Carcinogenic Risk =	1.8E-05	..
	Construction	Ingestion	8.3E-07	..
	Workers	Dermal Contact	3.1E-07	..
		Inhalation	9.2E-10	..
		Total Carcinogenic Risk =	1.1E-06	..
Fluoride Disposal Area No. 1	Residents	Ingestion	4.8E-06	..
	Adults	Dermal Contact	6.4E-06	..
		Inhalation of Particulates	1.5E-07	..
		Total Carcinogenic Risk =	1.1E-05	..
	Residents	Ingestion	1.1E-05	..
	Children (0-6 years)	Dermal Contact	1.9E-06	..
		Inhalation of Particulates	1.7E-07	..
		Total Carcinogenic Risk =	1.3E-05	..
	Residents (30 year combined)	Total Carcinogenic Risk =	2.4E-05	..

TABLE 6
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING CARCINOGENIC RISKS ACROSS PATHWAYS
FOR SCENARIOS WITH TOTAL RISK > 10-4

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	CANCER RISK INDIVIDUAL AMOUNT TO RISK	CHEMICALS CONTRIBUTING THE GREATEST RISK (Risk > 10-6)
FUTURE USE SCENARIOS CONT'D.				
SURFACE SOIL cont'd				
Fluoride Disposal Area No. 1 cont'd				
	Site Workers (Employees)	Ingestion	1.8E-06	..
		Dermal Contact	1.8E-06	..
		Inhalation of Particulates	4.9E-08	..
		Total Carcinogenic Risk =	3.6E-06	..
	Construction Workers	Ingestion	1.8E-07	..
		Dermal Contact	6.0E-08	..
		Inhalation	5.1E-10	..
		Total Carcinogenic Risk =	2.4E-07	..
Fluoride Disposal Area No. 2	Residents Adults	Ingestion	6.4E-06	..
		Dermal Contact	NA	..
		Inhalation of Particulates	2.4E-07	..
		Total Carcinogenic Risk =	6.6E-06	..
	Residents Children (0-6 years)	Ingestion	1.5E-05	..
		Dermal Contact	NA	..
		Inhalation of Particulates	2.8E-07	..
		Total Carcinogenic Risk =	1.5E-05	..
	Residents (30 year combined)	Total Carcinogenic Risk =	2.2E-05	..
	Site Workers (Employees)	Ingestion	2.4E-06	..
		Dermal Contact	NA	..
		Inhalation of Particulates	8.0E-08	..
		Total Carcinogenic Risk =	2.5E-06	..
	Construction Workers	Ingestion	2.4E-07	..
		Dermal Contact	NA	..
		Inhalation	8.4E-10	..
		Total Carcinogenic Risk =	2.4E-07	..
Disposal Area F	Residents Adults	Ingestion	1.4E-03	Carcinogenic PAHs, Dieldrin, Arsenic
		Dermal Contact	4.8E-07	..
		Inhalation of Particulates	1.0E-06	..
		Total Carcinogenic Risk =	1.4E-03	Carcinogenic PAHs, Dieldrin, Arsenic

TABLE 6
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING CARCINOGENIC RISKS ACROSS PATHWAYS
FOR SCENARIOS WITH TOTAL RISK > 10-4

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL CANCER RISK	CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO RISK (Risk > 10-6)
FUTURE USE SCENARIOS CONT'D.				
SURFACE SOIL cont'd				
Disposal Area F cont'd	Residents hildren (0-6 years)	Ingestion	3.2E-03	Carcinogenic PAHs, Dieldrin, Arsenic
		Dermal Contact	1.4E-07	..
		Inhalation of Particulates	1.2E-06	..
		Total Carcinogenic Risk =	3.2E-03	Carcinogenic PAHs, Dieldrin, Arsenic
	Residents (30 years combined)	Total Carcinogenic Risk =	4.6E-03	Carcinogenic PAHs
	Site Workers (Employees)	Ingestion	5.1E-04	Carcinogenic PAHs
		Dermal Contact	1.4E-07	..
		Inhalation of Particulates	3.5E-07	..
		Total Carcinogenic Risk =	5.1E-04	Carcinogenic PAHs
	Construction Workers	Ingestion	5.1E-05	..
		Dermal Contact	4.5E-09	..
		Inhalation	3.6E-09	..
		Total Carcinogenic Risk =	5.1E-05	..
Magnesium Chip Burial Area	Residents Adults	Ingestion	6.7E-06	..
		Dermal Contact	1.3E-06	..
		Inhalation of Particulates	4.0E-07	..
		Total Carcinogenic Risk =	8.4E-06	..
	Residents Children (0-6 years)	Ingestion	1.6E-05	..
		Dermal Contact	3.9E-07	..
		Inhalation of Particulates	4.6E-07	..
		Total Carcinogenic Risk =	1.7E-05	..
	Residents (30 year combined)	Total Carcinogenic Risk =	2.5E-05	..
	Site Workers (Employees)	Ingestion	2.4E-06	..
		Dermal Contact	3.8E-07	..
		Inhalation of Particulates	1.3E-07	..
		Total Carcinogenic Risk =	2.9E-06	..
	Construction Workers	Ingestion	2.4E-07	..
		Dermal Contact	1.2E-08	..
		Inhalation	1.4E-09	..
		Total Carcinogenic Risk =	2.5E-07	..

TABLE 6
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING CARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL CANCER RISK	FOR SCENARIOS WITH TOTAL RISK > 10-4 CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO RISK (Risk > 10-6)
SUBSURFACE SOIL				
Area Southwest of the West Parking Lot	Construction Workers	Ingestion	3.3E-07	..
		Dermal Contact	5.3E-09	..
		Inhalation	1.7E-09	..
		Total Carcinogenic Risk =	3.4E-07	..
MW-10 Area	Construction Workers	Ingestion	2.7E-07	..
		Dermal Contact	6.4E-09	..
		Inhalation of Particulates	1.7E-09	..
		Total Carcinogenic Risk =	2.8E-07	..
Fluoride Disposal Area No. 1	Construction Workers	Ingestion	4.1E-07	..
		Dermal Contact	4.2E-09	..
		Inhalation of Particulates	1.4E-08	..
		Total Carcinogenic Risk =	4.3E-07	..
Fluoride Disposal Area No. 2	Construction Workers	Ingestion	2.2E-07	..
		Dermal Contact	NA	..
		Inhalation of Particulates	1.2E-09	..
		Total Carcinogenic Risk =	2.2E-07	..
Former Coal Pile	Construction Workers	Ingestion	2.1E-07	..
		Dermal Contact	3.9E-09	..
		Inhalation of Particulates	1.1E-09	..
		Total Carcinogenic Risk =	2.2E-07	..
Former Runoff Basin	Construction Workers	Ingestion	4.2E-07	..
		Dermal Contact	6.2E-09	..
		Inhalation of Particulates	2.0E-09	..
		Total Carcinogenic Risk =	4.3E-07	..
Disposal Area F	Construction Workers	Ingestion	1.4E-06	..
		Dermal Contact	NA	..
		Inhalation of Particulates	1.1E-09	..
		Total Carcinogenic Risk =	1.4E-06	..
Magnesium Chip Disposal Area	Construction Workers	Ingestion	3.0E-07	..
		Dermal Contact	1.2E-08	..
		Inhalation of Particulates	1.1E-09	..
		Total Carcinogenic Risk =	3.1E-07	..

NOTES
No carcinogenic risks exceed the USEPA target risk range of 1E-04 to 1E-06
.. Indicates that the carcinogenic risk does not exceed the target risk range or could not be calculated; therefore, no chemicals were selected as contributors
NA: The carcinogenic risk for dermal contact with soil could not be calculated as no carcinogenic chemicals of potential concern have established dermal absorption factors

TABLE 7
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING NONCARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL HAZARD INDEX	CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO HAZARD INDICES (HQ > 1)
PRESENT/FUTURE-USE SCENARIOS				
SURFACE SOIL				
Soil Pile	Area Residents	Ingestion	7.3E-03	..
	(Trespassers)	Dermal Contact	3.0E-03	..
	Children (12-17 years)	Total Hazard Index =	1.0E-02	..
Disposal Area F	Site Workers	Ingestion	7.3E-02	..
	Adults	Dermal Contact	6.4E-04	..
		Inhalation of Particulates	1.2E-01	..
		Total Hazard Index =	1.9E-01	..
Magnesium Chip Burial Area	Site Workers	Ingestion	1.6E-02	..
	Adults	Dermal Contact	NA	..
		Inhalation of Particulates	2.3E-03	..
		Total Hazard Index =	1.8E-02	..
SURFACE WATER				
Industrial DrainageWay and Pond	Area Residents	Ingestion	9.7E-02	..
(All Compounds)	(Trespassers)	Dermal Contact	1.0E-04	..
	Children (12-17 years)	Total Hazard Index =		..
Industrial DrainageWay and Pond	Area Residents	Ingestion	1.2E-02	..
(Excluding SPDES Compounds)	(Trespassers)	Dermal Contact	1.1E-05	..
	Children (12-17 years)	Total Hazard Index =	1.2E-02	..
SEDIMENT				
Industrial DrainageWay and Pond	Area Residents	Ingestion	1.8E-01	..
(all Compounds)	(Trespassers)	Dermal Contact	3.5E-02	..
	Children (12-17 years)	Total Hazard Index =	2.2E-01	..
Industrial DrainageWay and Pond	Area Residents	Ingestion	5.0E-02	..
(Excluding SPDES Compounds)	(Trespassers)	Dermal Contact	2.3E-02	..
	Children (12-17 years)	Total Hazard Index =	7.3E-02	..
FISH				
Industrial DrainageWay and Pond	Area Residents	Ingestion	6.9E+00	Aroclor-1254, Arsenic

TABLE 7
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING NONCARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL HAZARD INDEX	CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO HAZARD INDICES (HQ > 1)
FUTURE-USE SCENARIOS				
SURFACE SOIL				
Soil Pile	Residents Adults	Ingestion	1.7E-01	..
		Dermal Contact	1.4E-01	..
		Inhalation of Particulates	9.0E-01	..
		Total Hazard Index =	1.2E+00	..
	Residents Children (0-6 years)	Ingestion	1.6E+00	..
		Dermal Contact	1.6E-01	..
		Inhalation of Particulates	4.3E+00	Manganese
		Total Hazard Index =	6.1E+00	Manganese
	Site Workers (Employees)	Ingestion	6.0E-02	..
		Dermal Contact	3.7E-02	..
		Inhalation of Particulates	2.9E-01	..
		Total Hazard Index =	3.9E-01	..
	Construction Workers	Ingestion	9.5E-02	..
		Dermal Contact	NA	..
		Inhalation	1.3E-04	..
		Total Hazard Index =	9.5E-02	..
Fluoride Disposal Area No. 1	Residents Adults	Ingestion	1.1E-01	..
		Dermal Contact	1.2E-01	..
		Inhalation of Particulates	5.3E.01	..
		Total Hazard Index =	7.6E-01	..
	Residents Children (0-6 years)	Ingestion	1.1E+00	..
		Dermal Contact	1.4E-01	..
		Inhalation of Particulates	2.5E+00	Manganese
		Total Hazard Index =	3.7E+00	Manganese

TABLE 7
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING NONCARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL HAZARD INDEX	CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO HAZARD INDICES (HQ > 1)
FUTURE USE SCENARIO CONT'D				
Fluoride Disposal Area No. 1 cont'd	Site Workers (Employees)	Ingestion	4.1E-02	..
		Dermal Contact	3.3E-02	..
		Inhalation of Prticulates	1.7E-01	..
		Total Hazard Index =	2.4E-01	..
	Construction Workers	Ingestion	5.3E-02	..
		Dermal Contact	NA	..
		Inhalation	4.9E-05	..
		Total Hazard Index =	5.3E-02	..
Fluoride Disposal Area No. 2	Residents Adults	Ingestion	7.6E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	4.8E-01	..
		Total Hazard Index =	5.6E-01	..
	Residents (Trespassers) Children (0-6 years)	Ingestion	7.1E-01	..
		Dermal Contract	NA	..
		Inhalation of Particulates	2.3E+00	Manganese
		Total Hazard Index =	3.0E+00	Manganese
	Site Workers (Employees)	Ingestion	2.7E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	1.5E-01	..
		Total Hazard Index =	1.8E-01	..
	Construction Workers	Ingestion	5.6E-02	..
		Dermal Contact	NA	..
		Inhalation	8.6E-05	..
		Total Hazard Index =	5.6E-02	..
Disposal Area F	Residents Adults	Ingestion	2.1E-01	..
		Dermal Contact	9.9E-03	..
		Inhalation of Particulates	3.7E-01	..
		Total Hazard Index =	5.9E-01	..

TABLE 7
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING NONCARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL HAZARD INDEX	CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO HAZARD INDICES (HQ > 1)
FUTURE USE SCENARIO CONT'D				
SURFACE SOIL cont'd				
Disposal Area F cont'd	Residents Children (0-6 years)	Ingestion	1.9E+00	..
		Dermal Contact	1.2E-02	..
		Inhalation of Particulates	1.7E+00	Manganese
		Total Hazard Index =	3.6E+00	Manganese
	Site Workers (Employees)	Ingestion	7.3E-02	..
		Dermal Contact	2.7E-03	..
		Inhalation of Particulates	1.2E-01	..
		Total Hazard Index =	2.0E-01	..
	Construction Workers	Ingestion	1.2E-01	..
		Dermal Contact	NA	..
		Inhalation	8.2E-05	..
		Total Hazard Index =	1.2E-01	..
Magnesium Chip Burial Area	Residents Adults	Ingestion	4.4E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	7.2E-03	..
		Total Hazard Index =	5.1E-02	..
	Residents Children (0-6 years)	Ingestion	4.4E-01	..
		Dermal Contact	NA	..
		Inhalation of Particulates	3.3E-02	..
		Total Hazard Index =	4.7E-01	..
	Site Workers (Employees)	Ingestion	1.6E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	2.3E-03	..
		Total Hazard Index =	1.8E-02	..
	Construction Workers	Ingestion	3.4E-02	..
		Dermal Contact	NA	..
		Inhalation	5.9E-05	..
		Total Hazard Index =	3.4E-02	..

TABLE 7
KENTUCKY AVENUE WELLFIELD SITE - OPERABLE UNIT 3
COMBINING NONCARCINOGENIC RISKS ACROSS PATHWAYS

MEDIA	RECEPTOR POPULATION	EXPOSURE ROUTE	INDIVIDUAL HAZARD INDEX	CHEMICALS CONTRIBUTING THE GREATEST AMOUNT TO HAZARD INDICES (HQ > 1)
FUTURE USE SCENARIO CONT'D				
SUBSURFACE SOIL				
Area Southwest of the West Parking Lot	Construction Workers	Ingestion	1.0E-01	..
		Dermal Contact	NA	..
		Inhalation of Particulates	1.1E.04	..
		Total Hazard Index =	1.0E-01	..
MW-10 Area	Construction Workers	Ingestion	7.9E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	6.6E-05	..
		Total Hazard Index =	7.9E-02	..
Fluoride Disposal Area No. 1	Construction Workers	Ingestion	1.5E-01	..
		Dermal Contact	NA	..
		Inhalation of Particulates	NA	..
		Total Hazard Index =	1.5E-01	..
Fluoride Disposal Area No. 2	Construction Workers	Ingestion	6.7E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	5.8E-05	..
		Total Hazard Index =	6.7E-02	..
Former Coal Pile	Construction Workers	Ingestion	7.2E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	5.6E-05	..
		Total Hazard Index =	7.2E-02	..
Former Runoff Basin	Construction Workers	Ingestion	7.9E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	NA	..
		Total Hazard Index =	7.9E-02	..
Disposal Area F	Construction Worker	Ingestion	1.0E-01	..
		Dermal Contact	NA	..
		Inhalation of Particulates	7.9E-05	..
		Total Hazard Index =	1.0E-01	..
Magnesium Chip Burial Area	Construction Worker	Ingestion	6.2E-02	..
		Dermal Contact	NA	..
		Inhalation of Particulates	6.0E-05	..
		Total Hazard Index =	6.2E-02	..

Notes
NA - The noncarcinogenic hazard index for dermal contact with soil could not be calculated as no noncarcinogenic chemicals of potential concern have established dermal absorption factors.

TABLE 8

SUMMARY OF COSTS
Kentucky Avenue Wellfield Site, Operable Unit No. 3

Remedial Alternative	Capital Cost(1)	O&M Cost(2)	Present Worth Cost(3)
DISPOSAL AREA F			
1A - No Action	0	0	0
2A - Containment with Asphalt Cover (Option 1)	219,200	19,200	514,100
2A - Containment with RCRA Cap (Option 2)	606,300	34,200	1,114,000
3A - Removal and Off-Site Disposal	549,000	4,600	619,600
4A - Physical Treatment by SVE(4)	525,900	4,600	596,500
FORMER RUNOFF BASIN AREA			
1B - No Action	0	0	0
2B - Removal and Off-Site Disposal	1,261,800	0	1,261,800
3B - Physical Treatment by DP-SVE(4) (Option 1)	544,700	0	544,700
3B - Physical Treatment by SVE-AS(4) (Option 2)	565,100	0	565,100
4B - Thermal Desorption Treatment	763,200	0	763,200

TABLE 8 (continued)

SUMMARY OF COSTS
Kentucky Avenue Wellfield Site, Operable Unit No. 3

Remedial Alternative	Capital Cost(1)	O&M Cost(2)	Present Worth Cost(3)
INDUSTRIAL DRAINAGEWAY			
1C - No Action	0	0	0
2C - Limited Action	268,200	13,000	480,100
3C - Containment with Concrete Lining	373,400	18,700	660,600
4C - Removal and Off-Site Disposal	365,600	0	365,600

Notes:
1. Capital costs include estimates for remedial design, construction, miscellaneous costs (e.g., administrative, permitting), and contingency.
2. O&M costs include estimates for maintenance, monitoring, five-year reviews (where applicable), and contingency.
3. Present worth calculated at discount rate of five percent for term of 30 years.
4. For alternatives using SVE, costs of one-year operational period included with capital costs. Estimates do not include costs for water treatment.

APPENDIX III
ADMINISTRATIVE RECORD INDEX

KENTUCKY AVENUE WELLFIELD SITE
OPERABLE UNIT NO. 3
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

2.0 REMOVAL RESPONSE

2.1 Sampling and Analysis Plans

P. 200001- 200077 Report: Work Plan, Hazardous Waste and Drummed Waste Removal, Former Westinghouse Plant Site, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, September, 1995.

P. 200078- 200110 Report: Addenda to Approved Sampling and Analysis Plan and Health and Safety Plan, Removal Action, Former Westinghouse Plant Site, Horseheads, New York, prepared for Westinghouse Electric corporation, prepared by Philip Environmental Services Corporation, October, 1995.

2.2 Sampling and Analysis Data/Chain of Custody Forms

P. 200111- 200166 Report: Removal Action Completion Report, Former Westinghouse Plant Site, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, July, 1996.

2.7 Correspondence

P. 200167- 200172 Letter to Mr. Mark Purcell, Remedial Project Manager, U.S. EPA, Region II, from Mr. Timothy R. Basilone, Manager, Environmental Remediation, and Mr. Leo M. Brausch, Project Engineer/Consultant, Westinghouse Electric Corporation, re: Administrative Order on Consent for Removal Action, Index No. II CERCLA-95-0219, Former Westinghouse Plant Site, Horseheads, New York October 20, 1995. (Attachment: Errata, Addendum to Approved Sampling and Analysis Plan and Health and Safety Plan, Removal Action, Former Westinghouse Plant Site, Horseheads, New York, October 20, 1995.)

P. 200173- 200174 Letter to Mr. Timothy R. Basilone, Manager, Environmental Remediation, c/o Mr. Leo Brausch, Consultant, Law and Environmental Affairs, Westinghouse Electric Corporation, from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Administrative Order on Consent for Removal Action, Index No. II CERCLA-95-0219, Former Westinghouse Plant Site, Horseheads, New York, October 31, 1995.

3.0 REMEDIAL INVESTIGATION

3.3 Work Plans

P.	300001-300172	Report: Remedial Investigation/Feasibility Study, Work Plan, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, Chemung County, New York, Revision 2.0, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., May 6, 1993.
P.	300173-300669	Report: Remedial Investigation/Feasibility Study, Field Sampling Plan, Volume II, Kentucky Avenue Wellfield Site, Operable unit No. 3, Horseheads, Chemung County, New York, Revision 2.0, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., February, 1994. (Note: Appendix G, pp. 300493-300572, Mine Safety Appliances Co. GasCorder User's Manual, Version 2.0A, is CONFIDENTIAL. It is located at U.S. EPA Superfund Records Center, 290 Broadway, 18th floor, N.Y., N.Y. 10007-1866).
P.	300670-301019	Report: Quality Assurance Project Plan, Remedial Investigation/Feasibility Study, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, Chemung County, New York, Volume IIIa, Revision 1.0, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., October, 1993.
P.	301020-301542	Report: Quality Assurance Project Plan, Remedial Investigation/Feasibility Study, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, Chemung County, New York, Volume IIIb, Air Program, Revision 1.0, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., October, 1993.
P.	301543-301945	Report: Remedial Investigation/Feasibility Study, Health and Safety Plan, Volume IV, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, Chemung County, New York, Revision 0.0, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., June, 1993.
P.	301946-301969	Report: Revised Work Plan, Supplemental Field Investigations and Treatability Studies, Remedial Investigation/Feasibility Study, Horseheads, New York, Revision 3.0, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, May 17, 1995.

3.4 Remedial Investigation Reports

P.	301970-301324	Report: Volume I, Text, Tables and Figures, Preliminary Site Characterization Summary, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Remedial Investigation/Feasibility Study, Horseheads, New York, prepared for Westinghouse Electric corporation, prepared by Burlington Environmental Inc., January 27, 1995
P.	302325-302861	Report: Volume II, appendices A-J-2, Preliminary Site Characterization Summary, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Remedial Investigation/Feasibility Study, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., January 27, 1995.
P.	302862-303386	Report: Volume III, Appendices J-3-S, Preliminary Site Characterization Summary, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Remedial Investigation/Feasibility Study, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., January 27, 1995.
P.	303387-304248	Report: Volume IV, Appendices T-Y, Preliminary Site Characterization Summary, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Remedial Investigation/Feasibility Study, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., January 27, 1995.
P.	304249-204385	Report: Draft Conceptual Site Model Technical Memorandum, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., March 1995.
P.	304386-304513	Report: Technical Memorandum, Data Evaluation and Selection of Chemicals of Potential Concern, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, Chemung County, New York, prepared for Westinghouse Electric Corporation, prepared by Burlington Environmental Inc., March 1995.
P.	304514-304613	Report: Report of Soil Vapor Extraction Pilot Studies, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, New York, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, August, 1995.

P.	304613A- 305178	Report: Final Baseline Human Health Risk Assessment, Kentucky Avenue Wellfield Site, Operable Unit III, Chemung County, New York, prepared for U.S. Environmental Protection Agency, prepared by CDM Federal Programs Corporation, November 20, 1995.
P.	305179- 305254	Report: Screening Level Ecological Risk Assessment for the Kentucky Avenue Wellfield Superfund Site, Operable Unit No. 3, Horseheads, New York, prepared by U.S. EPA, Region II, March 1996.
P.	305255- 305897	Report: Remedial Investigation Report, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, New York, Volume I, Text, Tables, Figures, Plates, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, June, 1996.
P.	305898- 306314	Report: Remedial investigation Report, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, New York, Volume II, Appendices A-K, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, June, 1996.
P.	306315- 306897	Report: Remedial Investigation Report, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, New York, Volume III, Appendices L-S, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, June, 1996.
P.	306898- 306902	Report: Addendum to Remedial Investigation Report. Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, New York, prepared by U.S. EPA, June, 1996.

3.5 Correspondence

P.	306903- 306904	Letter to Mr. Timothy R. Basilone, Manager, Environmental Remediation, c/o Mr. Leo Brausch, Consultant, Law and Environmental Affairs, Westinghouse Electric Corporation, from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Revised Work Plan - Revision 3.0, Supplemental Field Investigations and Treatability Studies, Remedial Investigation/Feasibility Study, Index No. II, CERCLA 10215, Horseheads, New York, May 19, 1995.

P.	306905- 306906	Letter to Mr. Mark Purcell, Remedial Project Manager, U.S. EPA, Region II, from Mr. Leo M. Brausch, Consultant/Project Engineer, Westinghouse Electric Corporation, re: Transmittal, Letter from Village of Horseheads Regarding Site Zoning, Remedial Investigation/Feasibility Study, Horseheads, New York, June 14, 1995. (Attachment: Fax transmission to Mr. Brausch from Philip Environmental, re: referenced zoning letter, June 5, 1995.)
P.	306907- 306911	Letter to Mr. Mark Purcell, Remedial Project Manager, U.S. EPA, Region II, from James Pinta Jr., Ph.D., Project Manager, Philip Environmental Services Corporation, re: Transmittal, Information from the Village of Horseheads Regarding Site Zoning and Comprehensive Plan - Operable Unit No. 3, Administrative Order on Consent for Remedial Investigation/Feasibility Study, Index No. II CERCLA-10215, Horseheads, New York, July 5, 1995. (Attachments: Village of Horseheads zoning maps and June 2, 1995 letter re: zoning plans.)
P.	306912- 306930	Letter to Mr. Timothy R. Basilone, Manager, Environmental Remediation, Law and Environmental Affairs, Westinghouse Corporation, from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Preliminary Site Characterizations Summary and Draft Conceptual Site Model - Technical Memorandum, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Administrative Order on Consent for the Remedial Investigation/Feasibility Study, Index No. II, CERCLA-10215, Horseheads, New York, July 21. 1995. (Attachment: EPA Comments on the Westinghouse Electric Corporation's Preliminary Site Characterization Summary, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Remedial Investigation/Feasibility Study, Horseheads, New York, dated January 27, 1995, July 17, 1995.)
P.	306931- 306961	Letter to Mr. Steven Shost, Bureau of Environmental Exposure Investigation, New York State Department of Health, from Mark Purcell, Remedial Project Manager, U.S. EPA, Region II, re: Village of Horseheads Site Zoning Map and Comprehensive Plan, Baseline Human Health Risk Assessment, Kentucky Avenue Wellfield Site, Horseheads, Chemung County, New York, September 15, 1995. (Attachments: 1. Philip Environmental Services Corporation's submittal containing the Village of Horseheads zoning maps and June 2, 1995 letter re: zoning plans for the Westinghouse manufacturing facility; 2. Table of Contents and select sections of the Village of Horseheads Comprehensive Plan Report transmitted to U.S. EPA on July 20, 1995.)

P. 306962- 306985 Letter to Mr. Richard K. Smith, Manager, Law and Environmental Affairs, Westinghouse Electric Corporation, from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Draft Remedial Investigation Report, Administrative Order on Consent for the Remedial Investigation/Feasibility Study, Index No. II CERCLA-10215, Horseheads, New York, January 30, 1996. (Attachment: EPA Comments on the Westinghouse Electric Corporation's Draft Remedial Investigation Report, Kentucky Avenue Wellfield Site-Operable Unit No. 3, Horseheads, New York, January 23, 1995.)

P. 306986- 307020 Letter to Mr. Richard K. Smith, Manager, Law and Environmental Affairs, Westinghouse Electric Corporation, from Ms. Carole Petersen, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Draft Remedial Investigation Report, Kentucky Avenue Wellfield Site, Administrative Order on Consent for the Remedial Investigation/Feasibility Study, Index No. II CERCLA-10215, Horseheads, New York, June 27, 1996. (Attachments: Remedial Investigation Report Addendum and Executive Summary.)

P. 307021- 307021 Memorandum to the Administrative Record File, Kentucky Avenue Wellfield Site - Operable Unit No. 3, from Mr. Mark Purcell, Project Manager, U.S. EPA, Region II, re: Quality Assurance/Quality Control Analytical Data for the Remedial Investigation at the Operable Unit No. 3, Kentucky Avenue Wellfield Superfund Site, Town of Horseheads, Chemung County, New York, August 29, 1996.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400001- 400234 Report: Feasibility Study Report, Kentucky Avenue Wellfield Site, Operable Unit No. 3, Horseheads, Chemung County, New York, prepared for Westinghouse Electric Corporation, prepared by Philip Environmental Services Corporation, August 1996.

4.6 Correspondence

P. 400235- 400237 Letter to Mr. Mark Purcell, Remedial Project Manager, U.S. EPA, Region II, from Mr. Leo M. Brausch, Project Engineer/Consultant, and Mr. Richard K. Smith, Manager, Environmental Engineering and Project Management, Westinghouse Electric Corporation, re: Transmittal, Feasibility Study Report, Administrative Order on Consent for Remedial Investigation Feasibility Study, Index No. II CERCLA 10215, Operable Unit No. 3, Kentucky Avenue Wellfield Site, Horseheads, New York, July 9, 1996.

P.	400238- 400246	Letter to Mr. Richard K. Smith, Manager, Law and Environmental Affairs, Westinghouse Electric Corporation, from Mr. Kevin Lynch, Chief, New York remediation Branch, Western New York Section, U.S. EPA, Region II, re: Revised Feasibility Study Report, Administrative Order on Consent for the Remedial Investigation/Feasibility Study, Index No. II, CERCLA-10215, Horseheads, New York, August 23, 1996. (Attachments: Feasibility Study Report cover sheet, executive summary and introduction, Remedial Investigation Report cover sheets for Volumes I - III)
P.	400247- 400247	Letter to Mr. Richard L. Caspe, Director, Emergency & Remedial Response Division, U.S. EPA, Region II, from Mr. Michael J. O'Toole, Jr., Director, Division of Environmental Remediation, NYSDEC, re: Westinghouse Electric Corporation Site, Site # 8-08-007, August 23, 1996.

7.0 ENFORCEMENT

7.3 Administrative Orders

P.	700001-700027	Administrative Order on Consent in the Matter of: The Kentucky Avenue Wellfield Site, Index No. II CERCLA-10215, August 6,1991.
P.	700028-700049	Administrative Order on Consent in the Matter of: The Kentucky Avenue Wellfield Site, Index No. II CERCLA 95-0219, September 27, 1995.

8.0 HEALTH ASSESSMENTS

8.1 ATSDR Health Assessments

P.	800001-800016	Report: Site Review and Update, Kentucky Avenue Wellfield, Chemung County, Horseheads, New York, prepared by the New York State Department of Health and the Agency for Toxic Substances and Diseases Registry, March 1994.
P.	800017-800032	Report: 1996/1997 Health Advisories: Chemicals in Sportfish and Game, prepared by the New York State Department of Health, Division of Environmental Health Assessment, March 1996.

8.3 Correspondence

P.	800033-800034	Letter to Mr. Mark D. Purcell, Remedial Project Manager, U.S. EPA, Region II, from Stephen J. Shost, Bureau of Environmental Exposure Investigation, New York State Department of Health, re: Kentucky Avenue Wellfield, Horseheads, Chemung County, Site ID #808012, July 28, 1995.

APPENDIX IV

STATE LETTER OF CONCURRENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION <IMG SRC 0296280D>
50 Wolf Road, Albany, New York 12233

Michael D. Zagata
Commissioner

SEP 27 1996

Mr. Richard L. Caspe
Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway, 20th Floor
New York, New York 10007-1866

Dear Mr. Caspe:

RE: Westinghouse Electric Corporation, Site # 8-08-007
Kentucky Avenue Wellfield, Site # 8-08-012

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) have reviewed the U.S. Environmental Protection Agency (USEPA) Record of Decision (ROD) for the Kentucky Avenue Wellfield (Westinghouse Electric Company, Site # 8-08-007) site. The ROD selects remedies to address soil contamination in three areas of concern at the site, identifies the ongoing interim remedial measure (IRM) as the final remedy for the groundwater and defers the decision on remediation of a nearby pond until the completion of an ecological risk assessment. The NYSDEC and NYSDOH concur with the no further action decision for the groundwater and the following remedies selected by the ROD:

Disposal Area F: Excavation and Off-Site Treatment or Disposal, at permitted facilities, of soils containing TCE, PAHs and arsenic at concentrations above the established cleanup objectives.

Former Runoff Basin Area: A SVE system utilizing either dual-phase or air stripping technologies, to be determined during design, to address volatile organic compound (VOC) contamination in soils above and below the water table.

Industrial Drainageway: Excavation of sediments containing concentrations of PCBs above the 1 ppm cleanup objective for the drainageway.

If you have any questions relative to this concurrence, please contact Mr. Robert W. Schick, P.E. at (518)457-434.

Sincerely,

<IMG SRC 0296280E>

cc: Commissioner Zagata

APPENDIX V

RESPONSIVENESS SUMMARY
KENTUCKY AVENUE WELLFIELD SITE
OPERABLE UNIT 3

INTRODUCTION

A responsiveness summary is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 CFR 300.430(f) (3) (F). It provides a summary of comments and concerns received during the public comment period, and the United States Environmental Protection Agency's (EPA's) and the New York State Department of Environmental Conservation's (NYSDEC's) responses to those comments and concerns. All comments summarized in this document have been considered in the EPA's and the NYSDEC's final decision for selection of a remedial alternative for the Kentucky Avenue Wellfield site (Site).

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

On September 17, 1986, the EPA held its first public meeting for the Site in the Village of Horseheads to discuss the results of a remedial investigation and feasibility study (RI/FS) and the proposed remedy. Approximately 20 residents attended the meeting. The following concerns were raised:

Reimbursements for the connections made by residents;
The future use of the KAW;
Whether future sampling and monitoring would be conducted in the area; and,
The identification of the contaminant sources.

During the second phase of cleanup for the Site (i.e., Operable Unit 2), a public comment period was held from July 21, 1990 through September 18, 1990 for interested parties to comment on the EPA's proposed remedy for OU2. Although the public comment period was originally scheduled to end on August 19, 1990, the EPA extended it to September 18, 1990 at the request of a party.

On August 1, 1990, the EPA held its second public meeting at the Village of Horseheads Town Hall to present the findings of a supplemental RI/FS, and the EPA's proposed remedy for OU2. Approximately 40 citizens were in attendance. The following concerns were raised during the meeting:

The health and safety of residents growing vegetable gardens;
The low levels of trichloroethylene (TCE) contamination detected in the Sullivan Street Wellfield and the design and construction of an extraction and treatment system at that Wellfield;
The schedule and duration of the OU2 cleanup;
The alleged dumping practices and contamination at the Old Horseheads Landfill; and,
The investigations planned for the three industrial facilities at the Site which were identified by the EPA as the primary contributors to ground-water contamination.

A public comment period was held from August 28, 1996 to September 26, 1996 for interested parties to comment on the Proposed Plan for the third phase of cleanup (Operable Unit 3) at the Site. On September 11, 1996 the EPA held a public meeting at the Village of Horseheads Town Hall to present the findings of the RI/FS conducted as part of OU3 and the EPA's Proposed Plan.

During the public meeting, the audience raised questions on a variety of issues. These issues are presented by category in the following sections of this document.

Attached to the Responsiveness Summary are the following Appendices:

Appendix A - Proposed Plan
Appendix B - Press Release
Appendix C - Public Notice

Appendix D - September 11, 1996 Public Meeting Attendance Sheet(s)
Appendix E - September 11, 1996 Public Meeting Transcript
Appendix F - Comment Letter submitted during Public Comment Period

SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA's RESPONSES

Comments expressed during the September 11, 1996 public meeting and written comments received during the public comment period held from August 28, 1996 and September 26, 1996 have been categorized as follows:

Buried drums at the Westinghouse Facility;

Other potential sources of ground-water contamination;

Human health risks associated with PCBs contamination in the industrial drainageway;

Other potential sources of Polychlorinated Biphenyl (PCB) contamination in the industrial drainageway;

Unauthorized discharges and dumpings of waste into the industrial drainageway; and,

Preferred alternatives for OU3.

A summary of the comments and the EPA's responses to those comments are provided below.

Buried Drums at the Westinghouse Facility

Comment No. 1: Ms. Mary Smith, a resident of Elmira, New York, wanted to know whether EPA was confident that it had located all of the drums in the former magnesium chip burial area, stating that 196 30-gallon drums were first reported buried and 179 55-gallon drums were actually found and removed. Ms. Smith noted the apparent discrepancy in the size of the drums, as well.

EPA Response: There is no discrepancy with respect to the size of the drums in the former Magnesium Chip Burial Area. Plant records indicated that the waste materials buried in this area were first containerized in 30-gallon drums. The 30-gallon drums were then placed inside 55-gallon drums, which were subsequently filled with concrete prior to burial. All 179 drums excavated from the Magnesium Chip Burial Area by Westinghouse during the 1995 removal activities were 55-gallon drums. Additionally, upon inspection, all 179 drums were found to be filled with concrete.

Although there is a discrepancy between the number of drums estimated to be buried at the Magnesium Chip Burial Area and the number actually found during the 1995 removal action performed by the Westinghouse Electric corporation (Westinghouse), the EPA does not believe that there are other drums buried in that area, or any other area investigated at Westinghouse's Facility. The number of drums estimated to be buried at the Magnesium Chip Burial Area was obtained by reviewing plant records, interviewing present and former employees, performing on-Site reconnaissance activities, and reviewing historic aerial photographs of the plant. It was only considered as an approximate number.

Additionally, ground-penetrating radar surveys, trenching activities, and borehole drilling techniques were used extensively during the remedial investigation (RI) to locate any drums or other objects which may have been buried at the Magnesium Chip Burial Area and/or other potential source areas at the Westinghouse Facility. The results confirmed the presence of drums only at the Magnesium Chip Burial Area. The actual number of buried drums in that area was determined to be 179 upon the excavation and removal of such drums by Westinghouse in late 1995.

Other potential sources of ground-water contamination

Comment No. 2: A citizen of Horseheads wanted to know if the EPA investigated the potential source areas to the west of the Westinghouse Facility, particularly in the vicinity of the Big Flats No. 1 public water supply well and the Horseheads Automotive Recycling facility (Recycling Facility), which are located in and near the Town of Fisherville. Additionally, the citizen inquired if there were any evidence to suggest that such potential source areas were contributing to the ground-water contamination at the Site.

EPA Response: The EPA did not investigate the area in the vicinity of the Big Flats No. 1 public water supply well or the Recycling Facility as part of the RI/FS for OU3. However, the NYSDEC has done a preliminary investigation in these areas. At the Recycling Facility, the results of soil and ground-water sampling and analyses revealed the presence of several volatile organic compounds, but a source of such contamination could not be identified.

Additionally, ground-water sampling and analyses have been performed by the New York State Department of Health and the Chemung County Health Department. The results indicated the presence of TCE and 1,1,1-trichloroethane in ground water.

Furthermore, a ground-water investigation of the area in the vicinity of the Big Flats No. 1 well has revealed the presence of 1,1,1-trichloroethane and TCE in several private drinking water wells. However, as in the case with the Recycling facility, the source of such contamination has not been identified.

Based on the results of previous hydrogeologic investigations, it has been determined that the ground-water flow regime is very complex. A ground-water divide was identified between the Fisherville area and the Westinghouse facility. This divide is where the ground-water flow direction in the vicinity of the Westinghouse Facility is to the east, and in the Fisherville area the flow direction is to the west. The Big Flats No. 1 well and the Recycling facility are located in the vicinity of this ground-water divide. With the available data, the NYSDEC has not been able to determine the direction of ground-water flow in these areas. The NYSDEC suspects that the flow direction is primarily to the west, and away from the Westinghouse Facility. However, there may also be seasonal variations in the flow direction.

Several monitoring wells located along the western, and most upgradient, perimeter of the Westinghouse Facility were sampled during the RI for OU3. The results revealed the presence of TCE at concentrations ranging up to 10 parts per billion (ppb) in two monitoring wells located at the southwestern corner of the Facility. If such contamination is coming from a source located west and upgradient of the Westinghouse Facility, further investigation would be necessary to identify that source.

The EPA will discuss this matter with the NYSDEC and then decide if further response actions are necessary.

It is noted that the groundwater recovery wells to be installed at the southeast corner of the Westinghouse Facility as part of the OU2 remedy are designed to prevent the entire contaminant plume beneath the Facility from migrating off-site. Therefore, this remedy will also capture any ground-water contamination that may be originating from an upgradient source, if present.

Human Health Risk Associated with PCBs

Comment No. 3: One citizen was concerned that the human health risk associated with exposure to polychlorinated biphenyl (PCB) contamination in the Industrial Drainageway may be overstated.

EPA Response: The concentrations of PCBs found in sediment samples collected from the industrial drainageway ranged from approximately 1 ppm to 9 ppm. In addition, fish tissue samples collected from Koppers Pond contained concentrations of PCBs ranging up to 0.5 ppm. Based on these findings, the EPA identified unacceptable health risks associated with exposure to PCBs through fish consumption. Therefore, a response action will be taken to address such health risk. The intent of the remediation at the industrial drainageway is to minimize the health risks associated with exposure to PCBs through fish consumption.

In assessing human health risks, the EPA makes conservative assumptions concerning risk and exposure parameters. Therefore, the risk assessment is highly unlikely to underestimate the actual risk related to PCB contamination in the industrial drainageway.

Other potential sources of PCB contamination in the industrial drainageway

Comment No. 4: What about PCB contamination from other sources, such as the Chemung County Department of Highways property or runoff from the highways and throughout Horseheads?

EPA Response: EPA did not investigate that property as part of the RI for OU3. However, it was investigated as part of the 1990 RI/FS for OU2. The results of the 1990 RI indicated that PCBs were detected in only one soil sample collected from within two feet of ground surface at a relatively low concentration (0.3 ppm). Based on these findings, the EPA does not consider this to be a source of PCB contamination.

The EPA also recognizes that the industrial drainageway may receive some runoff from nearby roads, especially in the area of the underground piping between the Westinghouse Facility and the Chemung Street outfall. Whether such runoff is contributing to the PCB contamination in the drainageway is not know at this time. However, during remedial design an attempt will be made to assess whether there are other apparent sources that may be contributing to the contamination of the industrial drainageway.

Comment No. 5: Why is there not more concern for the heavy metals contamination in sediments in the industrial drainageway.

EPA Response: Based on the results of the OU3 RI, several heavy metals were identified in the sediments and surface water at the industrial drainageway at elevated concentrations. Additionally, an industrial precipitate which has been present in the industrial drainageway since early 1995 was found to contain very high levels of several metals, including lead, chromium and cadmium. Although the concentrations of metals are elevated, the human health risks calculated by the EPA for exposure to such contamination fell within the EPA's target risk range. Therefore, the selected cleanup for the industrial drainageway was not based on metals contamination.

However, the EPA's screening level ecological risk assessment indicated that the metals contamination may be adversely impacting the environment. The EPA will conduct a supplemental study at Koppers Pond and the outlet stream south of the Pond to determine if, and to what extent, the environment has been impacted by such contamination. The results of the supplemental study will then be used to determine the appropriate cleanup actions, if deemed appropriate.

Reports of Unauthorized Dumping and Discharge

Comment No. 6: A long-time resident has observed evidence of alleged unauthorized discharges continuing in the drainageway, as well as suspected illegal dumping at property adjacent to the industrial drainageway. What is being done to identify the sources of this activity and prevent it in the future, following the cleanup?

EPA Response: The NYSDEC permitting authorities are currently conducting an investigation to determine the source(s) of the unauthorized discharges to the industrial drainageway. It is also the EPA's understanding that Westinghouse and the operators of the wastewater treatment plants at the Westinghouse Facility, the Toshiba Display Devices, Inc. and the Cutler-Hammer Division of Eaton Corporation, are cooperating with the NYSDEC officials in their investigation. Additionally, the NYSDEC is evaluating the monitoring requirements and discharge limits specified in the discharge permits issued for the two wastewater treatment plants at the Westinghouse Facility to determine if modification of such requirements and/or limits are necessary to prevent the recontamination of the industrial drainageway.

The remedy selected for the industrial drainageway (removal and off-Site disposal) will not be implemented until after the NYSDEC completes its investigation and the sources of contamination are identified and eliminated.

Concerning the potential for illegal dumping along the 2,200-foot length of the industrial drainageway, as in numerous other cases, there is no way to completely protect against such activities. While laws exist prohibiting such activities, there are no practical measures that can be imposed to ensure against them.

Comment No. 7: Upon hearing the previous concern expressed at the public meeting, another citizen has requested aggressive prosecution of those causing the contamination.

EPA Response: The white "floc-like" material observed floating in the Industrial Drainageway by local land owners and regulatory officials since the Spring of 1995 was found to contain elevated levels of several heavy metals, including lead, cadmium and chromium. Such levels exceed the allowable limits established for such chemicals on the discharge permits issued by the New York State Department of Environmental Conservation (NYSDEC) for the Westinghouse Facility. The NYSDEC permitting authority is currently conducting an investigation to identify the source(s) of such ongoing release, and it is the EPA's understanding that Westinghouse and the operators at the Westinghouse Facility are cooperating in this effort to determine if the unauthorized releases are a result of their wastewater treatment operations. In the event that the source(s) of the release are identified, appropriate response actions will be taken by the NYSDEC or Federal permitting authorities to eliminate those discharges. Such response actions may including legal actions, if deemed to be appropriate.

Preferred Alternatives for OU3

Comment No. 8: A citizen stated concurrence with EPA's preferred alternative for OU3, namely, Removal and Off-Site Disposal, but is concerned about EPA's preference for Alternative 3B - Option 2, Physical Treatment by Soil Vapor Extraction (SVE) with Air Sparging (AS), for the Former Runoff Basin Area. Would EPA consider a combination of Alternatives 2B (Removal and Off-Site Disposal) and 3B to maximize the cleanup?

EPA Response: The EPA selected Alternative 3B because it will effectively remove TCE from the soils at the Former Runoff Basin Area to the established cleanup level, including those soils in close proximity to building foundations and underground utilities. The removal of TCE to the cleanup level will prevent the further leaching of TCE to ground water.

Alternative 2B is a more difficult remedy to implement because of the presence of such structures. The excavation of contaminated soils would require shoring of the excavation walls, rerouting of utilities, and dewatering operations. Even with implementation of these measures, it is uncertain if all of the TCE contamination can be reached. Consequently, Alternatives 2B and 3B are deemed to be potentially less reliable for ensuring that all of the TCE contamination is remediated.

APPENDIX A

Superfund Proposed Plan

<IMG SRC 0296280F> Kentucky Avenue Wellfield
Superfund Site

Horseheads
Chemung County, New York

EPA
Region 2 August 1996

PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for addressing two areas of soil contamination at the former Westinghouse Electric Corporation (Westinghouse) Industrial and Governmental Tube Division facility (Facility) and contaminated sediments in a related industrial drainageway which are part of the Kentucky Avenue Wellfield Superfund site (Site).[1] This Proposed Plan also identifies the preferred remedial alternatives and explains the rationales for such preferences. The Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) as lead agency, with support from the New York State Department of Environmental Conservation (NYSDEC). The EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 U.S.C. 9601 - 9675, as amended, and 40 CFR 300.430(f) of the National Contingency Plan (NCP). The alternatives summarized herein for the Facility and industrial drainageway are described in the remedial investigation and feasibility study (RI/FS) reports, which should be consulted for a more detailed description of all the alternatives.

This Proposed Plan is being provided as a supplement to the RI/FS reports to inform the public of the EPA and the NYSDEC's preferred remedies and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternatives.

1 The Site is identified by the New York State Department of Environmental Conservation as the Westinghouse Electric Corporation, Site No. 8-08-007.

The remedies described in this Proposed Plan are the preferred remedies for the Site. Changes to the preferred remedies or a change from a preferred remedy to another remedy may be made if public comments or additional data indicate that such change will result in a more appropriate remedial action. The final decision regarding the selected remedies will be made after the EPA has taken into consideration all public comments. We are soliciting public comment on all of the alternatives considered in the detailed analysis of the RI/FS because the EPA and the NYSDEC may select remedies other than the preferred remedies.

COMMUNITY ROLE IN SELECTION PROCESS

The EPA and the NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI/FS reports, Proposed Plan, and supporting documentation have been made available to the public for a public comment period which begins on August 28, 1996 and concludes on September 26, 1996.

A public meeting will be held during the public comment period at the Village of Horseheads Hall located at 202 South Main Street in Horseheads, New York on September 11, 1996 at 7:30 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), which is the document which formalizes the selection of the remedy.

All written comments should be addressed to:

Mark Purcell
Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

MARK YOUR CALENDAR

August 28 - September 26, 1996
Public comment period on RI/FS report, Proposed Plan, and remedies considered

September 11, 1996 at 7:30 p.m.
Public meeting at the Village of Horseheads Hall
202 South Main Street
Horseheads, NY

Copies of the RI/FS reports, Proposed Plan, and supporting documentation are available at the following repositories:

Town of Horseheads Town Hall
150 Wygant Road
Horseheads, New York 14841
Phone: (607) 739-8783
Hours: M-F; 8:30-4:40 p.m.

New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010
Phone: (518) 457-4343
Hours: M-F; 8:30-4:45 p.m.

SCOPE AND ROLE OF ACTION

Site remediation activities are sometimes segregated into different phases, or operable units, so that remediation of different environmental media can proceed separately, resulting in an expeditious cleanup of the entire site. The EPA has designated three operable units for this Site. The remedies discussed in this Proposed Plan will address the two areas of soil contamination at the Facility and the sediment contamination in the industrial drainageway, which represent the third operable unit (OU3). The remedy for the operable unit provided the community with an alternative water supply to prevent ingestion of ground water contaminated by volatile organic compounds (VOCs), primarily trichloroethylene (TCE). An interim remedy selected for the second operable unit (OU2) will restore the Kentucky Avenue Wellfield (KAW) as a public drinking water supply and prevent the further spread of contamination within the ground-water aquifer, known locally as the Newtown Creek Aquifer.

The purpose of the OU3 investigation was, in part, to evaluate remedial options for source control at the Facility and a final restoration plan for the Newtown Creek Aquifer. The remedies which address the two areas of soil contamination at the Facility are source control measures to complement the interim ground-water remedy selected for OU2. They also address threats posed by direct contact with contaminated surface soils. The remedies which address contaminated sediments in the industrial drainageway are to mitigate the threat posed by consumption of fish in an adjacent 7-acre pond, known locally as Koppers Pond. The contaminated sediments in the industrial drainageway are believed to be a source of the polychlorinated biphenyls (PCBs) present in the fish.

Based on the findings of the RI/FS for OU3, no further ground-water treatment is warranted beyond that specified as the interim remedy for OU2, nor is further modification of such remedy necessary. Therefore, the EPA is proposing that the OU2 interim remedy becomes the final remedy for restoring the Newtown Creek aquifer to its beneficial use as a drinking water aquifer at this Site.

Based on an initial screening of ecological risk associated with Koppers Pond, the EPA determined that further investigation of the environmental conditions in the Pond and the outlet stream south of the Pond are warranted. The EPA plans on conducting this investigation as part of a supplemental study.

SITE BACKGROUND

The Site is located in the Village and Town of Horseheads and the Village of Elmira Heights in the south central portion of Chemung County, New York. The Site is approximately 4,500 acres in areal extent and is bounded by Hawes Hill to the west of New York (NY) Route 14, the Village of Elmira Heights to the south, the Newtown Creek to the east, and the Village of Horseheads to the north (see Site Location Map - Figure 1). The Site includes the KAW and the contaminated portions of the underlying ground-water aquifer and the source areas contributing to such contamination.

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The KAW is located east of NY Route 14 and approximately one mile south of the intersection of NY Routes 14 and 17. The KAW is part of the Elmira Water Board (EWB) public water supply system and consists of a single production well and three test wells. It was constructed in 1962 and provided approximately 10 percent of the potable water produced by the EWB until its closure in 1980, following the discovery of elevated levels of TCE.

Contamination of the KAW with TCE was first detected in May 1980 during an inventory of local wells initiated by the New York State Department of Health (NYSDOH). Further ground-water sampling in the area by the Chemung County Health Department (CCHD) in July 1980 revealed elevated levels of TCE at the KAW and several private residences and commercial facilities. This finding led to the closing of the KAW in September 1980 by the EWB. In July 1982, the Site was proposed for inclusion on the Superfund National Priorities List (NPL). The Site was placed on the NPL in September 1983.

Subsequent ground-water sampling at residential wells by the EPA, NYSDOH, and CCHD through 1985 identified TCE and other VOCs throughout the Newtown Creek Aquifer. The sampling results also revealed that TCE levels exceeded permissible drinking water standards established by the NYSDOH. Based on such findings, the EPA connected 49 residences with contaminated drinking water wells to the public water supply in 1985 and 1986.

An RI/FS was conducted by the NYSDEC under a cooperative agreement with EPA to determine the nature and extent of ground-water contamination at the Site. The results confirmed the presence of a ground-water contaminant plume within the Newtown Creek Aquifer and extending beyond the farthest downgradient monitoring wells (approximately one mile south of the KAW). The ground water contained VOCs, including TCE at concentrations up to 340 parts per billion (ppb), trans-1,2-dichloroethylene (DCE), a degradation product of TCE, and inorganic chemicals (i.e., metals) at concentrations exceeding Federal and New York State (NYS) drinking water standards.

Based on the results of that RI/FS and consideration of public comments and community concerns, the EPA issued a Record of Decision (ROD) on September 30, 1986, which required the following: 1) the installation and sampling of ground-water monitoring wells upgradient of the Sullivan Street Wellfield, a second wellfield owned by the EWB and located three miles south of the KAW; 2) identification of all residences using private drinking water wells within the area of ground-water contamination for connection to a public water supply; and, 3) initiation of a supplemental RI/FS to determine the nature and extent of contamination at the Site to identify, in part, the primary sources of ground-water contamination in the Newtown Creek Aquifer. The identification of source areas would allow development of an effective program of source control and contaminated ground-water migration control.

1986 ROD AND ACTIONS TAKEN

In accordance with the 1986 ROD, the EPA and the NYSDEC conducted the following actions at the Site through 1994:

1. The NYSDEC installed monitoring wells upgradient of the Sullivan Street Wellfield in July 1989 to monitor ground-water quality. Analysis of ground-water samples collected from those wells in January 1990 identified TCE at concentrations exceeding Federal and NYS drinking water standards. The public water supply at the Sullivan Street Wellfield was also found to be contaminated by TCE at levels exceeding

such standards. In April 1990, the EPA published an Explanation of Significant Difference (ESD) to the 1986 ROD announcing the design and construction of an air stripper facility at the Sullivan Street Wellfield. This treatment facility was constructed and operational by mid-1994.

2. The EPA connected an additional 46 residences and three commercial properties which were using private drinking water wells in the affected area of ground-water contamination to public water supply. Overall, a total of 95 residences and three commercial properties were connected to public water supplies between 1985 and 1994.

3. The EPA completed the supplemental RI/FS at the Site in February 1990. Based on the results, the EPA concluded the following:

the primary source of TCE contamination at and near the KAW was the Westinghouse Facility;

the Facet Enterprises, Inc. (Facet) facility and LRC Electronics, Inc. (LRC) facility were contributory sources of contamination in the ground-water aquifer, but such contamination had not impacted the KAW; and,

the sediments in the industrial drainageway were contaminated by inorganic chemicals, possibly as a result of the permitted industrial discharges originating from the Westinghouse Facility.

The Facet facility, which is located downgradient of the KAW, is another NPL Superfund site being remediated under the direct oversight of the EPA. The LRC facility is located northeast of the KAW and is being remediated under the direct oversight of the NYSDEC.

Based on the results of the supplemental RI/FS, the EPA issued a second ROD on September 28, 1990 selecting an interim ground-water remedy, which consisted of the following: 1) restoration of the KAW as a public drinking water supply; 2) prevention of further spreading of contaminated ground water within the Newtown Creek Aquifer by the installation of ground-water recovery wells to intercept the contaminant plume at a location between the KAW and the Facility; 3) construction of two water-treatment facilities, one located near the KAW and the other located between the KAW and the Facility to treat recovered ground water to Federal and NYS drinking water standards; and, 4) a long-term monitoring program to monitor contaminant migration and evaluate the effectiveness of the remedy.

The 1990 ROD designated that remedy as an interim remedy because it did not address the source areas which were contributing to ground-water contamination. Because the Westinghouse Facility was identified as the primary source of TCE contamination at the KAW, the 1990 ROD also called for a RI/FS to address source control at that Facility and a final remedy for restoring the Newtown Creek Aquifer to its beneficial use as a drinking water aquifer. Additionally, the study was to address the health threat posed by the contaminated sediments present in the industrial drainageway.

1990 ROD AND ACTIONS TAKEN TO DATE

On June 28, 1991, the EPA issued a unilateral administrative order under Section 106(a) of CERCLA, 42 U.S.C. 9606, to Westinghouse directing it to perform the remedial design (RD) and implement the remedy described in the 1990 ROD.
The RD was completed in July 1996 and Westinghouse is currently preparing to begin remedial construction activities in late Summer/early Fall of this year. The EPA is preparing a Fact Sheet which describes the design. Copies of the Fact Sheet will be made available at the information repositories identified on page 2. A community availability session will be held to provide an opportunity for citizens to discuss the design and aspects of construction with representatives of the EPA. The time and place of the availability session will be announced. The EPA will oversee all remedial construction activities performed at the Site.

On August 6, 1991, the EPA and Westinghouse entered into an administrative order on consent for Westinghouse to perform an RI/FS at its Facility, the industrial drainageway, and Koppers Pond, which are designated by the EPA as OU3.

REMEDIAL INVESTIGATION SUMMARY FOR OPERABLE UNIT 3

The purpose of the RI for OU3 was, in part, to determine the nature and extent of contamination in the soils and ground water at several potential source areas and areas of concern at and near the Facility, and whether such areas have contributed to the ground-water contamination present at the KAW. Overall, ten (10) separate areas were investigated in 1994 and 1995 (see Figure 2). Those areas are described in the next section of this document.

The nature and extent of ground-water contamination beneath the Facility were also evaluated to identify contaminant sources. Ground-water samples were collected for analysis from twenty-seven (27) on-site monitoring wells and one Facility production well in 1994 and 1995.

Additionally, the RI further characterized the nature and extent of contamination in the sediments, surface water, and biota (fish) in the industrial drainageway and Koppers Pond (see Figure 3).

Pilot-scale testing was conducted in 1995 to determine whether soil vapor extraction (SVE) would be an effective technology for the in-situ treatment (i.e., removal) of TCE from the soils at the Facility. Based on the success of the pilot-scale testing, SVE is a treatment technology evaluated under Remedial Alternatives 4A and 3B. See section on Summary of Remedial Alternatives.

FINDINGS OF THE REMEDIAL INVESTIGATION

Contaminant Source Areas

Magnesium Chip Burial Area: Westinghouse plant records indicated that from 1973 to 1975, ignitable and reactive magnesium chips and titanium turnings were containerized in 30-gallon drums and then placed in 55-gallon drums that were subsequently filled with concrete and buried in an 8-foot by 215-foot trench located at the northern portion of the facility and within approximately 400 feet of NY Route 17. It was estimated that 196 drums were buried in this area.

Ground-Penetrating Radar (GPR) surveys and subsequent trenching activities confirmed the presence of drums within a narrow trench at a depth of 2 to 4 feet. The drums were intact and did not appear to have impacted the surrounding soils. Analysis of soil samples collected from depths between 1 and 8 feet revealed low levels of several semi-volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs), PCBs and metals. Magnesium concentrations were below soil concentrations found generally in the area at the Site.

A total of 179 55-gallon drums were removed from the Magnesium Chip Burial Area and sent off-site for disposal as part of the removal action conducted by Westinghouse in 1995 (see section on Removal Action, below).

Calcium Fluoride Sludge Disposal Areas Nos. 1 and 2: Two of the ten areas investigated at the Facility included the two calcium fluoride sludge disposal areas located at the north end of the West Parking Lot. The materials placed at these disposal areas included sludges from the treatment of hydrofluoric acid wastewater at a former fluoride treatment operation.

One soil boring in Area No. 1 and two soil borings in Area No 2 revealed a white, damp, powdery material at depths between 3 and 7 feet. Analytical results revealed the white material to contain high levels of cadmium and several other metals. Subsequent analyses using the toxicity characteristic leaching procedure (TCLP) revealed the material to exhibit the characteristics of a RCRA hazardous waste because of leachable cadmium. Other chemicals detected in the soils at depths between 2 and 12 feet included PAHs, PCBs and metals at low concentrations. No TCE was detected in soil samples from these two areas.

Approximately 1,240 tons of the white powdery material and soil mixed with such material were excavated from the two Calcium Fluoride Sludge Disposal Areas and sent off-site for disposal as part of the removal action conducted by Westinghouse in 1995 (see section on Removal Action, below).

Former Runoff Basin Area: This is a storm-water runoff basin consisting of an oval-shaped depression located north and west of the main plant building. It is approximately 0.7 acre in areal extent and is currently covered by lawn, asphalt pavement and small man-made structures. A 7,500-gallon above-ground tank used for storing chlorinated solvents was located in this area at one time.

The GPR survey did not indicate the presence of any buried objects in this area. TCE was detected in 43 of 59 subsurface soil samples, with a maximum concentration of 79,000 parts per billion (ppb), and maximum depth of 12 feet. The water table was encountered at depths between 8 and 11 feet. The soils having the highest concentrations of TCE are proximal to the former location of the 7,500-gallon storage tank.

Additionally, TCE was detected at concentrations of 4 and 6 ppb in ground-water samples collected from the shallow and deep portions of the aquifer. Dibenzofuran, PAHs, PCBs and metals were also present at low concentrations.

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The soil and ground-water sample results confirmed that the Former Runoff Basin Area is a source of TCE contamination in ground water.

Disposal Area F: Plant records indicated that between 1971 and 1974, TCE still bottoms and degreaser sludges were disposed in shallow (2 to 3 feet deep) trenches covering an area about 75 feet by 100 feet. Subsurface trenching activities to the water table encountered various waste-like material, including a coal slag or tar-like material at the surface, coal-like material at a depth of approximately 2 feet, amber beads, a dark brown and black sand and pea gravel, and a layer of white, powdery material suspected of being waste pumice.

Significant levels of VOCs, SVOCs and metals were detected in soil samples collected at Disposal Area F. TCE was primarily detected in soil and waste materials at the northern portion of the disposal area from depths between 1 foot and 2.5 feet and at a maximum concentration of 20,000 ppb. Ground water was encountered at depths between 11 feet and 12.5 feet.

PAHs were also detected in surface soil samples, including fluoranthene (700 parts per million or ppm), pyrene (610 ppm), benzo(b)fluoranthene (420 ppm), benzo(a)pyrene (310 ppm) and benzo(a)anthracene (290 ppm). Arsenic was detected in surface and subsurface soils, with the maximum concentration (18.9 ppm) in a soil sample collected from a depth of 1.0 foot.

The soil sample results, along with the soil-gas and ground-water headspace survey results from the MW-10 Area (see section on MW-10 Area findings, below) confirmed that Disposal Area F is a contributing source of TCE contamination to ground water.

Former Coal Pile Area: Plant records indicated that during the 1960s, TCE and TCE-related still bottoms and degreaser sludges were placed on the coal at the Facility power house fuel pile.

The GPR survey did not indicate the presence of any buried objects at the Former Coal Pile Area. Twenty-one boreholes were drilled to evaluate subsurface conditions. Analysis of fifteen soil samples collected at depths between 2 and 10 feet revealed low concentrations of several VOCs, including
oluene (13 ppb) and TCE (6 ppb), SVOCs, PCBs and several metals. Ground water was encountered at depths between 8 and 11 feet.

Based on these findings, the Former Coal Pile Area does not appear to be a significant source of TCE contamination in ground water.

MW-10 Area: Monitoring well MW-10 is located about 250 feet hydrologically downgradient of Disposal Area F, and ground-water samples from this well have historically revealed the presence of TCE. The purpose of conducting the soil-gas and ground-water headspace surveys was to determine whether the TCE contamination at MW-10 was originating at Disposal Area F or another upgradient source or whether additional sources were present in the immediate vicinity of the MW-10 Area.

Soil-gas and ground-water headspace samples collected between Disposal Area F and MW-10 at depths between 7 and 12 feet confirmed that TCE (98 ppb) in soil gas was originating from Disposal Area F. Analytical results of three ground-water grab samples collected from the survey boreholes at the MW-10 Area were consistent with the TCE concentrations found in the soil-gas and ground-water headspace surveys.

Analysis of soil samples collected at a depth of approximately 3 feet at the MW-10 Area revealed the presence of TCE (32 ppb) and other VOCs, PAHs, PCBs and several metals at concentrations below remedial action objectives (RAOs) (see section on RAOs, below).

The results of the soil sample analyses and the soil-gas and ground-water headspace surveys indicate that Disposal Area F is the source of the TCE contamination in ground water at the MW-10 Area. No other source of TCE was identified upgradient of Disposal Area F or in the immediate vicinity of the MW-10 Area.

Soil Pile: Soil removed from previous on-site construction activities was stockpiled south of the West Parking Lot. A soil gas survey conducted at depths of 5 and 10 feet in the Soil Pile did not detect any VOCs. Analysis of soil samples collected from a depth of 0 to 2 feet revealed low concentrations of VOCs, SVOCs, PCBs and several metals. TCE (0.008 ppm) was below the established RAO of 0.8 ppm for TCE. SVOCs included the following PAHs: benzo(a) anthracene (1.9 ppm), benzo(b)fluoranthene (1.5 ppm) and benzo(a)pyrene (1.2 ppm). The 1.2 ppm level for benzo(a) pyrene exceeded the RAO of 0.78 ppm. The maximum PCB concentration was 3.2 ppm. Manganese was detected at a concentration of 1,220 ppm.

The PCB and PAH contaminated sediments at the Soil Pile were removed and transported off-site for disposal as part of the removal conducted by Westinghouse in 1995. The remaining uncontaminated soil was used as backfill material at the two calcium fluoride sludge disposal areas after the removal was conducted (see section on Removal Action, below).

Area Southwest of the West Parking Lot: A 1970s memorandum from a former plant environmental officer suggests that plant wastes may have been disposed of at this area. Soil-gas and ground-water headspace surveys detected low concentrations of TCE (<10 ppb) at six survey locations. Analysis of ten (10) soil samples collected from a depth of 3 to 4 feet revealed low levels of VOCs, SVOCs, PCBs and several metals, including arsenic at 10.5 ppm.

Based on these findings, this area does not appear to represent a source of TCE in ground water.

Surface-Water Runoff Drains: Site reconnaissance identified 31 surface-water runoff drains present at the Facility. Since concrete or cobbles lined five of these drains, only the other 26 were investigated during the RI. The soil in these drains were found at depths between 4 and 6 feet and each drain had a manhole cover. The drains were investigated to determine if they serve as receptors of conduits for liquid waste materials to reach the underlying soil and ground water.

Analyses of 26 soil samples collected from depths of 5 to 15 feet showed concentrations of various VOCs, SVOCs, pesticides and metals. The most frequently detected VOC was toluene (13 of 26 samples) at a maximum concentration of 270 ppb. TCE was also detected, but at very low concentrations. SVOCs detected included PAHs, phthalates and phenols. Fluoranthene (810 ppm), pyrene (650 ppm) and phenanthrene (630 ppm) were detected at the highest concentrations. Eighteen pesticides and two PCBs were detected, with PCB levels all less than 1.0 ppm. Twenty-two inorganics were detected, with twelve of these detected in all 26 samples, including lead (421 ppm) and zinc (422 ppm).

Based on these findings, it does not appear that the surface-water runoff drains act as conduits for TCE or other VOCs to leach to ground water. The PAHs are believed to be the result of storm water runoff across the large areas of asphalt pavement at the Facility.

New York Route 17: An area of NYSDOT right-of-way for NY Route 17, which is beyond the Facility property, was investigated when an anonymous source reported witnessing an alleged disposal of 350 to 500 fifty-five gallon drums in this area during construction of NY Route 17.

The results of soil-gas and ground-water headspace analysis from depths between 19 and 35 feet at twenty-two locations beneath NY Route 17 revealed low levels of VOCs, including tetrachloroethane (14 ppb), total xylenes (11 ppb), benzene (6 ppb) and TCE (<3 ppb). Benzene and total xylenes are associated with petroleum and petroleum product derivatives. Such levels are believed to be too low to represent a source of contamination. No buried drums were encountered during this investigation.

Ground Water

Ground Water: The results of an investigation conducted by Westinghouse at its Facility in 1987 and 1988 revealed the presence of TCE and several other VOCs and metals in ground water beneath the eastern and southern portions of the Facility. Based on that investigation and the results of the EPA's supplemental RI/FS for OU2, the EPA concluded that the Facility was the primary source of TCE contamination in the aquifer at the KAW. Additionally, as discussed above, the purpose of OU3 was to evaluate options for source control at the Facility and final restoration of the Newtown Creek Aquifer. Therefore, an evaluation of ground water was included in the RI/FS for OU3 to identify contaminant source areas and determine what further remedial efforts, in addition to the interim ground-water remedy selected for OU2, were warranted for ground water.

Analysis of ground-water samples collected from monitoring wells at the Facility in 1994 confirmed that several VOCs, including primarily TCE (120 ppb) along with 1,1,1-trichloroethane (8.5 ppm), 1,2-dichloroethene (total) (4 ppb) and chloromethane (140 ppb), have contaminated the shallow and deep portions of the ground-water aquifer beneath the Facility. The highest TCE concentrations were detected in wells located along the southern portion of the property. Isoconcentration contour maps define the distribution of TCE in both the shallow and deep aquifer zones as narrow, elongated plumes originating from the vicinity of Disposal Area F and extending eastward, in a downgradient direction, through the MW-10 Area and beyond the southeast corner of the Facility.

Analysis of ground-water samples collected from the on-site monitoring wells also revealed several metals, including chromium, nickel and cadmium at concentrations exceeding Federal and NYS Maximum Contaminant Levels (MCLs). However, the metals are believed to be attributable to particulate matter either in the aquifer (clays) or in the well screen as a result of artifacts of well construction. An analysis of ground-water samples from a downgradient plant production well (SW-5) for both total metals (unfiltered samples) and dissolved metals (filtered samples) revealed concentrations below MCLs. Although metals are present in ground water beneath the Facility, they do not appear to be migrating off-site and therefore, the Facility is not considered a contributory source of metals contamination at the KAW.

Based on the findings of the RI/FS, the EPA has determined that further ground-water treatment is not warranted beyond that specified for the OU2 interim remedy in the 1990 ROD, the 1991 administrative order, and the approved remedial design for OU2. Therefore, the EPA proposes that the interim remedy become the final remedy for restoring the Newtown Creek Aquifer to its beneficial use as a drinking water aquifer at the Site.

Industrial Drainageway

Industrial Drainageway and Koppers Pond: The industrial drainageway is a 7 to 10 foot wide and 3 to 12 inch deep open ditch or channel which begins at the Chemung Street outfall, approximately 1,500 ft southeast of the Facility, and extends approximately 2,500 feet in a southeastward direction to Koppers Pond. It receives permitted wastewater discharges and storm-water runoff from the Westinghouse Facility.
Koppers Pond is bounded to the west by railroad tracks and to the north and northeast by the Old Horseheads Landfill. It is approximately 3 to 6 feet deep and flows into an outlet stream to the south, which ultimately drains into Newtown Creek.

The industrial drainageway and Koppers Pond were investigated as part of OU3 because the results of the supplemental RI/FS for OU2 revealed that several metals, primarily cadmium, were present in the sediments of the industrial drainageway at levels which posed a health risk from direct contact exposure. Additionally, because TCE had historically been a permitted discharge parameter at varying levels in the treated wastewaters released to the industrial drainageway from the Facility, the industrial drainageway was considered as a possible migration pathway for TCE to impact ground water at the KAW (i.e., surface water to ground water). Surface water and/or sediment samples were collected for analysis from twenty (20) locations within the industrial drainageway system, including the underground piping between the drainageway and the Facility, Koppers Pond and the outlet stream south of Koppers Pond.

Surface-water samples contained several VOCs, including TCE (8 ppb) and toluene (44 ppb), SVOCs, pesticides and metals. The metals included cadmium (20 ppb), chromium (28 ppb), copper (55 ppb), and lead (345 ppb) from samples collected in the open drainageway. The current permitted discharge limit for TCE at the Facility wastewater treatment plants is 11 ppb.

The sediment samples contained elevated concentrations of several VOCs, SVOCs, pesticides, PCBs, and metals. The VOCs included toluene (38 ppb), carbon disulfide (27 ppb) and TCE (25 ppb).

The 1994 sediment samples, which were collected from a depth of 0-2 feet, contained PCBs (total) at concentrations ranging up to 8.6 ppm, with the highest concentrations found in the samples collected from the upstream portion of the industrial drainageway (sample locations 6-12; see Figure 3). The highest concentration of PCB s detected in the sediments collected from Koppers Pond was 1.6 ppm. PCBs were not detected in the sediment samples collected from the outlet stream south of Koppers Pond. PCBs were also not detected in any surface-water samples collected from this area.

The 1995 sediment samples, which were collected from a depth of 0 to 6 inches, contained lower levels of PCBs than that of the 1994 samples. The highest PCB concentration detected in samples collected from both the industrial drainageway and Koppers Pond was 1.2 ppm.

The metals detected in the sediment samples included cadmium (1,055 ppm), chromium (378 ppm), copper (870 ppm), lead (1,810 ppm), nickel (213 ppm) and zinc (10,775 ppm). The highest concentrations were from sediment samples collected from the industrial drainageway. The metals concentrations in sediment samples collected from Koppers Pond and the outlet stream south of Koppers Pond were generally an order of magnitude lower than those concentrations found in samples from the industrial drainageway.

Based on these findings, a source of PCB contamination in the industrial drainageway is believed to be from the Facility, where PCBs have been detected in soil samples collected from most of the areas investigated during the RI. The highest PCB concentration found at the Facility was 3.2 ppm in a soil sample collected from the Soil Pile. Because the Soil Pile was generated as part of previous construction activities believed to be associated with plant expansions in 1987 and 1988, the precise source of the Soil Pile is not known.

Elevated concentrations of metals in the industrial drainageway sediments and surface water are believed to be the direct result of previous and ongoing permitted discharges from the Facility. Additionally, unauthorized releases from a currently unknown source are believed to have also impacted the sediments and surface water in the industrial drainageway.

Beginning in the Spring of 1995, local citizens and representatives of Federal and NYS regulatory agencies have observed a significant amount of a whitish-brown material floating in the industrial drainageway. Analysis of this material revealed elevated concentrations of several metals, including lead (14,600 ppm), cadmium (334 ppm), and chromium (294 ppm). No PCBs were detected.

Subsequent sampling and analysis of the whitish-brown material by the NYSDEC in September 1995 indicated elevated levels of several metals, including lead (5,800 ppm), zinc (6,220 ppm), chromium (347 ppm), and cadmium (116 ppm). Samples obtained and analyzed by the NYSDEC in June 1996 also contained lead (2,300 ppm), copper (1,100 ppm), aluminum (11,000 ppm), chromium (200 ppm), and cadmium (180 ppm).

The NYSDEC is currently conducting an investigation to identify the possible source(s) of such ongoing releases. As part of that investigation, a Facility operator has agreed to perform an investigation of its wastewater treatment plant operations under the direct oversight of the NYSDEC.

Fish: Analyses of fish samples (carp and large mouth bass species) collected at Koppers Pond by the NYSDEC in 1988 revealed concentrations of total PCB s at approximately 4.0 ppm, which exceeded the Food and Drug Administration (FDA) limit of 2.0 ppm for total PCBs in fish. Based on such data, the NYSDOH issued a fish consumption health advisory for Koppers Pond recommending that the consumption of carp be limited to one meal per month for the general population and avoiding fish consumption for women of child bearing years and children under the age of fifteen (see NYSDOH Health Advisory Chemicals in Sport Fish and Games). In light of such findings, fish-tissue-sample analysis was included as part of the RI for the industrial drainageway and Koppers Pond.

White sucker and carp species were collected by electroshocking technique at Koppers Pond in June 1995. All fish samples collected were relatively small (approximately 6-9 inches). Thirteen fish-tissue samples were prepared by filleting and removal of skin. The samples were analyzed for Target Compound List (TCL) and Target Analyte List (TAL) chemicals. The fish-tissue analyses revealed concentrations of VOCs, PCBs and metals. The VOCs included carbon disulfide (589 ppb), acetone (474 ppb), and toluene (11 ppb). The PCB (Aroclor 1254) levels ranged up to 0.54 ppm. Fifteen metals were also detected, including arsenic at a maximum concentration of 0.1 ppm.

SUMMARY OF RISK

Based upon the results of the RI, a baseline human health risk assessment and screening level ecological risk assessment were conducted by the EPA to estimate the risks associated with current and potential future site conditions. These risk assessments estimate the human health and ecological risk which could result from the contamination at the Facility, industrial drainageway, and Koppers Pond if no remedial actions were taken.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment–-estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The baseline risk assessment began with selecting contaminants of concern which would be representative of risks associated with OU3. These contaminants included VOCs, SVOCs, PCBs, pesticides and metals in various media. Several of the contaminants, including TCE, PCBs and arsenic are known to cause cancer in laboratory animals and are suspected to be human carcinogens.

The baseline risk assessment evaluated the health effects which could result from exposure to contamination as a result of ingestion, dermal contact and inhalation of untreated soils; the ingestion and dermal contact of surface water and sediments; and the ingestion of fish. Specifically, human receptors evaluated for exposure to contaminated soils at the Facility were Site workers, employees and on-site construction workers in present and potential future industrial land use scenarios. Such exposures were also evaluated for adult and child residents in the potential future residential land use scenario. At the industrial drainageway and Koppers Pond, area residents (teenage trespassers) were evaluated for exposure to contaminated surface water and sediment, and area residents (adults) were evaluated for exposure to contaminated fish in present and future residential land use scenarios.

Although a future residential land use scenario is included in the assessment for the Facility, the property is currently industrial and zoned for industrial uses only. Additionally, it is not anticipated that the industrial setting will change in the foreseeable future. Therefore, the remedial alternatives discussed in this Proposed Plan for the Facility address only those risks associated with the present and future industrial land use settings (see section below on Summary of Remedial Alternatives).

Current federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the range of 10-4 to 10-6 (e.g., over a 70-year period of exposure, the likelihood of an additional instance of cancer developing is one-in-ten-thousand to one-in-a-million) and a maximum health Hazard Index (HI), which reflects noncarcinogenic effects for a human receptor, equal to 1.0. An HI greater than 1.0 indicates a potential of noncarcinogenic health effects.

The results of the baseline risk assessment indicate that surface soil at the Facility and contaminated fish at the industrial drainageway and Koppers Pond pose an unacceptable risk to human health. Carcinogenic risk (i.e., cancer risk) as a result of ingestion of surface soil by present and potential future Site workers/employees at Disposal Area F was estimated to be 5.1 x 10-4. This number means that approximately five (5) additional persons out of 10,000 who are most likely to receive the maximum exposure are at risk of developing cancer if the soils are not remediated. The cancer risk is attributable primarily to carcinogenic PAHs (i.e., benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)anthracene and Indeno(1,2,3-cd)pyrene) and arsenic. The noncarcinogenic HIs estimated for ingestion of surface soils by these receptor groups were below the EPA's target level of one.

The carcinogenic risk related to ingestion of contaminated fish in the industrial drainageway and Koppers Pond by area residents (adults) was estimated to be 3.8 x 10-4. This risk exceeds the EPA's 10-4 to 10-6 target risk range and is attributed to PCBs (Aroclor 1254) and arsenic. The HI related to fish ingestion by an adult was estimated to be 6.9. This value exceeds the EPA's target level of 1.0 and is attributed to Aroclor 1254 and arsenic.

All other areas and environmental medial investigated during the RI presented health risks which were below or within the EPA's 10-4 to 10-6 target risk range for carcinogens or below the EPA's HI target level of one for noncarcinogenic health hazards.

Actual or threatened releases of hazardous substances, pollutants and contaminants form the Facility, if not addressed by the preferred alternative or ne of the other active measures considered, may present a current or potential threat to public health or welfare.

Ecological Rick Assessment

To assess the effect of site-related contaminants on the ecosystems in the industrial drainageway and Koppers Pond, the EPA performed a screening level ecological risk assessment. The initial step of this assessment was to screen contaminant concentrations detected in the sediment and surface water samples against ecological criteria established for the protection of aquatic and terrestrial wildlife and their habitats.

Following ecological screening, three contaminants of concern (i.e., cadmium, lead and Aroclor 1254) were used in conjunction with site-specific biological species/habitat information for characterizing ecological risk. Two receptor species identified at the Site, the great blue heron and racoon, were selected for ecological risk modeling. The potential exposure pathways used for those receptor species were the ingestion of contaminated fish and ingestion of surface water and sediments. To perform the exposure assessment, the EPA estimated exposure point concentrations (daily doses) based on the fish fillet data obtained during the RI and sediment bioaccumulation factors.

Ecological screening revealed that several metals, including cadmium, chromium, copper, lead, nickel and zinc, along with PCBs, are present in the sediments at levels which may have an adverse effect on benthic organisms and/or upper trophic level receptors (i.e., aquatic and terrestrial wildlife). Concentrations of many of these metals exceed severe effects levels (SELs) screening criteria, which are defined to be detrimental to the majority of benthic organisms.

Surface-water analytical data indicate that levels of metals (e.g., cadmium, copper and lead) may also present an adverse risk to biota. Such levels exceed the NYSDEC Ambient Water Quality Standards for Class C surface waters and Federal Ambient Water quality Criteria chronic effect levels.

Additionally, Aroclor 1254 levels detected in fish tissue samples exceeded the NYS whole body fish criteria for PCBs and indicate that the contaminant is bioaccumulating at levels known to be associated with adverse ecological effects.

Aroclor 1254, cadmium and lead dosage calculations performed for the great blue heron and racoon, when compared to known reference doses for toxicity, also revealed that estimated daily doses of such contaminants are at or exceed levels which cause adverse ecological effects in organisms.

Field observations in 1994 and 1995 revealed a fairly diverse wildlife community around Koppers Pond, but the aquatic habitat appeared to be stressed. Koppers Pond appeared to be depauperate of fauna. No small fish, tadpoles or newts were observed in the pond and no benthic organisms were sited in the industrial drainageway, nor in the sediment samples collected from the industrial drainageway, the pond, and outlet stream south of the pond.

In light of the findings of the screening level ecological risk assessment and field observations, the EPA has determined that further field investigations are warranted at this time to assess the extent of environmental impacts to this area. Such investigation will determine the actual toxicity of the sediments to benthic organisms in Koppers Pond and the outlet stream south of Koppers Pond. The EPA plans to conduct such an investigation as part of a supplemental study.

REMOVAL ACTION

On September 27, 1995, the EPA and Westinghouse entered into an administrative order on consent for Westinghouse to remove an estimated 196 buried 55-gallon drums containing magnesium chips and titanium turnings waste from the Magnesium Chip Burial Area and hazardous soils at the two Calcium Fluoride Sludge Disposal Areas containing a white material having characteristics of a RCRA hazardous waste. The buried drums and hazardous soils constituted a release and/of threat of release to the environment and therefore were removed from the Facility.

In late 1995 and early 1996, Westinghouse excavated and sent off-site for disposal the following materials:

1. A total of 179 55-gallon drums (284.9 tons) were removed from the Magnesium Chip Burial Area, opened to confirm that the wastes were encased in concrete, and sent off-site for proper disposal;

2. At the two Calcium Fluoride Sludge Disposal Areas, approximately 1,240 tons of the white powder sludge material and soil mixed with such material were excavated and sent off-site for disposal as RCRA hazardous waste; and,

3. Four truck loads of soil containing PCBs and PAHs were removed from the Soil Pile area and taken off-site for disposal, with the remaining uncontaminated soil used to backfill other areas excavated during the removal.

Confirmation soil sampling and analysis confirmed that the residual soils at the excavations of the two Calcium Fluoride Sludge Disposal Areas and the Magnesium Chip Burial Area met the EPA's established risk-based cleanup objectives.

REMEDIAL ACTION OBJECTIVES

RAOs are specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment.

RAOs were developed for two contaminated media, namely, soil at the Facility and sediment in the industrial drainageway. RAOs for soil are designed, in part, to mitigate the health threat posed by ingestion, dermal contact or inhalation of particulates where these soils are contacted or disturbed.
Such objectives are also designed to mitigate the potential of these soils as continuing sources of contamination to ground water. The areas requiring soil remediation are Disposal Area F and the Former Runoff Basin Area. As previously indicated, the Calcium Fluoride Sludge Disposal Areas, the Magnesium Chip Burial Area, and the Soil Pile were addressed as part of the removal action and therefore, do not require soil remediation.

The RAOs established for the industrial drainageway sediments will reduce health threats posed by direct contact pathways and limit the availability of PCBs for fish uptake, thereby serving to reduce the health threat posed by fish consumption.

Soils: The overall RAO is to prevent direct contact with soils that pose an unacceptable risk (i.e., carcinogenic risk greater than the EPA's 10-4 to 10-6 target risk range or a noncarcinogenic HI greater than one) under the present and future industrial land use scenarios. In order to determine which areas at the Facility require soil remediation, cleanup goals were established for those contaminants of concern identified in the EPA's risk assessment for each area investigated. The cleanup goals or concentrations are calculated such that the carcinogenic risk posed by the soils residual contaminant levels after cleanup are no greater than 1 x 10-6.

Based on such calculations, the only potential source area at the Facility having soil contamination levels that exceed the established risk-based cleanup goals in Disposal Area F. The contaminants of concern which exceed such goals are four PAHs and arsenic. The calculated risk-based RAOs for the PAHs are as follows:

Benzo(a)anthracene	7.80 ppm
Benzo(a)pyrene	0.78 ppm
Benzo(b)fluoranthene	7.80 ppm
Indeno(1,2,3-cd)pyrene	7.80 ppm

Because the risk-based cleanup goal for arsenic is below the background level at the Site, it cannot be achieved. A background level of 26.5 ppm for arsenic was calculated based on data from 16 soil samples collected at depths between 0 to 2 feet and 10 to 12 feet along the perimeter of the Facility. However, because this value was above the normal background range for arsenic in New York (3 to 12 ppm), as described by the NYSDEC Technical and Administrative Guidance Memorandum (TAGM), the EPA decided to use the maximum background value provided by the TAGM (12 ppm) as a more conservative cleanup goal.

Soils at several other potential source areas, in addition to Disposal Area F, have arsenic levels higher than the risk-based cleanup goal calculated for arsenic, but such levels are below the established cleanup goal of 12 ppm.

Under the future industrial setting, there are no instances in which the HI associated with exposure to surface soil at the Facility exceeds the EPA's target level of one.

Based on the EPA's baseline risk assessment, no RAOs are required for subsurface soils as a result of or threat posed by direct-contact exposure.

Protection of Ground Water: As part of the source control effort to complement the OU2 ground-water remedy, RAOs have been developed for those soils identified in the RI as contributing to the contamination in ground water beneath the Facility. TCE is present in the soils at Disposal Area F and the Former Runoff Basin Area at concentrations which have the potential to leach to ground water. To prevent further leaching of TCE to ground water, an RAO of 0.8 ppm was calculated for TCE based on a soil leaching model contained in the EPA's 1994 Technical Background Document for Soil Screening Guidance. For comparison, the NYSDEC's established cleanup goal for TCE in soil is 0.7 ppm, as defined in the TAGM.

Sediment: Based on the EPA's baseline human health risk assessment, the RAO for sediments at the industrial drainageway and Koppers Pond is to prevent exposure to PCBs through fish consumption and direct contact with sediments. For mitigating such human health threats, a RAO of 1.0 ppm PCB (total) is established for those sediments. The 1.0 ppm level is consistent with the EPA and the NYSDEC TAGM guidance for PCB cleanup levels in residential areas. Remedial efforts would be focused on the industrial drainageway sediments because PCB concentrations exceeded the 1.0 ppm RAO. However, because the PCB levels in the pond sediments were approximately equal to the RAO, no remedial efforts will be considered for Koppers Pond. The additional field investigation (i.e., supplemental study) will be performed, in part, to confirm that such PCB levels are at or below the RAO.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The FS report evaluates in detail, twelve remedial alternatives for addressing eh contamination associated with OU3 at the Kentucky Avenue Wellfield Site, four each for Disposal Area F, the Former Runoff Basin Area and the industrial drainageway. Because each of the areas to be remediated differs with regard to the nature and extent of contamination, general physical characteristics, and location, the EPA is not recommending one remedial alternative for the entire operable unit, rather a specific remedy for each area of contamination.

The remedial alternatives proposed for OU3 are described below. It should be noted that the numerical designation of several alternatives in this Proposed Plan differ from those used for the same alternatives contained in the FS Report.

Also, the time periods referenced below for construction and operation of the remedial alternatives does not reflect that period of time required to negotiate with the responsible party, complete design work, and procure any contracts which are necessary to implement the remedy.

Disposal Area F

Alternative 1A - No Action:

Capital Cost:	0
O & M Cost:	0
Present-Worth Cost:	0
Time to Implement:	None

The Superfund program requires that the "No Action" alternative be considered as a baseline for comparison of other alternatives. The No Action alternative for Disposal Area F provides for no further effort to avoid exposure to soil or to control the leaching of contaminants to ground water. The access controls for the Facility (e.g., security guard and perimeter fence) would remain active. The existing, temporary fence around Disposal Area F would be left in place and the area would remain a vacant, unused portion of the plant site. TCE present in the soils would eventually leach into ground water and migrate to the OU2 ground-water recovery wells, where it would be extracted and treated.

Because this alternative, if selected, would result in contaminants remaining on-site above health-based levels, CERCLA requires that the area be reviewed every five years.

Alternative 2A (Option 1) - Containment with Asphalt Cover:

Capital Cost:	$219,220
O & M Cost (per year):	$19,200
Present-Worth Cost:	$514,100
Time to Implement:	<1 year

Under this containment alternative, Disposal Area F would be capped with a 40 mil (one mil = one-thousandth of an inch) thick Flexible Membrane Liner (FML), 6-inch subbase layer and 6-inch asphalt pavement. The paved area would cover approximately 0.8 acres of ground surface and could be used for parking. Institutional controls would include a deed restriction to limit excavation work and further property use or development, long-term physical monitoring to minimize future worker contact and enforce the deed restriction, and long-term ground-water monitoring to determine the ongoing contribution of this area to TCE contamination in ground water.

Because this alternative, if selected, would result in contaminants remaining on-site above health-based limits, CERCLA requires that the area be reviewed every five years.

Alternative 2A (Option 2) - Containment with Low-Permeability Cap:

Capital Cost:	$606,300
O & M Cost (per year):	$34,200
Present-Worth Cost:	$1,114,000
Time to Implement:	<1 year

This containment alternative involves placing a 6-foot thick multi-layer, low permeability cap (i.e., RCRA cap) over an approximate 29,200 square feet (o.67 acre) area. The components of the cap would include a 2-foot thick clay layer, 40 mil FML, 12-inch thick drainage layer with overlying geotextile filter fabric, 30-inch thick barrier-protection soil layer and 6 inches of topsoil. The capped area would be fenced, the deed restriction instituted and long-term physical and ground-water monitoring performed.

Because this alternative, if selected, would result in contaminants remaining on-site above health-based limits, CERCLA requires that the area be reviewed every five years.

Alternative 3A - Removal and Off-Site Disposal:

Capital Cost:	$549,000
O & M Cost (per year):	$4,600
Present-Worth Cost:	$619,600
Time to Implement:	<1 year

This alternative involves the excavation and off-site disposal of approximately 1,100 cubic yards (1,600 tons) of contaminated waste materials. Prior to excavation, further sampling and analysis would be conducted to classify the waste material for off-site disposal. PAH and arsenic contaminated soils are not listed RCRA hazardous waste and are not expected to exhibit the characteristics of a RCRA waste.
Therefore, it may be possible to dispose of such waste in a permitted solid waste landfill. Waste materials containing TCE may not be suitable for landfill disposal, if they are considered to be RCRA hazardous wastes subject to Land Disposal Restrictions (LDRs). For such materials, the TCE treatment standard is 6.0 ppm. Therefore, waste containing TCE at concentrations above such standard may require treatment in a permitted hazardous waste incinerator in advance of land disposal. It is estimated that only 32 cubic yards (50 tons) or approximately 3 percent of the total volume (1,100 cubic yards) of waste material contain TCE at concentrations above the LDR standard.

The depth of excavation would be approximately 2.0 - 2.5 feet to meet designated cleanup goals for TCE, PAHs and arsenic. Following excavation, confirmatory sampling and analysis will be performed. With complete removal of the waste materials exceeding cleanup goals, institutional controls or post-remediation monitoring would not be required.

Alternative 4A - Physical Treatment by Soil Vapor Extraction:

Capital Cost:	$525,900
O & M Cost (per year):	$4,600
Present-Worth Cost:	$596,500
Time to Implement:	Installation <1 year Operation - minimum 1 year

To address TCE contamination, a conventional SVE system would be installed using vertical air extraction wells in the area where TCE levels in soils exceed the cleanup goal of 0.8 ppm. These extraction wells would cause the movement of soil vapor and some ground water through the unsaturated soils towards the wells. The soil vapors withdrawn from those wells would be sent through an off-gas treatment system using granular activated carbon to remove TCE. Any ground-water recovered with the soil vapor would be sent to the water treatment facility installed as part of the ground-water remedy for OU2. Because the TCE contaminated soils are relatively near the surface (0-2.5 feet), a 40-mil FML would be placed over the treatment area (1,200 square feet) to minimize short-circuiting of air flow.

To address the PAH and arsenic contamination in the surface soils, a 2-foot cover of imported clean soil would be placed over the entire affected area to prevent direct-contact exposure pathways. The upper six inches would consist of topsoil.

The treatment and cover area would be fenced, deed restrictions instituted and long-term physical monitoring implemented. Long-term ground-water monitoring would be performed until SVE is completed and the cleanup goal for TCE is achieved.

Because this alternative, if selected, would result in the PAH and arsenic contamination remaining on-site above health-based limits, CERCLA requires that the site be reviewed every five years.

Based on pilot-scale SVE testing, it is estimated that one year of operation would be required to achieve TCE cleanup goals in soils.

Former Runoff Basin Area

Alternative 1B - No Action:

Capital Cost:	0
O & M Cost:	0
Present-Worth Cost:	0
Time to Implement:	None

As stated above, the No Action alternative is considered as a baseline for comparison of other alternatives. The No Action alternative would provide no further efforts to address TCE leaching to ground water in this area. The access controls for the Facility (e.g., security guard and perimeter fence) would remain active and the asphalt pavement would be left in place. The TCE present in soils would continue to leach to ground water for eventual extraction and treatment by the ground-water recovery well system installed as part of the OU2 remedy.

Because this alternative, if selected, would result in contaminated soils remaining on site above health-based limits, CERCLA requires that the Site be reviewed every five years.

There are no capital or operation and maintenance costs associated with the No Action alternative and no time would be required for construction.

Alternative 2B - Removal and Off-Site Disposal:

Capital Cost:	$1,261,800
O & M Cost:	0
Present-Worth Cost:	$1,261,800
Time to Implement:	<1 year

This alternative involves the excavation of approximately 750 cubic yards of TCE contaminated soils for off-site disposal at a RCRA hazardous waste landfill or treatment at a RCRA hazardous waste incinerator, depending on waste classification and LDRs. Any non-hazardous waste would be disposed at an off-site solid waste landfill. Because of the depth of excavation (10 feet) and proximity of man-made structures, the sidewalls would require shoring with sheet piling. Underground utilities would be relocated or replaced prior to driving sheet piling and construction dewatering would be performed since the ground-water table is at a depth of 8.5 feet. Ground water recovered from dewatering operations would be pumped to the water treatment facility to be installed at the Facility as part of the ground-water remedy for OU2.

Confirmatory sampling and backfilling with clean off-site soil will complete the remedial effort. Post remediation monitoring would not be required.

Alternative 3B (Option 1) - Physical Treatment by Dual-Phase Soil Vapor Extraction:

Capital Cost:	$544,700
O & M Cost:	Included with capital costs
Present-Worth Cost:	$544,700
Time to Implement:	Installation <1 year Operation - minimum 1 year

This alternative involves the installation of a "dual-phase" SVE system (DP-SVE) at the Former Runoff Basin Area because the TCE contaminated soils extend below the water table. In a dual-phase system, ground water and soil-gas would be withdrawn through the same extraction wells and the water and air would then be separated for treatment. The air stream will be sent to an off-gas treatment system using granular activated carbon. The ground water would be sent to the water treatment facility installed as part of the OU2 remedy. The SVE treatment area would be approximately 55 feet by 75 feet and the extraction wells would extend to a depth of 15 feet. The existing asphalt cover would provide a suitable low-permeability cover to limit short circuiting of air flow. Ground-water monitoring would be conducted until the DP-SVE operation is complete and the cleanup goals for TCE in soil are achieved.

Alternative 3B (Option 2) - Physical Treatment by Soil Vapor Extraction with Air Sparging:

Capital Cost:	$565,100
O & M Cost:	Included with capital costs
Present-Worth Cost:	$565,100
Time to Implement:	Installation <1 year Operation - minimum 1 year

This alternative involves the use of SVE with air sparging (SVE-AS) to remove TCE from soils above and below the water table to the cleanup level of 0.8 ppm. The SVE-AS alternative is similar to Option 1, except that air sparging would treat the saturated soils in-situ, rather than extracting ground water for treatment at the OU2 treatment facility. With this process, air is injected under pressure into the soils below the water table. The air bubbles which form traverse horizontally and vertically through the water column. Dissolved TCE, when exposed to the air bubbles, volatilizes into the gas phase and is carried into the vadose zone where it is captured by the vapor extraction system. Although SVE-AS was not part of the pilot-scale SVE test, it is estimated that this system would operate for a period of one year to achieve the 0.8 ppm soil cleanup level for TCE.

Alternative 4b - Thermal Desorption Treatment:

Capital Cost:	$763,200
O & M Cost:	0
Present-Worth Cost:	$763,200
Time to Implement:	Installation <1 year Treatment - several weeks

This alternative involves the excavation of TCE contaminated soils and treatment on-site through a transportable thermal desorption unit. Thermal desorption is a means to physically separate VOCs and some SVOCs from soil by heating the contaminated media between 200-1000°F and driving off water and volatile contaminants. Off-gases would be burned in an afterburner, condensed to reduce the volume to be disposed, or captured by a carbon treatment system.

Excavation would proceed as described in Alternative 2B and would include the provisions for utility relocation or replaceent, excavation sidewall shoring, and construction dewatering.

The treated soils would be tested and, if found to meet cleanup objectives, returned to the excavation as backfill. Soils not meeting the cleanup objectives would be retreated.

Confirmatory sampling would be conducted to ensure that all contaminated soils requiring treatment are excavated and processed. Because thermal treatment involves removal of contaminants, post remediation monitoring would not be required.

Industrial Drainageway

Alternative 1C - No Action:

Capital Cost:	0
O & M Cost:	0
Present-Worth Cost:	0
Time to Implement:	None

As stated above, the No Action alternative is considered as a baseline for comparison of other alternatives. The No Action alternative for the industrial drainageway sediments would provide no further efforts to reduce the availability of PCBs for direct-contact exposure by trespassers or uptake by fish which may be consumed. It is assumed that the existing NYSDOH fish consumption advisory for Koppers Pond and access controls placed by the current landowner of the pond area would remain in place.

Because this alternative, if selected, would result in the contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Alternative 2C - Limited Action:

Capital Cost:	$268,200
O & M Cost (per year):	$13,800
Present-Worth Cost:	$480,100
Time to Implement:	<1 year

The Limited Action alternative would involve supplementing the existing NYSDOH fish consumption advisory and access controls with a fence erected along both banks of the drainageway and around the perimeter of the pond. This fence would be an 8-foot high chain-link fence of approximately 7,600 feet in total length. warning signs would be placed along the fence to prevent inadvertent access. Principal property owners include the Village of Horseheads and Hardinge Brothers, Inc. Long-term physical monitoring would be performed to ensure the integrity of the fence.

Because this alternative would result in the contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Alternative 3C - Containment with Concrete Ditch Lining:

Capital Cost:	$373,400
O & M Cost (per year):	$18,700
Present-Worth Cost:	$660,600
Time to Implement:	<1 year

Under this alternative, the 1,500 lineal feet of the industrial drainageway from the Chemung Street outfall to the culvert beneath the railroad tracks would be lined with concrete. The method of liner placement would be determined during design, but could include either formed and poured concrete or a Fabriform lining system. The liner would be designed to conform with the existing shape of the flow channel so as to minimize the quantity of sediments requiring removal or regrading.

In constructing such lining, diversion pumping and necessary erosion and sedimentation controls would be emplaced to avoid spreading contaminated sediments to downstream locations.

Because this alternative, if selected, would result in the contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Alternative 4C - Removal and Off-Site Disposal:

Capital Cost:	$365,600
O & M Cost:	0
Present-Worth Cost:	$365,600
Time to Implement:	<1 year

Sediments containing PCB concentrations above the cleanup objective of 1.0 ppm would be removed from the industrial drainageway and sent off-site for disposal in a permitted industrial waste landfill. The volume of sediment to be removed is estimated at 1,100 cubic yards. During excavation, diversion pumping and necessary erosion and sedimentation controls would be emplaced to avoid spreading contaminants to downstream locations. Following confirmatory sampling and analysis, erosion control matting would be emplaced before redirecting water flows through channel. With removal of contaminants to cleanup goals, access controls or post remediation monitoring would not be required.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluative criteria, namely, overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluative criteria are described below.

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

Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

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

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies a remedy may employ.

Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular options.

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

State acceptance indicates whether, based on its review of the RI/FS reports and Proposed Plan, the state concurs, opposes, or has no comment on the preferred alternative at the present time.

Community acceptance will be assessed in the Record of Decision (ROD) following a review of the public comments received on the RI/FS reports and the Proposed Plan.

A comparative analysis of these alternatives for each of the three areas to be remediated, which is based upon the evaluation criteria noted above, is provided below.

Disposal Area F:

Overall Protection of Human Health and the Environment: All of the alternatives proposed, with the exception of the No Action alternative, would provide adequate protection of human health by eliminating risks posed by the exposure to surface soils. Additionally, such alternatives address soil contamination as source control measures for complementing the OU2 ground-water remedy selected by the EPA for the protection of human health.

Alternatives 2A, Option 1 (Containment with Asphalt Cover) and Option 2 (Containment with RCRA Cap) would provide engineering controls (capping) to reduce the risk of exposure to contaminated soils and institutional controls (fencing, deed restrictions and/or monitoring) to ensure cap integrity.

Alternative 3A (Removal and Off-Site Disposal) would eliminate the risk of exposure to contaminated surface soils. It would also be an effective source control measure in addressing TCE contamination in ground water.

Alternative 4A (Physical Treatment Using SVE) is a source control remedy to address TCE, but includes a copping component (soil cover) to address risks posed by exposure to surface soils.

Compliance with ARARs: The principal action-specific ARARs for Disposal Area F include RCRA requirements for the identification, transportation, treatment and disposal of hazardous waste (40 CFR Parts 261 thru 264 and Part 268) and the corresponding NYS hazardous waste requirements. Additionally, Federal and NYS requirements for air emissions are action-specific ARARs (6NYCRR Parts 200, 201, 211, 219 and 257; NYS Air Guide-1) because of the potential for gaseous and particulate air emissions to be generated during excavation and transportation of contaminated soils and SVE off-gassing.

As the source control and final aquifer restoration operable unit for the Site, the principal chemical-specific ARARs for ground water are Federal and New York State Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs). The cleanup goal for TCE-contaminated soils is established to prevent the leaching of TCE to ground water. Such source control measures, in combination with the OU2 ground-water remedy, would achieve MCLs and MCLGs.

No chemical- or location-specific ARARs address the soils contaminated with PAHs and arsenic at Disposal Area F.

Alternative 1A would not achieve the cleanup goals for contaminated soils and therefore would not comply with the chemical-specific ARARs for ground water. Since this alternative involves no remedial activities, it does not trigger any location- or action-specific ARARs.

Alternative 2A, Options 1 and 2, would not initially comply with the chemical-specific ARARs for ground water, because contaminants at concentrations above the cleanup levels would remain in the soils. However, such options would reduce infiltration of precipitation and impede the leaching of contaminants to the underlying ground water. Therefore, ARARs may be achieved over time through natural attenuation (i.e., processes of volatilization and biodegradation) and by operation of the OU2 ground-water recovery wells and treatment system. Those ground-water recovery wells will be located directly downgradient of the contaminant plume originating at Disposal Area F. The low-permeability RCRA cap (Option 2) would be better than the asphalt pavement (Option 1) at preventing infiltration from occurring. Long-term ground-water monitoring would be implemented to comply with RCRA requirements.

Alternative 3A effectively removes TCE contaminated soils to cleanup levels. It would also be an effective source control measure for complementing the OU2 ground-water remedy and achieving ground-water ARARs more quickly. The excavated waste materials would be classified to meet RCRA action-specific ARARs and the corresponding NYS hazardous waste regulations for the identification, transportation, treatment and disposal of hazardous waste. Additionally, due to the potential for gaseous and particulate air emissions to be generated during the excavation or transportation of contaminated soils, provisions would be included to comply with federal and state action-specific ARARs and guidance for air emissions.

Alternative 4A would achieve TCE cleanup levels in soils over time (at least one year) and therefore, be an effective source control measure for complementing the OU2 ground-water remedy, Effective source control would enable the ground-water remedy to comply with ground-water ARARs more quickly. Long-term ground-water monitoring would be performed to comply with RCRA requirements. Provisions would also be included to comply with all State and Federal ARARs for air emissions, including the action-specific ARARs and guidance for SVE off-gassing.

Long-Term Effectiveness and Permanence: Alternative 1A does not provide long-term effectiveness because the contamination is not removed, treated or contained. Therefore, the current risks posed by exposure to such contamination remains the same.

Alternative 2A provides limited long-term effectiveness because ongoing monitoring will be required to maintain the integrity of the asphalt cover or RCRA cap. Long-term physical monitoring will be required to ensure cap integrity. Long-term ground-water monitoring will be required to assess effectiveness of the remedy as a source control measure for complimenting the OU2 ground-water remedy and compliance with ground-water ARARs.

Alternative 3A provides long-term effectiveness because the contaminants are permanently removed from the Site. It eliminates the risks posed by direct-contact with soils and is an effective and permanent source control measure for addressing ground-water contamination at Disposal Area F. No post-remediation monitoring is required.

Alternative 4A provides limited long-term effectiveness because physical monitoring will be required to maintain the integrity of the soil cover. However, the alternative would be effective as a source control measure because TCE is removed from the soil. Ground-water monitoring would be performed during the period of SVE treatment.

Reduction of toxicity, mobility, or volume: All of the alternatives other than the No Action alternative provide some degree of reduction of the toxicity, mobility or volume (TMV) through treatment. Alternative 2A, Options 1 and 2, rely solely on containment to reduce chemical mobility. However, they do not reduce the toxicity or volume of the waste. Alternative 4A would effectively reduce the TMV of TCE by treatment, but it only reduces the mobility of the PAHs and arsenic in contaminated soils by relying on containment. Alternative 3A reduces the TMV of the TCE, PAHs and arsenic by removal and off-site treatment and disposal.

Short-term effectiveness: The No Action and containment alternatives (Alternatives 1A and 2A) have minimal potential for adverse short-term impacts because workers would not handle affected soils while performing remedial activities. Potential short-term impacts are associated with the alternatives for removal and off-site disposal and physical treatment by SVE (Alternatives 3A and 4A), due to the direct contact of soils by workers and the potential for vapor and/or particulate emissions. Such impacts would be addressed through worker health and safety controls and air pollution controls such as water sprays, dust suppressants, and tarps for covering truck loads during transportation. Additionally, a community air monitoring program would be utilized to ensure public safety. It is estimated that all of the alternatives, except for SVE treatment, could be easily completed in one construction season.

Implementability: Each of the alternatives is implementable. The SVE treatment alternative is performed in the ground and therefore, is more difficult to control and assess. The one-year SVE operation period estimated for removal of 95 percent of TCE mass is based on limited pilot-scale testing and therefore, could be longer than the actual time period necessary to attain the established TCE cleanup goal (0.8 ppm) in soils. SVE would also require more extensive design than the other alternatives. RCRA permitted facilities are available for the off-site disposal of hazardous wastes.

Cost: The capital, present-worth and operation and maintenance (O&M) costs of the alternatives for Disposal Area F are summarized in Table 1. The net present worth of the remedial alternatives, including capital costs and, where appropriate, 30-year O&M costs, range from $0 to $1,114,000. The No Action alternative involves no costs. The costs estimated for the Containment with Asphalt Cover, Removal and Off-Site Disposal and Physical Treatment by SVE alternatives are all comparable, ranging between $500,000 and $620,000. The containment and SVE alternatives depend to some degree on the volume of affected materials, but their costs are much less sensitive to volume than the Removal and Off-Site Disposal alternative. The costs associated with such an alternative ($619,600) are directly proportional to the quantity of affected material requiring treatment. While efforts were made to perform a comprehensive study at Disposal Area F, such efforts still did not fully delineate the horizontal extent of the affected area. Hence, there is the potential for the quantity of affected material, and therefore the cost of this alternative, to increase by as much as 50 percent.

TABLE 1

SUMMARY OF COSTS
Kentucky Avenue Wellfield Site, Operable Unit No. 3

Remedial Alternative	Capital Cost(1) ($)	O&M Cost(2) ($)	Present Worth Cost(3) ($)
DISPOSAL AREA F			
1A - No Action	0	0	0
2A - Containment with Asphalt Cover (Option 1)	219,200	19,200	514,100
2A - Containment with RCRA Cap (Option 2)	606,300	34,200	1,114,000
3A - Removal and Off-Site Disposal	549,000	4,600	619,600
4A - Physical Treatment by SVE(4)	525,900	4,600	596,500
FORMER RUNOFF BASIN AREA			
1B - No Action	0	0	0
2B - Removal and Off-Site Disposal	1,261,800	0	1,261,800
3B - Physical Treatment by DP-SVE(4) (Option 1)	544,700	0	544,700
3B - Physical Treatment by SVE-AS(4) (Option 2)	565,100	0	565,100
4B - Thermal Desorption Treatment	763,200	0	763,200
INDUSTRIAL DRAINAGEWAY			
1C - No Action	0	0	0
2C - Limited Action	268,200	13,800	480,100
3C - Containment with Concrete Lining	373,400	18,700	660,600
4C - Removal and Off-Site Disposal	365,600	0	365,600

Notes:
1. Capital costs include estimates for remedial design, construction, miscellaneous costs (e.g., administrative, permitting), and contingency.
2. O&M costs include estimates for maintenance, monitoring, five-year reviews (where applicable), and contingency.
3. Present worth calculated at discount rate of five percent for term of 30 years.
4. For alternatives using SVE, costs of one-year operational period included with capital costs. Estimates do not include costs for water treatment.

The incineration costs associated with the Removal and Off-Site Disposal alternative is $63,000 and is based on an estimated volume of 32 cubic yards (50 tons) or approximately 3 percent of the total volume (1,100 cubic yards) of waste material containing TCE at concentrations exceeding the treatment standard of 6.0 ppm.

The costs associated with the containment alternatives are $514,100 for the asphalt cap and $1,114,000 for the RCRA cap. Those costs would be somewhat sensitive to a larger surface area of affected material. However, the area proposed to be covered by asphalt would extend well beyond the currently defined limit of Disposal Area F and therefore, the costs associated with an asphalt cover are not anticipated to change significantly. The larger area of asphalt covering is proposed as a practical matter, because the asphalt cap would be extended to the existing asphalt parking lot at the Facility.

State Acceptance: The State of New York concurs on the preferred remedy.

Community Acceptance:

Community acceptance of the preferred alternative for Disposal Area F will be assessed in the ROD following review of the public comments received on the RI/FS report and the Proposed Plan.

Former Runoff Basin Area:

Overall Protection of Human Health and the Environment: No exposure pathways under current or future industrial site use were associated with direct-contact pathways for the Former Runoff Basin Area. For the restoration of the ground-water aquifer as a safe drinking water source, all of the alternatives, with the exception of the No Action alternative, would provide adequate protection of human health as source control measures for addressing ground-water contamination.

Alternatives 2B (Removal and Off-Site Disposal) and 4B (Thermal Desorption Treatment) would remove the contaminated soils above and below the water table which are accessible with conventional material-handling equipment. However, any contamination in the soils in close proximity to, or directly beneath, building foundations in the Former Runoff Basin Area, if present, would continue to leach to ground water.

Alternative 3B (Physical Treatment by Dual-Phase SVE or SVE and AS) would be designed to effectively remove contaminants from all soils, including those near or beneath building foundations, to below cleanup objectives.

Compliance with ARARs: The principal action-specific ARARs for the Former Runoff Basin Area are RCRA requirements regarding the identification, transportation, treatment and disposal of hazardous waste (40 CFR Parts 261 thru 264 and Part 268) and the corresponding NYS hazardous waste requirements. Additionally, Federal and NYS requirements for air emissions are action-specific ARARs or guidance (6NYCRR Parts 200, 201, 211, 219 and 257; NYS Air Guide-1) due to the potential for gaseous and particulate air emissions to be generated during excavation, transportation and/or waste feed preparation of contaminated soils and SVE off-gassing.

As the source control and final aquifer restoration operable unit for the Site, the principal chemical-specific ARARs for ground water are Federal and New York State Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs). The cleanup goal for TCE-contaminated soils is established to prevent the leaching of TCE to ground water. Such source control measures, in combination with the OU2 ground-water remedy, will be for achieving MCLs and MCLGs.

Alternatives 2B (Removal and Off-Site Disposal) and 4B (Thermal Desorption Treatment) would be somewhat effective in removing TCE-contaminated soils to cleanup levels, including those affected soils in the saturated zone below the water table, as source control measures for attainment of chemical-specific ground-water ARARs. However, these alternatives would not address soil contamination in close proximity to, and directly under, the building foundations at the Former Runoff Basin Area. Such contamination, if present, would remain in place and continue to leach to ground water.

Alternative 3B (Physical Treatment by Dual-Phase SVE or SVE and AS) would effectively remove TCE from all affected soils, including those soils in close proximity to, or directly under, the building foundations at the Former Runoff Basin Area. Extraction wells could be positioned to remove soil vapors and ground water from those areas for treatment, resulting in more effective source control and, ultimately, a shorter period of time for attainment of ground-water ARARs.

For Alternatives 2B and 4B, excavated materials would be classified to meet RCRA action-specific ARARs and the corresponding NYS hazardous waste regulations for the identification, transportation, treatment and disposal of hazardous waste.

Additionally, because the potential for gaseous and/or particulate air emissions to be generated during the excavation and waste feed preparation or transportation of contaminated soils or off-gassing during SVE operations, provisions would be included for Alternatives 2B, 3B and 4B to comply with Federal and NYS action-specific ARARs and guidance for air emissions.

Long-Term Effectiveness and Permanence: Each of the alternatives proposed for the Former Runoff Basin Area, except the No Action alternative, provide long-term effectiveness and permanence by removing the contaminants from the soils. The SVE treatment alternatives (Alternative 3B, Options 1 and 2) would provide permanent remedies for the contaminated soils both above and below the water table, including those areas near, and potentially below, building foundations. The alternatives for removal with off-site disposal and thermal desorption treatment (Alternatives 2B and 4B) provide permanent remedies, in that excavated soils can be permanently removed from the site or treated on site. However, such alternatives may not be effective at addressing any contamination, if present, in the soils near or beneath building foundations.

Reduction of toxicity, mobility, or volume: With the exception of the No Action alternative, each of the alternatives reduce the TMV of TCE in the soils at the Former Runoff Basin Area through treatment.

Short-term effectiveness: The No Action alternative would not result in any adverse short-term impacts. Potential short-term impacts would be associated with the other alternatives due to the direct contact with soils by workers and/or the generation of vapor and particulate air emissions. Such impacts would be addressed through worker health and safety controls, air pollution controls such as water spraying, dust suppressants, and tarps for covering waste during loading, transporting and waste feed preparation. The thermal desorption treatment alternative is anticipated to have the potential for most significant releases of air-borne contaminants during remediation. Site and community air monitoring programs would be implemented when conducting such activities to ensure protection of workers and the nearby community. It is estimated that all of the alternatives could be completed within one construction season.

Implementability: All of the alternatives involve commonly used construction practices and are implementable from an engineering standpoint. Each alternative would utilize commercially available products and accessible technologies.

The SVE treatment alternatives (Alternative 3B, Options 1 and 2) and thermal desorption treatment alternative (Alternative 4B) require more extensive engineering design. The one-year SVE operation period estimated for removal of 9 percent of TCE mass is based on limited pilot-scale testing and therefore, could be longer than the actual time period necessary to attain the established TCE cleanup goal (0.8 ppm) in soils, especially since dual-phase SVE and air sparging were not part of the SVE tests. Commercial-scale thermal desorption units exist and are in operation.

Cost: The capital, present-worth and operation and maintenance (O&M) costs of the alternatives described for the Former Runoff Basin Area are summarized in Table 1. The net present worth of such alternatives, including capital costs and, where appropriate, 30-year O&M costs, range between $0 and $1,261,800. There are no costs associated with the No Action alternative. The net present-worth of the two SVE treatment alternatives are estimated at $544,700 for Dual-Phase SVE (Option 1) and $565,100 for SVE with air sparging (Option 2). The thermal desorption treatment alternative is somewhat more expensive at $763,200. The highest costs ($1,261,800) are associated with the removal and off-site disposal alternative, due mostly to costs for incineration of TCE waste materials exceeding the LDR treatment standard of 6.0 ppm for

TCE. It is estimated that approximately 33 percent of the 750 cubic yards of TCE-affected soil will be incinerated at a cost of $470,000.

State Acceptance: The State of New York concurs on the preferred remedy.

Community Acceptance: Community acceptance of the preferred alternative for the Former Runoff Basin Area will be assessed in the ROD following review of the public comments received on the RI/FS report and the Proposed Plan.

Industrial Drainageway:

Overall Protection of Human Health and the Environment: Alternative 1C (No Action) is not protective of human health because it does not eliminate, reduce or control the contamination at the Site.

Alternative 2C (Limited Action) provides some level of protection at the industrial drainageway and pond by establishing institution controls (e.g., fencing and warning signs) to reduce risks posed by ingestion of contaminated sediments and consumption of fish. It is also assumed that the NYSDOH fish advisory and access controls placed by current property owner would remain in place.

Alternative 3C (Containment with Concrete Lining) is protective. It would reduce the availability of contaminants for fish uptake in the pond and, along with such institutional controls as fencing, warning signs and the existing NYSDOH health advisory, reduce the risk posed from fish consumption.

Alternative 4C (Removal and Off-Site Disposal) is protective. It would eliminate the risk of direct-contact exposure to contaminated sediments in the industrial drainageway and minimize the availability of PCBs to aquatic life, thereby reducing the risk posed by fish consumption.

Compliance with ARARs: The principal location-specific ARARs for the Industrial Drainageway include 40 CFR Part 6, Appendix A - Executive Order 11990 for the protection of wetlands, and NYS Freshwater Wetlands Act, Article 24 and Article 71, Title 23 requiring a wetlands assessment and restoration plan for wetlands impacted by contamination or remediation.

The EPA and U.S. Army Corps of Engineers regulations under the Clean Water Act which, in part, regulates the discharge of dredged or fill materials to the waters of the United States constitute important action-specific ARARs. Additionally, RCRA regulations regarding the identification, transportation, treatment and disposal of hazardous waste (40 CFR Parts 261 thru 264 and Part 268), and the corresponding NYS hazardous waste requirements may be action-specific ARARs for this alternative, depending on waste classification. Due to the potential for gaseous and/or particulate air emissions to be generated during excavation and transportation of contaminated sediments, Federal and NYS requirements for air emissions are also action-specific ARARs (e.g., 6NYCRR Parts 200, 201, 211, 219 and 257; NYS Air Guide-1).

Location-specific ARARs for the protection, delineation and assessment of wetlands would be achieved, as appropriate, under all of the alternatives proposed for the industrial drainageway. Alternative 4C would comply with RCRA action-specific ARARs and corresponding NYS hazardous waste regulations for identification, transportation, treatment and disposal of hazardous waste. Finally, due to the potential for gaseous and particulate air emissions to be generated during the excavation and transportation of contaminated sediments, Alternative 4C would comply with federal and state action-specific ARARs and guidance for air emissions.

Long-Term Effectiveness and Permanence: Alternative 1C does not provide for long-term effectiveness and permanence. Over time, the PCB concentrations may only change as a result of natural sediment deposition processes, assuming no additional sourcing of PCB contamination to the industrial drainageway and pond.

Alternative 2C provides marginal long-term effectiveness in that it restricts inadvertent access, but does not eliminate the potential for trespassers.

Alternative 3C provides long-term effectiveness in minimizing the availability of PCB-containing sediments for direct-contact exposure and for availability to aquatic life. The lining would be designed for resistance to erosion and long-term stability. Long-term physical monitoring will be required to ensure the integrity of the liner.

Alternative 4C would permanently eliminate the PCB contaminated sediments in the industrial drainageway for direct-contact exposure or availability to aquatic life.

Reduction of toxicity, mobility, or volume: With the exception of the No Action and Limited Action alternatives, each alternative reduces the TMV of contaminants in the sediments through treatment or containment.

Short-term effectiveness: No Action and Limited Action do not require workers to handle contaminated sediment and do not involve construction work in a waterway. Potential short-term impacts are associated with the alternatives for containment with concrete lining and removal and off-site disposal. The containment option would involve more limited excavation and handling, but does include construction work in the drainageway. The removal alternative represents the most significant potential short-term impact because it involves sediment excavation from within a waterway. Such impacts to workers would be addressed by compliance with a health and safety plan, including an air monitoring plan. Additionally, a community air monitoring program would be implemented to monitor and control airborne particulates and vapors for ensuring public safety. Bypass pumping and erosion and sedimentation controls would also be necessary. These alternatives could be completed in one construction season.

Implementability: All of the alternatives involve commonly used construction practices and are implementable from an engineering standpoint. With the exception of No Action, all of the alternatives would require several construction easements. Additionally, the containment and removal alternatives would require permits by the U.S. Army Corps of Engineers. These access and permitting issues could delay implementation.

Cost: The capital, present-worth and operation and maintenance (O&M) costs of the alternatives described for the industrial drainageway are summarized in Table 1. The net present-worth of such alternatives, including capital and 30-year O&M costs, where appropriate, range from $0 to $660,000. There are not costs associated with the No Action alternative. The net present-worth cost for the Limited Action alternative is $480,100, with an estimated capital cost of $152,000 for the 7,600 feet of fencing. The Removal and Off-Site Disposal alternative has a net present-worth of $365,600. The most costly alternative proposed is the Containment with Concrete Lining alternative, with a net present-worth of $660,000.

State Acceptance: The State of New York concurs on the preferred remedy.

Community Acceptance: Community acceptance of the preferred alternative will be assessed in the ROD following review of the public comments received on the RI/FS report and the Proposed Plan.

PREFERRED ALTERNATIVES

Based upon the results of the RI and FS Reports and after careful consideration of all reasonable alternatives, the EPA and the NYSDEC recommend Alternative 3A (Removal and Off-Site Disposal) for the contaminated soil at Disposal Area F; Alternative 3B (Physical Treatment by SVE) for the contaminated soil at the Former Runoff Basin area; and Alternative 4C (Removal and Off-Site Disposal) for the contaminated sediments at the industrial drainageway as the preferred alternatives for the OU3 remedies.

The Removal and Off-Site Disposal alternative would be the most effective and permanent source control measure for TCE contamination. As an effective source control, such a remedy would complement the ground-water remedy selected for OU2 and allow the attainment of ground-water ARARs more quickly than the other remedial alternatives evaluated. Additionally, no long-term physical monitoring or ground-water monitoring would be necessary. The other alternatives would require such monitoring to ensure the integrity of the asphalt, RCRA or soil covers and institutional controls.

The Physical Treatment by SVE alternative would be the most cost-effective and protective remedy for the

Former Runoff Basin area and will address the contaminated soils near building foundations and underground utilities.

The Removal and Off-Site Disposal alternative would be the most cost-effective and permanent remedy for addressing the PCB contamination in the industrial drainageway sediments and limiting the availability of PCBs for uptake by fish in Koppers Pond. However, for any cleanup at the industrial drainageway to be effective and permanent, the unauthorized releases to the industrial drainageway must be eliminated. Those releases are suspected to be contributing to the sediment contamination in the industrial drainageway and Koppers Pond. Without the elimination of such releases, it is anticipated that the sediments in the industrial drainageway would be recontaminated with metals to levels which may, ultimately, result in a threat to human health. Such an assessment assumes that all future permitted discharges from the Facility would meet the discharge limits established by the NYS permitting authorities under the State Pollutant Discharge Elimination System program.

In light of the above, and as a practical matter, the preferred alternative for removal and off-Site disposal, if ultimately selected, would be implemented after the NYSDEC completes its investigation as to the source(s) of the unauthorized releases to the industrial drainageway and those releases are eliminated. The EPA and the NYSDEC would ensure that those sources, when identified, are addressed. In addition, once the remediation is conducted, the EPA and the NYSDEC would ensure that the effectiveness of that cleanup effort is not influenced by future unauthorized discharges to the industrial drainageway.

Specifically, the preferred alternatives will involve the following:

Disposal Area F

Performance of soil sampling and analysis to further characterize and classify the materials for off-site disposal.

Excavation of soils containing TCE, PAHs and arsenic at concentrations above the cleanup objectives established for such chemicals.

Transportation of affected soils to permitted waste management facilities (e.g., RCRA hazardous waste incinerator, RCRA hazardous waste landfill or industrial landfill).

Performance of confirmatory sampling and back-filling of excavation with clean soil taken from an off-site borrow pit.

Former Runoff Basin Area

Design and test an SVE system using either dual-phase or air sparging, depending on site-specific characteristics, to address VOC contamination above and below the water table.

Installation of SVE wells.

Construction and operation of SVE treatment system, including off-gas carbon absorption treatment system.

If a dual-phase SVE system is implemented, recovered ground water would be piped to the water treatment facility installed as part of the ground-water remedy for OU2.

A monitoring program to assess the effectiveness of SVE treatment on achieving TCE cleanup objectivies in soil and Federal and State drinking water standards (MCLs) in ground water.

Industrial Drainageway

Excavation of sediments containing PCB concentrations above the cleanup objective at the industrial drainageway.

Placement and operation of diversion pumping and necessary erosion and sedimentation controls.

Performance of confirmatory sampling.

Reshaping the flow channel using clean off-site soils, as needed.

Transportation of contaminated sediments to permitted waste management facilities.

Additionally, the EPA proposes that the interim ground-water remedy selected for OU2 become the final remedy for restoration of the Newtown Creek Aquifer at the Site. Specifically, this final ground-water remedy will involve the following:

Final Remedy for Ground-Water Aquifer

Construction of a water treatment facility with a 44-foot high air stripper tower near the KAW having a 700 gallon per minute (gpm) treatment capacity for removing TCE and other contaminants to below Federal and NYS drinking water standards;

Refurbishing the existing well pump, pump station building and treatment equipment a the KAW in order that the KAW can supply 700 gpm potable (drinkable) water;

Installation of two ground-water recovery wells (i.e., Barrier Wells) at the southeast corner of the Westinghouse Facility for continuous pumping at 500 gpm and 900 gpm to provide hydrodynamic control of the contaminant plume(s) beneath the Westinghouse Facility and extraction of contaminated ground water for treatment;

Construction of a water treatment plant at the Westinghouse Facility with 1,400 gpm treatment capacity for processing ground water recovered from the Barrier Wells and use of granular activated carbon for removing TCE and other contaminants to below Federal and NYS drinking water standards;

Use of treated ground water primarily as non-potable production water for the Westinghouse Facility manufacturing operations or for discharge to the industrial drainageway via the permitted outfalls; and,

Implementation of a Long-Term Ground-Water Monitoring Program to monitor contaminant migration and evaluate effectiveness of the final remedy for restoring the Newtown Creek Aquifer to its beneficial use as a drinking water aquifer.

The preferred alternatives for Disposal Area F, the Former Runoff Basin and the industrial drainageway would provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. The EPA and the NYSDEC believe that the preferred alternatives would be protective of human health, would comply with ARARs, would be cost effective, and would utilize permanent solutions to the maximum extent practicable. The remedy also would meet the statutory preference for the use of treatment as a principal element.

Note: At the time the 1990 ROD was issued for the second operable unit at this Site, the EPA and NYSDEC envisioned that both water treatment facilities would use air-stripping technology to remove TCE and other VOCs from recovered ground water. Additionally, based on the Site-related ground-water data showing elevated levels of metals in unfiltered samples, filtration was believed to be a necessary treatment component to remove suspended solids having adsorbed inorganic contamination from recovered ground water. Furthermore, vapor-phase carbon adsorption treatment to address off-gassing at the air strippers was envisioned to meet NYS air guideline regulations. However, information obtained from a pilot study performed by Westinghouse as part of the remedial design for OU2 indicted that filtration and vapor-phase carbon adsorption were not necessary components of the remedy.

Based on the analysis of raw water quality at the KAW, a pumping well halfway between the KAW and the Westinghouse Facility and a production well at the Facility, concentrations of metals and total suspended solids are below levels that would require removal for compliance with drinking water standards. Additionally, based on the findings of an in-field pilot-scale test using an air stripper tower at the KAW, it was determined that off-gas treatment at the air stripper would not be necessary to meet NYS air quality regulations and guidelines.

Following completion of the remedial design pilot study, Westinghouse proposed that GAC treatment be used at the Barrier Well water treatment facility, rather than air stripping. GAC was believed to be more feasible due to the need for continuous pumping to control contaminant plume migration. Additionally, there was no significant cost advantage to air stripping over GAC treatment. Since GAC was a proven treatment technology for removing VOCs from ground water, the preference for this technology was acceptable.

The EPA and the NYSDEC are taking the opportunity in accordance with CERCLA Section 117(c), to inform the public of the agencies' decision to select GAC treatment for the Barrier Well water treatment facility, rather than air stripping, and to eliminate filtration and vapor-phase carbon adsorption treatment from the remedy. In considering this new information, the EPA believes that the remedy selected in the 1990 ROD remains protective of human health and the environment, complies with Federal and NYS requirements that are legally applicable, or relevant and appropriate to the final ground-water remedy, and is cost effective.

The EPA approved the remedial design for this remedy on July 15, 1996 and construction activities are scheduled to begin in late August/early September of this year.

APPENDIX B

<IMG SRC 0296280I>

United States
Environmental Protection Agency
Region 2: NJ, NY, PR, VI
290 Broadway
New York, New York 10007-1866

NEWS

96 (061) Ann Rychlenski 212/637-3672

For Release: Tuesday, August 27, 1996

THIRD PHASE OF CLEANUP AT KENTUCKY AVENUE WELLFIELD SUPERFUND SITE TO BE PRESENTED AT PUBLIC MEETING IN HORSEHEADS, NEW YORK

NEW YORK -- The U.S. Environmental Protection Agency (EPA) has announced its proposed plan for the third phase a of cleanup at the Kentucky Avenue Wellfield, located Horseheads and Elmira, New York. This third phase of cleanup action will address the Westinghouse Electric Corporation's manufacturing facility and a related industrial drainageway. The plan calls for the removal of contaminated soils at one area of the Westinghouse facility and disposal off-site, treatment of contaminated soils at another area of the facility with soil vapor extraction, and removal of contaminated sediments in the industrial drainageway for off-site disposal.

EPA will present this plan and take public comment at a public meeting to be held on Wednesday, September 11, 1996, at 7:30 p.m., at the Village of Horseheads Hall located at 202 South Main Street in Horseheads, New York. The public comment period runs through September 26, 1996. You may submit written comments, postmarked by close of business that date to Mark Purcell, Remedial Project Manager, U.S. EPA, 290 Broadway, 20th floor, New York, New York 10007. In addition, site-related documents are available for public review at the information repositories established for the site at the following locations:

NY State Dept. Of Environmental Conservation
6274 East Avon-Lima Road
Avon, NY

Town of Horseheads Town Hall
150 Wygant Road
Horseheads, NY

APPENDIX C

<IMG SRC 0296280J>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
INVITES PUBLIC COMMENT

<IMG SRC 0296280K>

on the
Proposed Cleanup
Operable Unit 3, Kentucky Avenue Wellfield Superfund Site
Town of Horseheads, Chemung, County, New York

The United states Environmental Protection Agency (EPA) announces the opening of a 30-day public comment period on the Proposed Plan for the cleanup of Operable Unit 3 (OU3) at the Kentucky Avenue Wellfield, located in Horseheads and Elmira Heights, Chemung County, New York. OU3 consists of the Westinghouse Electric Corporation's manufacturing facility and a related industrial drainageway and pond (known locally as Koppers Pond). As part of this comment period, EPA will hold a public meeting on Wednesday September 11, 1996 at 7:30 p.m. at the Village of Horseheads Hall located at 202 South Main Street, Horseheads, New York. Members of the community are invited to attend and to express their concerns.

The EPA and the New York State Department of Environmental Conservation (NYSDEC) evaluated the following alternatives to clean up contaminated soils at two separate areas at the Westinghouse facility (Disposal Area F and Former Runoff Basin Area) and sediments at the Industrial Drainageway:

Disposal Area F

1A: No Action
2A: Containment with Asphalt Cover/Cap
3A: Removal and Off-site Disposal
4A: Physical Treatment by Soil Vapor Extraction

Industrial Drainageway

1C: No Action
2C: Limited Action
3C: Containment with Concrete Ditch Lining
4C: Removal and Off-site Disposal

Former Runnoff Basin Area

1B: No Action
2B: Removal and Off-site Disposal
3B: Physical Treatment by Soil Vapor Extraction
4B: Thermal Desorption Treatment

Based on the available information the EPA and NYSDEC prefer Alternative 3A to remediate the soils at Disposal Area F. Alternative 3B to remediate the soils at the Former Runoff Basin Area, and Alternative 4C to remediate the sediments at the Industrial Drainageway. Such alternatives would provide the best balance of overall protection of human health, compliance with applicable or relevant and appropriate requirements; short- and long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contaminants through treatment; implementability; and cost effectiveness. Although these are the preferred alternatives, the EPA and NYSDEC may select any of the alternatives after considering community concerns.

The Proposed Plan and all documents, including the Remedial Investigation and Feasibility Study Report related to the cleanup of the Site are available for review in the information repositories at the NYSDEC Office, 50 Wolf Road, Albany, New York 12233, and at the Town of Horseheads Town Hall.

The public may comment in person at the meeting and may submit written comments through September 26, 1996 to:

Mark Purcell
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
(212) 637-4282

APPENDIX D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NEW YORK 10007

KENTUCKY AVENUE WELLFIELD SUPERFUND SITE
PROPOSED PLAN OPERABLE UNIT 3

Sign-In Sheet

September 11, 1996
Town of Horseheads, New York

Please be sure to print your name and address clearly so that we can add your name to our mailing list.

<IMG SRC 0296280L>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NEW YORK 10007

KENTUCKY AVENUE WELLFIELD SUPERFUND SITE
PROPOSED PLAN OPERABLE UNIT 3

Sign-In Sheet

September 11, 1996
Town of Horseheads, New York

Please be sure to print your name and address clearly so that we can add your name to our mailing list.

<IMG SRC 0296280M>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NEW YORK 10007

KENTUCKY AVENUE WELLFIELD SUPERFUND SITE
PROPOSED PLAN OPERABLE UNIT 3

Sign-In Sheet

September 11, 1996
Town of Horseheads, New York

Please be sure to print your name and address clearly so that we can add your name to our mailing list.

<IMG SRC 0296280N>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NEW YORK 10007

KENTUCKY AVENUE WELLFIELD SUPERFUND SITE
PROPOSED PLAN OPERABLE UNIT 3

Sign-In Sheet

September 11, 1996
Town of Horseheads, New York

Please be sure to print your name and address clearly so that we can add your name to our mailing list.

<IMG SRC 0296280O>

APPENDIX E

PUBLIC MEETING

KENTUCKY AVENUE WELLFIELD SUPERFUND SITE

Horseheads Village Hall, Horseheads, NY

Wednesday, September 11, 1996

<IMG SRC 0296280P>

ANN RYCHLENSKI: We are going to call the meeting to order. Hi. Good evening. Thanks for coming out here tonight. This meeting is being held by the U.S. Environmental Protection Agency. We are here to discuss our proposed plan for the third phase of the cleanup over at the Kentucky Avenue Wellfield Superfund Site.

Before I turn the program over to my colleagues here who are going to be doing the presentations, I just want to tell you a few things. First of all, my name is Ann Rychlenski. And I am the community relations coordinator for the site. I will introduce the rest of the folks that are here from EPA. To my immediate right, Jim Doyle, and he is our legal counsel. We go over to Kevin Lynch, he is a section chief in the New York Superfund section. And then there is Mark Purcell and he is the remedial project manager for the Kentucky Avenue Wellfield Site. Then all the way down there is Gina Ferreira. And Gina is an environmental scientist.

I want to remind you of a couple of things before we go into the program. First of all, as you can see, se have a stenographer present here tonight. That's so that a clear legal record can be made of this meeting. So what I am going to ask you to do is to please hold all your questions until the very end, until all the presentations are over. Then when you do have your question, please stand and speak clearly and identify yourselves so that the stenographer can take that all down.

As I said, tonight we are going to be talking about the third phase of the cleanup over at the Kentucky Avenue Wellfield Site. I hope you all have meeting agendas. You can follow along where we are headed. Kevin Lynch is going to give an overview of how Superfund works, the law that governs this whole process so you know where we are coming from. And Mark will take over the rest of the presentation. He will talk a little bit about the background of the site, what it is we found in our investigations at the site, and what it is that we propose to do for the cleanup.

Now, one of the things that EPA does all the time when we get to this stage of the proposed plan is we take public comment. That's one of the reasons that we are here this evening. Formal public comment is given through the stenographer and also you can send written comments. You may not think of everything here tonight after hearing this information. You may say you didn't get to talk to EPA about this or that; you may still have a question. If that is indeed so, you can send your questions or your comments on to us. You can send them to Mark Purcell. Our public comment period ends on the 26th of this month, so please make certain that whatever you send will be post marked by midnight on September 26th. Please make certain that you take the information that's here. We have copies of the proposed plan and meeting agendas. Also please sign in. There are sign in sheets here. If you have not already done so, please be certain that you do before you leave. This way we can keep your name on our mailing list. Please put your address down in full so that we have your zip code as well, so we can keep you abreast of whatever it is that goes on, more meetings or whatever.

Is there anything else I need to

talk to you about? I guess that's about it. So, again, please keep your questions until the end and sign in if you haven't. I am going to turn it over to Kevin.

KEVIN LYNCH: Back in 1979, a couple of environmental disasters occurred, probably the worst one of which was the Love Canal, where people found that they were living on an abandoned hazardous waste site. The federal government didn't have a real good way to respond to any problems like this. So, in 1980, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act, CERCLA, which gave us authority to take action. One thing it did, was to create a fund, at that time a 1.6 billion dollar fund, to address these sites. That's where the name Superfund came from. And we can use that money to go and address the cleanup sites.

There are a number of ways we can approach these sites. One, we can take a quick action which we call a removal action. In emergencies or if we find a serious problem out there, such as if we find an area, where people are drinking contaminated water, we can go out and immediately give them an alternate water supply. If we find an area that has a lot of drums in it, that is dangerous, for instance, they can blow up, we go out there and take an action just to clean up those drums. These removals are supposed to be short-term actions, so we can get a quick fix on things.

The other way we approach a site is through the remedial process. And this is intended to have a more long-term, more permanent fix on the site. CERCLA also gave us the authority to require other people to go out and take these remedial actions at sites. And the people who can do that are what we call potentially responsible parties. They can be either owners or former owners or operators of the site when the problems started. They can be generators, they can be anyone who created something that is at the site now that is causing part of the problem or they can be someone who transported things to that site.

Now, it's a strict liability law. As such, you didn't have to do anything wrong. You could have been doing everything just the way everyone did at that time. But if these substances are causing a problem now, it's a recognition that it's causing a problem, the stuff that you had, and you have to be part of the solution.

A typical way a site goes through this process is the discovery. Usually, the site is referred to EPA by the state. Once it's referred, we will go out and gather information about the site. They usually have a lot of information on it already. It's why they suspected there is a problem out there. They will know some things that are out there, what kind of waste is there, what kind of substances. We will look for things like what's the population around the site, where is the closest source of drinking water. We will take a look at that information and do a quick study on the site. We physically go there and take some samples to give us a better idea of what's out there. Then we put this information into a mathematical model and it comes up with a rating. If the site gets above a certain number, it goes onto the national priorities list and it's a site that we address using the Superfund or using the Superfund authorities. If the site doesn't make it above that number, it goes back to the state and they usually address it using the state Superfund. This is an attempt to handle the worst sites first. If it sounds like 1.5 billion dollars is a lot of money, we found out there are a lot more hazardous waste sites than anyone suspected. And there are a lot more expensives involved to clean up these sites than we thought.

Once the site gets on the list, we will go out and do what we call a remedial investigation and feasibility study. The remedial investigation is designed to determine the nature and the extend of the problem. We want to find out what's out there, where it is going and what problems it is creating. We will do that by physically going to the site, and taking samples. We will take samples of the soil if there is waste there, we will put monitoring wells in the area, and we will take samples of the water so we can determine where the ground water is going and what's in it. And what problems it may cause.

Then we will do a risk assessment,

which is an attempt to find out what threats these things cause, the stuff we found out there. Then we will do a feasibility study, which is simple a study where we look at different alternative solutions to the problem. We compare them to one another using criteria that are given to us in our regulations, and we come up with what we think is the best solution to the problem. We put that into a proposed plan, publish the plan, get public input, then we go back and make a decision on what we will do at the site.

Next we prepare a document called a record of decision or ROD. After we sign the ROD, we then design the remedy, or cleanup and implement the remedy. When I say we, I remind you that in addition to EPA, the state can do some of this work, and responsible parties in general have been doing work all around the country and through the state to accomplish this. In fact, at this site, this is the third time we have done this remedial investigation/feasibility study. We have taken other studies. One was done by the state DEC. One was done by EPA. And another study was done by one of the responsible parties.

Mark Purcell now will present a summary of what has happened at the site, results of the latest study, and present the proposed plan.

MARK PURCELL: Hopefully all my overheads will fit onto this screen. The first figure I am going to show here is a figure of the site and it includes the contaminated Kentucky Avenue Well, which is located in this red circle. The well is located about a mile south of Route 17, and just east of Route 328. The site had its beginnings in 1980 when trichloroethylene, a compound, was detected at the Kentucky Avenue Well. The well was closed in that same year. In 1983, the site was added to the national priorities list for the cleanup of the site.

The first stage of remediation that EPA and the New York State DEC conducted was to identify all the residencies and businesses which had private drinking water wells in the area of contamination. Since 1985, EPA has connected over 90 properties to public water supply.

During the second phase of the investigation, EPA conducted some remedial investigations in the mid to late 1980s to determine the sources of contamination for the site and also to select a groundwater remedy. Those investigations showed three areas, three locations or facilities, which were contributing to the aquifer contamination. They are shown in yellow. The first facility, LRC Electronics, is located in the northeast corner of the site. The Facet Enterprises facility is located in the southwest corner of the site. And the Westinghouse facility is located in the northwest corner of the site. Based on these studies, EPA determined that of the three, the Westinghouse facility was contributing contamination to the Kentucky Avenue Well.

In 1990, the EPA selected a groundwater remedy that included restoring the well as a public drinking well and also installing a groundwater recovery and treatment system between the well and the Westinghouse facility. In 1991, EPA issued an administrative order to Westinghouse to implement that remedy. The designs of that remedy were completed in June of this year. And construction of those activities are starting this month.

The last phase or the third phase of the remedial efforts here is to control the source of contamination at the Westinghouse facility. We conducted a remedial investigation there in 1994 and 1995. We also investigated the industrial drainageway and pond, known locally as Koppers Pond. Some of the investigations in the mid to late 1980s identified contamination there. So we investigated the surface water and sediments.

This is a figure of the Westinghouse facility. It's a 59-acre site which was used to manufacture television picture tubes and other electronics television components since 1952. There were several areas that received plant waste and other potential areas of concern which we investigated during the remedial investigation. Those areas are covered in yellow.

The first of those areas is located to the north of the facility and it's known by the name of the magnesium chip burial area. Their plant records indicated that Westinghouse had disposed of approximately 200 drums of plant waste encased in concrete. To the east of that area is a former coal pile area which was also investigated. Just north of the building proper is a circular area, that is known as the former runoff basin area. It is an oval depression which received storm water runoff. Westinghouse also located there a 7,500-gallon tank for storing solvents.

In the parking lot area, there were two locations where calcium fluoride sludge and other plant waste were disposed of, you can see by those boxes. South of that area along the property boundary to the south is a disposal area by the name of disposal area F.

Other areas of concern were in the vicinity of one of the monitoring wells which traditionally had TCE in the ground water, monitoring well MW-10. To the southwest of the west parking lot, a plant memorandum indicated that waste might have been disposed there at some time. So we investigated that area.

The small orange area sitting back here along the parking lot is a soil pile. That pile was generated during construction activities at the facility probably due to plant expansion, sometime in the 1980s. The large yellow area along Route 17 also was investigated. An anonymous source reported allegedly witnessing the disposal of 300 to 500 drums of waste while they were constructing that highway.

The green dots located around the facility are surface water runoff drains. They are 4 to 6-foot deep drains covered by manholes. They were investigated to determine if they acted as conduits for liquid wastes which could possibly leach into the underlying soils and ground water.

And the last area we looked at here was the ground water at the site. There are a number of monitoring wells; they are all circled in red. We collected groundwater samples and had those analyzed as part of the investigation.

This is a figure of the magnesium chip burial area. The yellow colored trench shows where we believe the drums were buried. Dark black lines and the red bars show where the ground penetrating radar surveys were conducted and trenching operations were performed to confirm the presence of buried drums. Based on those results, buried drums were confirmed at a depth of 2 to 3 feet.

In late 1995, Westinghouse conducted a removal action to send the drums off-site for disposal. They recovered 179 drums. They were all opened to confirm that they were filled with concrete.

This is a figure of the two calcium fluoride sludge disposal areas shown in yellow. Black dots show the location of where soil borings were drilled to collect soil samples. Two or three of the soil boring locations colored in green show where a white powdery material was encountered. Further analysis showed that that material exhibited the characteristics of a hazardous waste due to a leachable cadmium. As part of the 1995 removal action, Westinghouse excavated those materials. A total of 1,200 tons were removed. The excavation areas are shown in orange.

This is a figure of the soil pile located at the southwest corner of the parking lot; it's colored in yellow and orange. The little black boxes are where soil samples were collected and analyzed. A number of samples showed elevated concentrations of polychlorinated biphenyls or PCBs and polycyclic aromatic hydrocarbons or PAHs. Those soils were also included as part of the removal action of late 1995. The remaining soils colored in yellow were used as backfill materials as part of that removal operation.

This is a figure of the former runoff basin area, that circular area was a low and which received storm water runoff. The figure shows the corner of the facility down here on the lower right-hand corner. The red box shows the former location of the 7,500-gallon solvent tank. The green shaded area is where we found TCE contamination in the soils. Maximum concentrations ranged up to 20 parts per million or ppm. And, at the depth -- I am sorry, maximum concentrations ranged up to 80 ppm and at a depth of 10 to 11 feet. From the distribution of TCE in the soils, we can determine that the source of those TCE concentrations is the former location of where the tank was stored.

This is a figure of the former disposal area, disposal area F. The yellow box here is where we first estimated that the area of waste disposal was located. The dark bars show where trenching operations were performed during the remedial investigation. Trenches went down to the groundwater table. The orange area is actually where we found waste materials placed here. You can clearly see that the area of waste was somewhat larger than what was originally] anticipated. The green area is where those waste materials were found to contain TCE. The TCE concentrations here were up to a range of about 20 ppm found at the depth of 2 to 3 feet. Other chemicals we found here were PAHs and arsenic.

This is a figure of the monitoring well 10 area. Again, it's located in the southwest corner of the Westinghouse facility, shown here in the upper right. Disposal area F, which is located off to the west, is shown in yellow. The green area where we found TCE contamination. To determine where the source of TCE contamination located at the well was originating from, we collected soil vapors and analyzed them for TCE. The location of the soil vapor survey is shown by black dots. The green area shows where we found TCE vapors in the unsaturated soils. You can see a very pronounced, elongated east/west trending distribution of TCE vapors. This is in part a reflection of the TCE contamination of the ground water underlying the unsaturated soils. The TCE contamination in ground water is flowing to the east with the direction of groundwater flow as shown by this arrow. This distribution is indicative of where the TCE source is originating from. And that's in the vicinity of disposal area F. This area where TCE contamination was found at disposal area F is almost directly on the line where these TCE vapors are showing up in the MW-10 area.

This is another figure of the plant site. The areas investigated are colored in yellow. The red dots indicate the locations of monitoring wells where we collected groundwater samples. This is a map of TCE concentrations in the shallow aquifer zone at the facility. The green lines show TCE concentrations. The highest concentrations are located right in here, at about 90 ppm. The highest concentration I think we found was at MW-10, 110 ppm. You can clearly see a very defined, elongated east/west trending plume of TCE at the southern portion of the facility. It appears to originate very close to disposal area F and it moves to the east along with the groundwater flow past the Westinghouse facility and off-site. There also is some influence from the TCE contamination at the former runoff basin area, where we had TCE down to 10 or 11 feet. Several of the wells along the north side of the facility had elevated levels of TCE in ground water.

Okay. This is a figure of the industrial drainageway and pond. Again, we looked at this area during the investigation because contamination was found back in the late '80s as part of previous investigations. The industrial drainageway and pond are shown in blue. The industrial drainageway is a 7- to 10-foot-wide open ditch which begins at about where Chemung Street is located. It extends to the southeast about .5 mile and empties into Koppers Pond. The industrial drainageway receives permitted wastewater discharges from the underground piping at the Westinghouse facility. That piping is shown by the dashed black lines. Westinghouse facility is located in the upper corner of the figure.

We collected sediment, surface water and fish tissue samples from the industrial drainageway and pond. The locations of the sediment and surface water samples are shown by the black dots. The results of those analyses confirmed elevated levels of metal in the industrial drainageway and pond, along with PCBs in the sediments and also in the fish tissue.

This is another figure of the pond and drainageway outlined by blue color. The sediment sampling locations and surface water locations are shown by the orange circles. It shows PCB concentrations that we found in the sediments and in the fish collected from the pond. The sediments in the upper drainageway range from 1 ppm to about 9 ppm. At the lower drainageway and pond area, the concentrations of PCBs were non detect to less than or equal to about 1 1.5 ppm. The fish samples collected from the pond, which were white sucker and carp species, contained about .5 ppm of PCBs and several other chemicals.

As part of the remedial investigation, EPA conducted a human health risk assessment. Based on the results of that assessment, we identified two areas where long-term exposure to certain contaminants resulted in unacceptable human health risks. One of those areas identified was disposal area F and the industrial drainageway where site employees and site workers were exposed to soil in disposal area F via soil ingestion, the contaminants, PAH and arsenic, provide an unacceptable human health risk. For the industrial drainageway, the receptor group there was area residents. The exposure pathway was fish consumption and the contaminants were PCBs.

Based on the remedial investigation and the results of EPA's human health risk assessment, we identified three remedial objectives for this phase of the site. The first remedial objective is to clean up the source of groundwater contamination at the Westinghouse facility. That includes disposal area F and the former runoff basin.

The second objective is to clean up the contaminated surface soils at the facility to protect site workers and employees. That is specifically at disposal area F.

The last remedial objective is to clean up the contaminated sediments in the industrial drainageway to protect area residents and to limit the availability of chemicals for uptake by fish in the pond.

For disposal area F, this overlay shows the contaminants of concern that we are going to attempt to clean up. TCE was detected at a maximum concentration of 20 ppm. The clean up objective is about .8 ppm, that is to prevent the leaking of TCE into groundwater. The three or four PAHs listed here range in concentrations from about 130 ppm to 420 ppm. We have identified cleanup objectives based on human health risks ranging from about .8 to 7.8 ppms. And for arsenic, the maximum concentration was 19 ppm. We are going to clean up arsenic to 12 ppm, which is a recommended background level by the New York State DEC.

For the former runoff basin, the

contaminant that we want to address is TCE. And we want to prevent it from leaching to ground water. Maximum concentration was again 79 ppm to prevent it from leaching to the water table, the clean up goal is .8 ppm. For the industrial drainageway, the contaminants are PCBs. The maximum detected concentrations in the sediments was 8.6 ppm and in fish 0.5 ppm. The clean up objective for sediments is 1.0 ppm. That's the New York State DEC and EPA's guidance, cleanup level for PCB contamination.

We have evaluated a number of remedial alternatives for the three areas that we feel need to be addressed. The first of these is the no action alternative. We're required to look at this alternative. We use it as a baseline for comparison to all other alternatives.

The next alternative is limited action. Limited action involves institutional controls, such as property deed restrictions, physical monitoring, fencing and warning signs to prevent access. Groundwater monitoring also would be included for areas where TCE contamination was found. We would monitor the concentrations over time.

Another alternative we considered was containment, for disposal area F and the industrial drainageway. Options at disposal area F were an asphalt cover with an underlying plastic liner just beneath the asphalt to prevent infiltration of precipitation from leaching TCE to ground water. We also looked at a concrete lining of the industrial drainageway to prevent direct exposure to area residents.

This is a figure of the asphalt cover at disposal area F. The orange shows where we found waste materials; the dark black line or box is where the asphalt would be placed. Beneath that asphalt, again, we would have a flexible plastic liner. The pavement would be taken to the parking lot already at the facility. I have also shown where TCE vapors in the soils and in the ground water.

Excavation and off-site disposal was another alternative that we looked at for all three areas. Contaminated soils or sediments would be excavated and sent off-site for proper disposal, and treatment, if so required. This is just an illustration, but it's got some specifics to the former runoff basin area. Excavation and off-site disposal is more difficult there because of the close proximity of the contaminated soils to building foundations and underground utilities. Also, the contamination has gone below the groundwater table. So we would need dewatering operations when we excavate those materials.

Another alternative was thermal desorption. That's where we would bring a transportable unit to destroy volatile and semi-volatile compounds. Materials would be excavated and fed into this unit on-site. Soils would be heated to 200 to approximately 1,000 degrees Fahrenheit and the residual materials would be backfilled into the excavation.

The last alternative that we looked at was soil vapor extraction. I didn't have a real good figure for this so I just thought I would show you a schematic of the process. Soil vapor extraction is being considered for the former runoff basin area and disposal area F. It consists of vertical air extraction wells which are placed in the area of the soil contamination. Those wells would pull contaminated vapors and moisture from the soils; they would then be sent into a vapor and liquid separator where they would be funneled off for treatment. The vapor treatment would be through an off-gas carbon treatment system. The recovered liquid would be sent to a water treatment facility which Westinghouse is currently building at their plant.

This overlay shows several criteria which EPA uses for evaluating remedial alternatives. I am not going read all of them to you. Overall protection of human health and the environment and compliance with all federal and state requirements. Those are two significant criteria.

Others are the long-term effectiveness and permanency of the remedy, and the implementability of the remedy. We look at costs. Of course, state acceptance and community acceptance.

This shows a summary of the cost of all of the alternatives that we have looked at for the three areas. It shows capital cost, operation and maintenance cost, net present worth cost. The cost for disposal area F ranged between .5 and 1.1 million dollars. The cost for the former runoff basin area, again net present worth costs, ranged between about .5 to 1.3 million dollars. Most expensive of those alternatives was removal and off-site disposal, partly because of the difficulties which I showed you on an earlier figure for dealing with the close proximity of building foundation and underground utilities. Also, for that alternative, some of the TCE contaminated soils may have to be incinerated if they don't meet land disposal restriction standards. For the industrial drainageway, the alternatives ranged between about $300,000 to $700,000.

My last overlay, our proposed remedies for disposal area F and for the industrial drainageway are removal and off-site disposal. For the former runoff basin area, we also looked at removal and off-site disposal. However, again, with the difficulties in dealing with that area, we felt that soil vapor extraction was a better remedy. It addressed those soils in close proximity to the building foundations, it is one of the remedies of least cost.

One last point I wanted to make with the industrial drainageway. The removal and off-site disposal of contaminated sediments would be for the industrial drainageway. We are not proposing any remedial action at Koppers Pond. EPA did conduct an ecological risk assessment which showed us that, based on the levels of contamination out there, that further study is warranted. We plan to go back to the pond in the spring of next year and conduct an ecological study. The purpose is to see whether the levels of contamination are acceptable at the pond.

That's all. I think I will open up the question and answer period here.

ANN RYCHLENSKI: I would just like to add one thing before we do. Is there anyone here present from any of the state agencies, state DOA or state DEC? Just identify yourselves. Thank you. We just want to acknowledge you and your name please.

STEPHEN SHOST: Steve Shost of the

New York State Health Department in Albany.

WAYNE MIZERAK: My name is Wayne Mizerak of the New York State DEC in Albany.

ANN RYCHLENSKI: Thank you. Just in case anything comes up that's within your jurisdiction, people will know who is here to answer those questions. We will take your questions now. Again, please stand, speak clearly, and give your names so that our stenographer can get everything down accurately.

MARY SMITH: I am Mary Smith. And I live at 3512 Michigan, which is parallel to Kentucky Avenue, at that residential site. And I am concerned about the number of barrels that have been found. According to your statistics, 197 were put in the ground, approximately 200, you said. And 179 were found and removed. I would like to know where the other 17 might be hiding.

MARK PURCELL: Well, the initial number I think was an estimate based upon records. Clearly, we investigated the entire area and 179 is all that we could find. We assume at this point that that's all that there were.

MARY SMITH: So someone just

couldn't count?

MARK PURCELL: Right, these are old records and you do the best you can. You saw in disposal area F, or the area F disposal, where that yellow box was. When we actually broke the ground open, we found waste in a larger area than was originally estimated. You really have to go and you have to investigate it. We believe -- and we shot it with ground penetrating radar and dug trenches -- we got it.

MARY SMITH: Okay.

KENNETH ROHRER: My name is Kenneth Rohrer. I live at 530 Perkins Avenue, Horseheads. I was associated with the Westinghouse Environmental Control Program starting in 1971. I also served as the environmental control officer at Westinghouse from 1987 through 1994 when I retired. So I am speaking tonight as a Horseheads citizen.

I have several concerns reading the reports. Unfortunately, I could only spend about an hour this afternoon going through two cardboard boxes of reports primarily. There was a question on there for you that you missed. Number one:

Prior reports. There was some concern about the presence of TCE in the property from Horseheads Automotive. This is a crowded area. I don't care. I also understand there is a Big Flats well that was also shut-in.

The question to you is: What's being done in those sources where sewers have vapors. I didn't see anything off Westinghouse property to determine what the effect in the plume may be.

MARK PURCELL: As part of the remedial investigation, we didn't look at the automotive junk yard that you have mentioned. In early 1990, levels of TCE are showing up in some of the Westinghouse welling at Westinghouse. I have been on this project too long. The junkyard was west of the Westinghouse facility. And that's where it was located. We are picking up some traces of chemicals coming in, trichloroethylene is one. I can show you that figure.

KENNETH ROHRER: Chlorethene was another one as I recall.

MARK PURCELL: Okay.

KENNETH ROHRER: That's chloroform.

MARK PURCELL: We didn't really see that at the Westinghouse facility. TCE was really the only chemical that we saw as a defined plume that was moving away from the facility. We were going from about 5.0 ppm on the western edge until we get to disposal area F. And then we jump up to 100, 120 ppm. So we think that the source, at least the lion's share of where this plume originates is the Westinghouse facility. We have the areas that we're focusing on in disposal area F and the other areas, and will address those areas as source control. However, the ground water remedy that EPA selected back in 1990 is to capture the entire contaminate plume coming off the Westinghouse facility. And if there is something coming in from the west side, then that would be captured in this treatment system also.

Two pumping wells that are going to be installed as part of the groundwater remedy are located in the southeast corner of the facility. And they're dead on line with the plume, where we found the plume is moving. And we have modeled our design to show that it will in fact capture the entire groundwater plume coming across the

Westinghouse site. We are confident we have it. Disposal area F and former runoff basin are additional control measures. Those are to help us expedite the clean up of this aquifer. If leaving them there, we may have to pump those wells for a lot longer to pull all the TCE from into those areas. Getting that contamination out of there, definitely will help us.

KENNETH ROHRER: I have another concern about your drainageway project. Unfortunately, in that hour, I couldn't really take the time to cover the report. But in your risk assessment in the drainageway, it's my opinion that it may be slightly overstated. I am really concerned about the attention that you are showing to PCB in the drainageway. Are you weighing into the program the extensive draining system from the highway and throughout the village. Runoff potentially containing PCBs that may enter there, not just form the Westinghouse facility?

MARK PURCELL: We recognize that that underground piping cuts across a portion of the town.

KENNETH ROHRER: It goes miles from there.

MARK PURCELL: I don't know how long it goes. But we recognize that fact. And we have low levels of PCBs in the industrial drainageway and pond. I mean 1 to 10 ppm, that's not a high concentration.

KENNETH ROHRER: That's why I am saying I think it's overstated.

MARK PURCELL: But the problem is with 1 to 9 ppm in the industrial drainageway. We barely found 1 ppm in the pond. We have .5 ppm in the fish in that pond and that .5 ppp is generating human health risk. So, they're picking those PCBs up from their environment. And even though it's not a very high concentration, it's contaminating those fish and people if they are consuming those fish, you know, that exposure pathway can lead to --

KENNETH ROHRER: I can understand it. I guess what I am saying, even when you clean up the drainageway, you are really not going to succeed in the objective that you have stated. There are other sources of PCB. One that I question was the previous report where there were high PCB levels found at the county highway department property. I don't see anything in the report regarding those.

MARK PURCELL: Yeah, there are. No, we didn't look at that as part of this project.

KENNETH ROHRER: Another thing that I have great concern for is that I have personally observed over many, many years and reported to DEC about industrial users of solvents and oils in the immediate area, open landfilling, huge amounts, just bulldozing those things right in the ground in the area on the other side of the pond, on the adjoining road down. I have also reported for years to DEC the access roads leading into the area that is adjacent to the railroad tracks going down to the Kentucky Avenue Well. I have seen people come in there and dump things and leave them there. And I have seen them remain there for months, open drums of solvents and oils. And I have seen them exist for six months or more until the DEC finally came and got them.

One concern I have is after you go through all this effort, that the dumping is still going to continue unless you cut off access to those areas. It's too easy to get in there.

MARK PURCELL: Okay. That's another concern.

KENNETH ROHRER: The other concern I have is that I would think that you would be more concern about heavy metal sediments.

MARK PUCELL: Well, concentrations of heavy metals are very high. And back in the mid '80s, when EPA did its investigation, they were higher. And, in fact, we actually generated risk from those contaminants. We went back out '84, and '85. Even though the concentrations were elevated, they fell within our risk range. Didn't seem to be a player like the PCBs were. We acknowledge that there is heavy metal contamination of those sediments without a doubt.

KENNETH ROHRER: One thing you mentioned in this report that you didn't mention tonight and that is the description of unauthorized discharges continuing in the drainageway. I have probably observed that drainageway thousands of times over 20 years. And I can say with certainty that in the last 5 months

I have never seen it look so bad. Probably for 30 years, this is the worst I have ever seen it. I was there recently, several weeks ago, when all three tenants from the old Westinghouse facility were supposedly shut down for vacation. While I was standing there it was so heavy that I could not see to the bottom of the stream. And we know where it's coming from. And we know that it's not a consistent permanent discharge. It's an intentional dump.

So I guess my question is: What do you plan on doing? It just seems senseless to clean it up without locating the source first.

MARK PURCELL: That's the approach to this whole process right now. We were out there in 1995 trying to conduct this aspect of the Wellfield site remedy. We conducted samples out there and low and behold we noted a flock material floating in the drainageway. And several landowners had commented to us about it. In fact, they had actually gone out and collected a sample of this flock material and found it to be heavily contaminated with heavy metals; lead at 14,000 or 15,000 ppm. These levels far exceed any permanent discharge limit. It's been ongoing since mid 1995 and it's still going on now. We have, and the State of New York DEC has gone out there several times and collected samples. And we have confirmed what the local landowners found. They are conducting an investigation right now. The DEC authorities are looking into it. Clearly, it's some kind of violation or an unauthorized discharge. Where it's coming from, I's not sure if we can say at this point. They are looking into it. I do know the concern about going out there and cleaning up this drainageway and having it recontaminated. And we've got to address this ongoing problem right now. We have actually wrote, I think it is in this proposed plan, that whatever cleanup action is selected for the industrial drainageway, we're not going to take that action until this problem is addressed. That's really where we are.

KENNETH ROHRER: I have never seen it look the same on any day I have been there. It's either red, green, blue, white, brown, black, take your pick of color.

MARK PURCELL: Do you notice it on,

are you seeing it on a certain day of the week or is it every day?

KENNETH ROHRER: Obviously, I haven't gone every week. Every time I have been there it looks different.

JIM DOYLE: For my benefit, you said you know where it's coming from. If you don't want to say, that's fine.

KENNETH ROHRER: Well, there are three manufacturing concerns and buildings, so it must be one or more of them.

JIM DOYLE: Okay. We are looking into trying to figure either way.

KENNETH ROHRER: Certainly, by the magnitude of the dumps indicates it isn't originating from the drainage system off the highway.

JIM DOYLE: I see, I thought you were implying that it was something more obvious, something else going on. Yeah, that's what the state and the permit people are looking at.

KENNETH ROHRER: It shouldn't be too difficult to find out where it is coming from.

WAYNE MIZERAK: Just to answer your

question about what's being done. Within the past month, our permanent people have met with the operators of I believe Toshiba. They will be submitting an investigation plan to evaluate it. Our permitting people are pursuing the fact that something needs to be done there. So action is working toward what you requested.

MARK PURCELL: Thank you. Are there any other questions?

ANN RYCHLENSKI: Okay then, we will say good night. I just want to remind you once again, that if you have any comments, you want to write them in, you can send them to Mark. His address is right there. Please make certain that you take one. If you didn't sign in, please do so, so they can have you name on my mailing list. We thank you for coming out and we will keep you abreast of further actions taken out here.

Thank you. Good night.

C E R T I F I C A T I O N

I hereby certify that the proceedings and evidence are contained fully and accurately in the notes taken by me on the above cause and that this is a correct transcript of the same to the best of my ability.

<IMG SRC 0296280Q>

ELIZABETH I. REICHERT

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APPENDIX F

16 Sep 1996

Mark Purcell, Project Manager
US Environmental Protection Agency
20th Floor
290 Broadway
New York NY 10007-1866

Re: Kentucky Avenue Wellfield Superfund Site

I was part of the public meeting 11 Sep at the Village of Horseheads Hall and spoke up about the inconsistency of the number of 30-gallon drums containing ignitable and reactive magnesium chips and titanium turnings buried during 1973-1975 by Westinghouse. On page five the estimate is 196 drums buried. On page twelve, (1) states that a total of 179 55-gallon drums were removed from this area. Both the number of drums and the size of the drums do not match.

I concur that you have developed a comprehensive cleanup plan and feel the best remedial alternative to the three areas you have cited on page twenty be: removal and off-site disposal. I am concerned about your preference for 3B - Physical Treatment by SVE-AS (Option 2) for the former runoff basin area but understand you feet it would be more inclusive as it would involve those soils in close proximity to, or directly under, the building foundations at the Former Runoff Basin Area. Might you consider a combination of Alternative 2B and 3B to maximize the cleanup?

It is also my understanding from information offered at the public hearing, that there currently is continued contamination in the area and the source or sources have not been identified. Aggressive prosecution of those causing contamination must be pursued.

<IMG SRC 0296280R>

cc: Citizens Clearinghouse for Hazardous Waste, PO Box 6806, Falls Church VA 22040
Center for Respect of Life and Environment, 2100 L St NW, Washington DC 20037
Environmental Justice Program, Catholic Charities, 1700 College Ave, Elmira 14901