# WESTINGHOUSE ELECTRIC CORPORATION

Cheektowaga (T), Erie County, New York
Site No. 9-15-066

# PROPOSED REMEDIAL ACTION PLAN

## Operable Unit No. 2

### Surface Water and Groundwater Contamination

## August 1995

Prepared by:

Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation

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## WESTINGHOUSE ELECTRIC CORPORATION
**Operable Unit No. 2 - Surface Water and Groundwater Contamination**
**Cheektowaga (T), Erie County, New York**
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## SECTION 1: PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) is proposing Groundwater Hydraulic Gradient Control/Collection combined with a Source Removal Program for the Westinghouse Electric Corporation, Operable Unit No. 2. Operable Unit No. 2 will address the groundwater and surface water impacted by contamination at the site.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the rationale for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments submitted during the public comment period.

This PRAP is issued by the NYSDEC as an integral component of the citizen participation plan responsibilities provided for by the New York State Environmental Conservation Law (ECL) and 6 NYCRR Part 375. This document is a summary of the information that can be found in greater detail in the Remedial Investigation and Feasibility Study (RI/FS) reports on file at the document repositories.

The NYSDEC may modify the preferred alternative or select another response action presented in this PRAP and the RI/FS Report based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

The public is encouraged to review the documents at the repositories to gain a more comprehensive understanding of the site and the investigations conducted there. The project documents can be reviewed at the following repositories:

**Cheektowaga North Branch Library**
**735 Maryvale Drive**
**Cheektowaga, New York 14225**
**(716) 634-4424**
**Hours: 10:00-5:00, Mon//Wed/Fri.**
**1:00-9:00, Tues/Thurs.**

**NYSDEC - Region 9 Office**
**270 Michigan Avenue**
**Buffalo, New York 14203**
**(by appointment only)**
**(716) 851-7220**

**NYSDEC - Central Office**
**50 Wolf Road**
**Albany, New York 12233-7010**
**contact: Michael Ryan**
**(518) 457-4343**

Written comments on the PRAP can be submitted to Mr. Ryan at the above address.

DATES TO REMEMBER:

The public comment period for the PRAP extends from **August 22, 1995** until **September 22, 1995**.

A public meeting has been scheduled for **September 12, 1995** to discuss the PRAP at the **Cheektowaga Town Hall at 7:00 p.m.**

## SECTION 2: SITE LOCATION AND DESCRIPTION

The Westinghouse Electric Corporation site is located in Erie County, New York, at 4454 Genesee Street in the Town of Cheektowaga (refer to Figure 1). The site is bordered to the north and west by the Greater Buffalo International Airport, to the east by Holtz Drive and to the south by Genesee Street. The site setting is urban/industrial.

The site is approximately 130 acres in size. A large plant building structure, approximately 2.5 million square feet in size, and several smaller buildings occupy a significant portion of the site (30 acres). The remaining portion of the site consists of paved areas, roadways, railroads, and open grass/vegetated areas (refer to Figure 2).

The site is presently inactive with the exception of the Flying Tigers Restaurant, situated on the northern extreme of the site.

Due to the size and complexity of the site and based on the findings of the RI, the site was divided into two Operable Units. An Operable Unit represents a discrete portion of the remedy for a site which for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the contamination present at a site. Operable Unit No. 1, which was the subject of a March 1995 Record of Decision, addressed hot spot soil areas as well as sediment contamination in the U-Crest ditch. The U-Crest ditch, which is situated south of the site, receives storm water discharge from the southern portion of the site. Operable Unit No. 2, which is the subject of this PRAP, addresses the groundwater contamination identified at the site.

## SECTION 3: SITE HISTORY

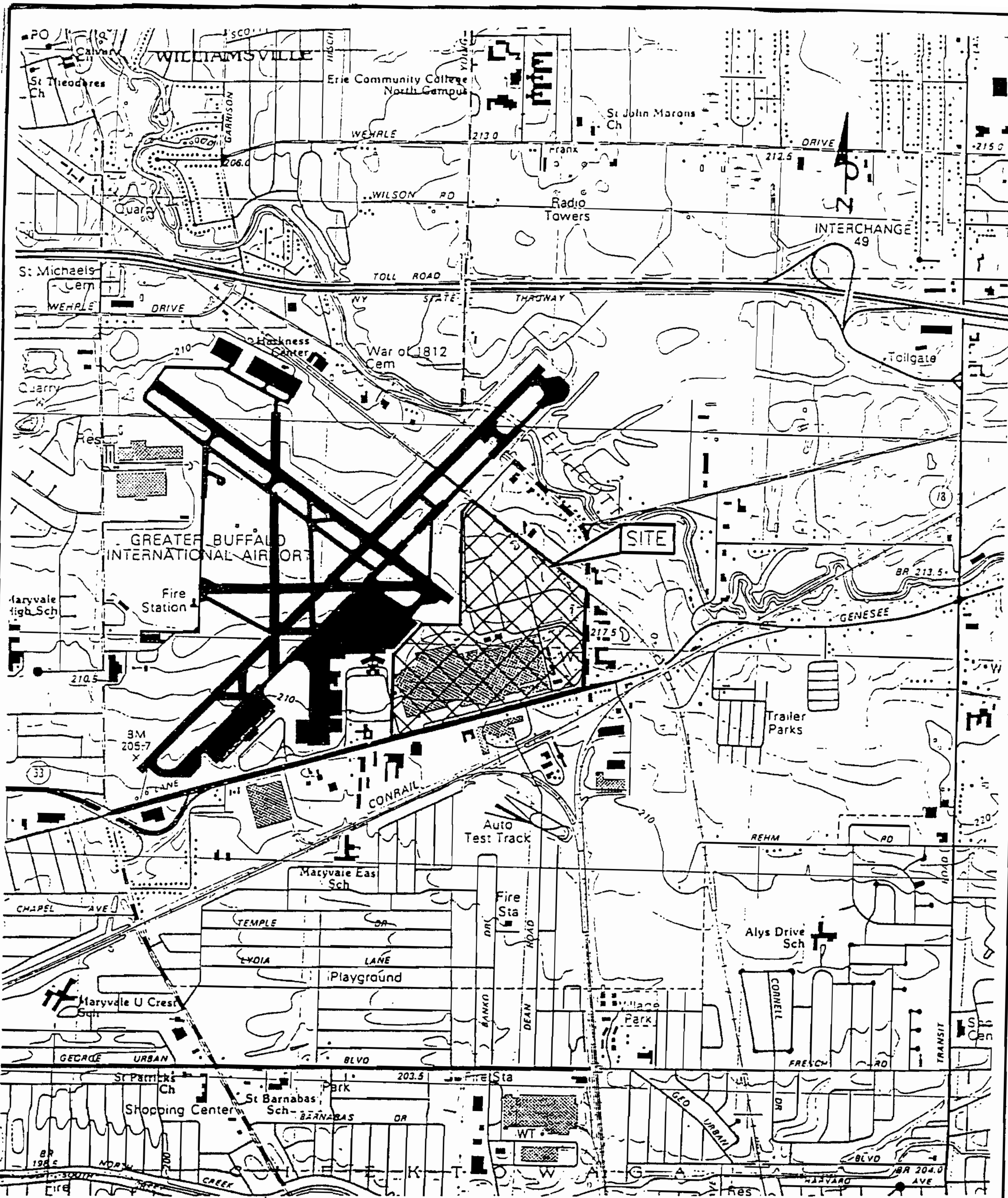
### 3.1: Operational/Disposal History

**1940:** The existing facility was constructed and was operated by the Curtis-Wright Corporation for aircraft production.

**1946:** The site is sold to the Westinghouse Electric Corporation.

**1946-84:** Westinghouse Electric Corporation operated the facility to manufacture a variety of products including motors, generators, motor controls and gears. Principal manufacturing processes included wire production; copper and aluminum casting; metal machining, fabrication, plating and finishing.

**1984:** Westinghouse Electric Corporation sold 11.4 acres on the northern portion of the property to the Niagara Frontier Transportation Authority (NFTA) and entered into an agreement to sell the remaining portion of the property to a private investor.




**DUNN ENGINEERING COMPANY**
495 Commerce Drive
Amherst, NY 14228

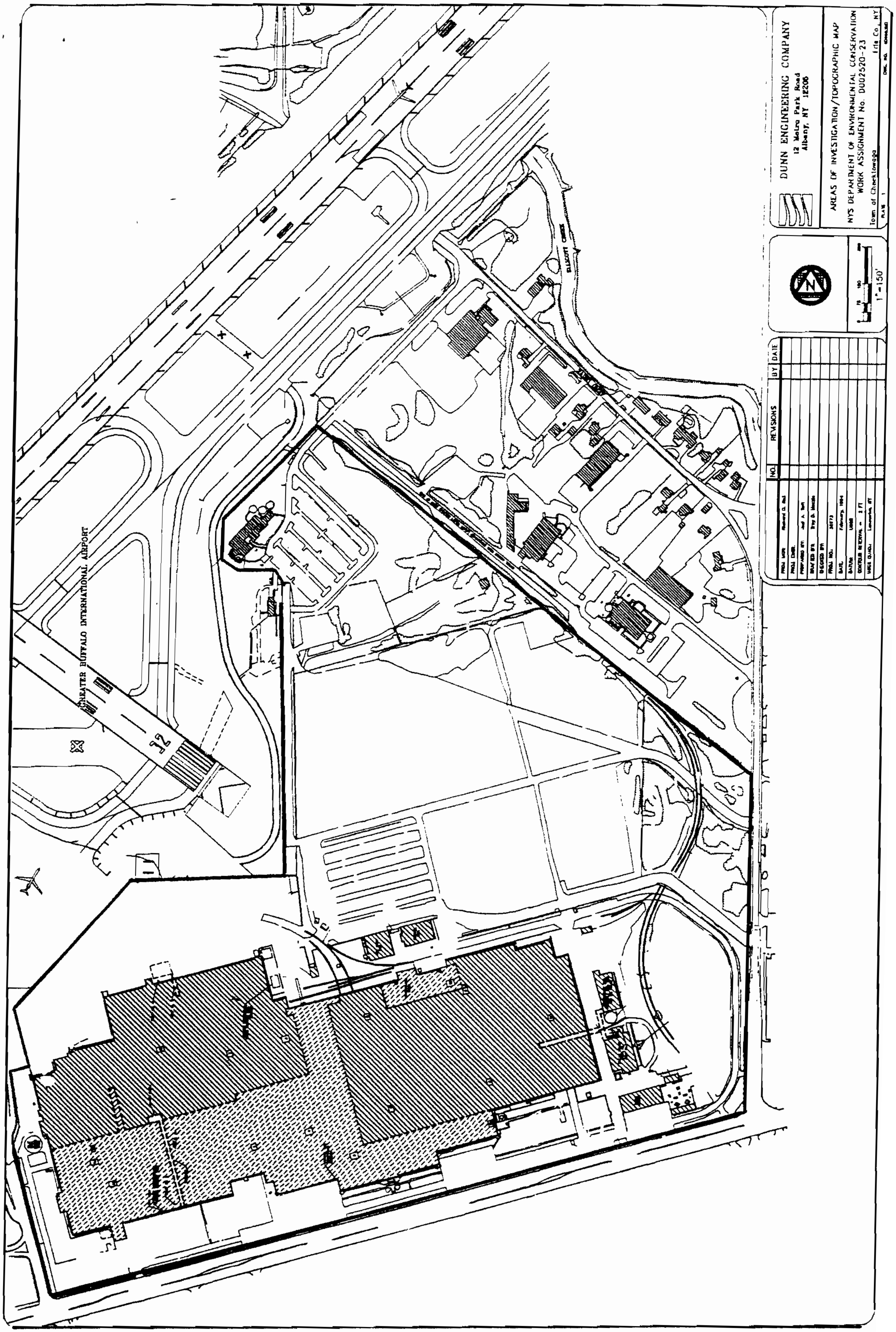
NYS DEPT. OF ENVIRONMENTAL CONSERVATION
WORK ASSIGNMENT No. D002520-23

SITE LOCATION MAP

WESTINGHOUSE REMIDIAL INVESTIGATION

| PROJECT NO. 35673 | DATE Mar., 1994 | DWG. NO. 4A0087SD | SCALE 1"=2000' | FIGURE NO. 1 |
|---|---|---|---|---|

FIGURE 2


DUNN ENGINEERING COMPANY
12 Metro Park Road
Albany, NY 12205
AREAS OF INVESTIGATION/TOPOGRAPHIC MAP
NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Town of Cheektowaga
REVISIONS
NO.
BY
DATE
GREATER BUFFALO INTERNATIONAL AIRPORT
ELLICOTT CREEK
1"=150'

**1985:** The Erie County Industrial Development Agency (ECIDA) accepted all rights and interest in the facility from the owner. The Buffalo Airport Center Associates (BACA) subsequently entered an agreement (lease with an option to buy) with the ECIDA.

**1985-91:** The BACA subleased portions of the building for warehousing, general office, and distribution operations.

**1991:** All tenancies were discontinued.

### 3.2: Remedial History

**1985-86:** NYSDEC Phase I Investigation conducted. The Phase I concluded that further investigation was warranted.

**1990-91:** NYSDEC Preliminary Site Assessment (PSA) conducted. Based on the findings of the PSA, a Class 2 designation was assigned to the Westinghouse site, signifying that the site posed a significant threat to human health and/or the environment.

**1992:** After negotiations with Westinghouse Electric Corporation were unsuccessful, the site was referred for action under the State Superfund Program, funded by the 1986 Environmental Quality Bond Act.

**1993-94:** NYSDEC Remedial Investigation (RI) conducted. The RI recommended the site be divided into two Operable Units to address the (1) soil and sediment contamination and (2) the groundwater/surface water contamination.

**September 1994:** NYSDEC Feasibility Study (FS) for Operable Unit No. 1, Soil and Sediments was completed and presented to the public.

**September 1994:** At the request of the NYSDEC, the BACA implemented a voluntary removal of all polychlorinated biphenyl (PCB) transformers at the site. A total of 24 transformers were removed from 15 subsurface vaults within the facility.

**March 1995:** In a Record of Decision, the State selected On-Site Low Temperature Thermal Desorption as the remedy to address Operable Unit No.1, the soil and sediment contamination, related to Areas I, J, K, M and the U-Crest ditch (ref. Figure 3).

**June 1995:** NYSDEC Feasibility Study (FS) for Operable Unit No. 2, Contaminated Surface Water and Groundwater was completed.

## SECTION 4: CURRENT STATUS

In response to a determination that the presence of hazardous waste at the Site presents a significant threat to human health and/or the environment, the State has recently completed a Remedial Investigation/Feasibility Study (RI/FS).

### 4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted in two phases. The first phase was conducted in the summer of 1993 and the second phase was conducted in early 1994. A report entitled "Remedial Investigation/Feasibility Study Report, Westinghouse Electric Corporation Site", dated September 1994, has been prepared describing the field activities and findings of the RI in detail.

The RI activities consisted of the following:

- Soil Gas Investigation - A soil gas survey was conducted on selected portions of the site to help pinpoint areas of concern and select optimum locations for borings and monitoring wells. Grids were established and soil gas probes were installed at depths ranging from two to four feet. Soil gas/headspace analysis was conducted using an on-site gas chromatograph (GC), targeting eleven volatile parameters previously identified at the site. The GC was also used to analyze test pit soil samples and soil boring samples.

- Environmental Sampling - Samples were collected from storm sewers, sanitary sewers, outfalls, streams, ditches sumps, tunnels, vaults, surface soils, surface water and sediments.

- Test Pit Excavation - A total of one hundred test pits were excavated in eleven principal areas of investigation to assess the physical and chemical characteristics of subsurface soils and fill materials.

- Boring/ Monitoring Well Installation - Soil borings and groundwater monitoring wells were installed for analysis of soils and groundwater as well as to determine the physical properties of the soil and the hydrogeologic conditions.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the data obtained from the RI was compared to environmental Standards, Criteria, and Guidance (SCGs). Groundwater, drinking water and surface water SCGs identified for the Westinghouse site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria were used to develop remediation goals.

Based upon the results of the remedial investigation in comparison to the SCGs and potential public health and environmental exposure rates, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

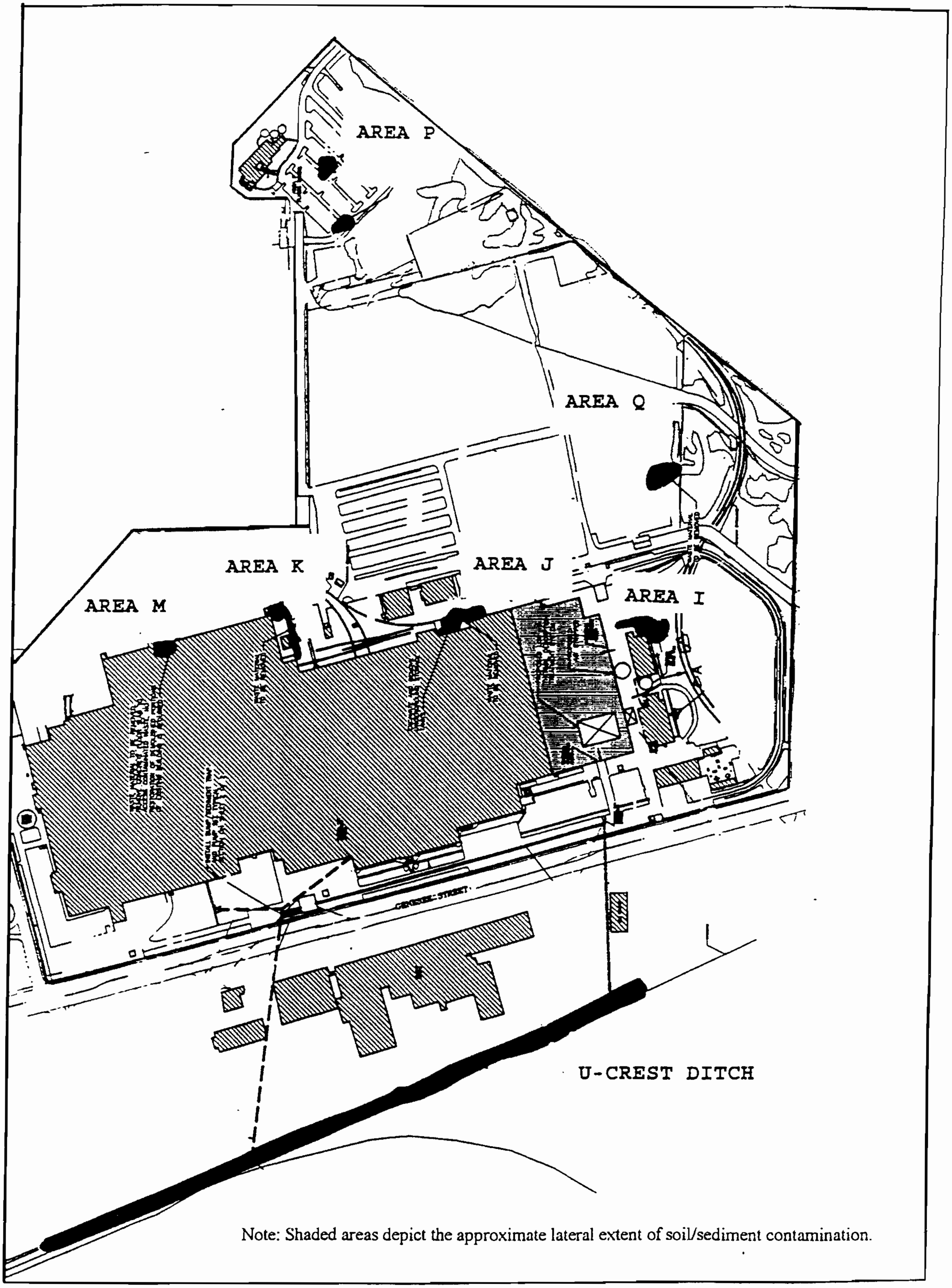
The RI focused on a number of areas identified by the NYSDEC PSA, which were considered to represent potential environmental concerns. These Areas of Investigation are illustrated on Figure 3. The RI revealed the presence of several distinct areas of significant soil contamination (i.e. hot spot areas) at this site. These areas (Areas I, J, K and M), which are in the immediate vicinity to the main plant building, were formerly used for manufacturing operations and/or tank storage. These hot spot areas are the subject of Operable Unit No. 1 (OU-1). The RI also focused on identified groundwater contamination and surface water contamination. The RI involved installation of additional monitoring wells and piezometers to better assess groundwater quality and to delineate the extent of the groundwater contamination. The groundwater and surface water contamination are the subject of Operable Unit No. 2 (OU-2).

The RI revealed the presence of significant groundwater contamination and surface water contamination associated with distinct areas of the site. Elevated levels of contaminants, primarily volatile organic compounds, were detected in groundwater in the vicinity of the hot spot areas. It is believed that these areas are acting as a continuing source of the contamination observed in the groundwater. Groundwater contamination was also observed beneath the main plant building. Elevated levels of volatile organic compounds and PCBs were detected in water samples collected from flooded subsurface structures including the Fan Room tunnel, the Mixing Room Service tunnel and transformer vaults. The surface water contamination, which was observed in the sewer system, at the outfalls and in the U-Crest ditch, is attributed to contaminated groundwater which has infiltrated the storm sewer lines.

The Fan Room tunnel and the Mixing Room Service tunnel comprise Area A. These tunnels are flooded with contaminated groundwater which infiltrated these subsurface structures subsequent to the termination of the building's sump pump system. During the RI, the volume of water observed in the tunnels was estimated at 72,000 gallons and 13,000 gallons, respectively. Area E is comprised of the storm and sanitary sewer systems located beneath the main plant building (ref. Figure 4). The storm sewer system is an extensive network of sewer laterals which ultimately discharge to three primary trunk lines. Analytical data from these lines (001, 002 and 003) is included on Figure 4. Like the tunnels, contaminated groundwater is infiltrating the sewer system due to its position relative to the water table. The migration of contaminated groundwater into these areas has resulted in the discharge of contaminated surface water, via the storm sewer system, to the U-Crest ditch. The water quality in Areas A and E is viewed as generally indicative of the groundwater quality beneath the main plant building, It should be noted, however, that the roof drains discharge into the storm sewer network and this additional water would have the effect of diluting the levels of contamination detected during the outfall monitoring. The results of an Interim Remedial Measure (IRM) program conducted during the RI (ref. Section 4.2) revealed that Areas I, J, K and M are acting as a continuing source to the groundwater contamination beneath the building. The findings of the IRM, however, also support the existence of numerous smaller contaminant source areas beneath the plant building. These source areas are attributed to the past heavy industrial use of the facility and the numerous manufacturing process-related features (e.g. catch basins, oil/grease pits, collection sumps, etc.) within and beneath the 30-acre main plant building structure.

Groundwater contamination was also observed in the northern portion of the site in Areas P and Q. Area P is located on the NFTA-owned parcel. Area Q is situated east of the parking lot area on the BACA property. Areas P and Q were the focus of the soil gas investigation, which was one of the first tasks implemented as part of the RI. The soil gas investigation was used to help pinpoint source areas within P and Q. Soil

FIGURE 3


AREA P
AREA Q
AREA K
AREA J
AREA M
AREA I
U-CREST DITCH
Note: Shaded areas depict the approximate lateral extent of soil/sediment contamination.

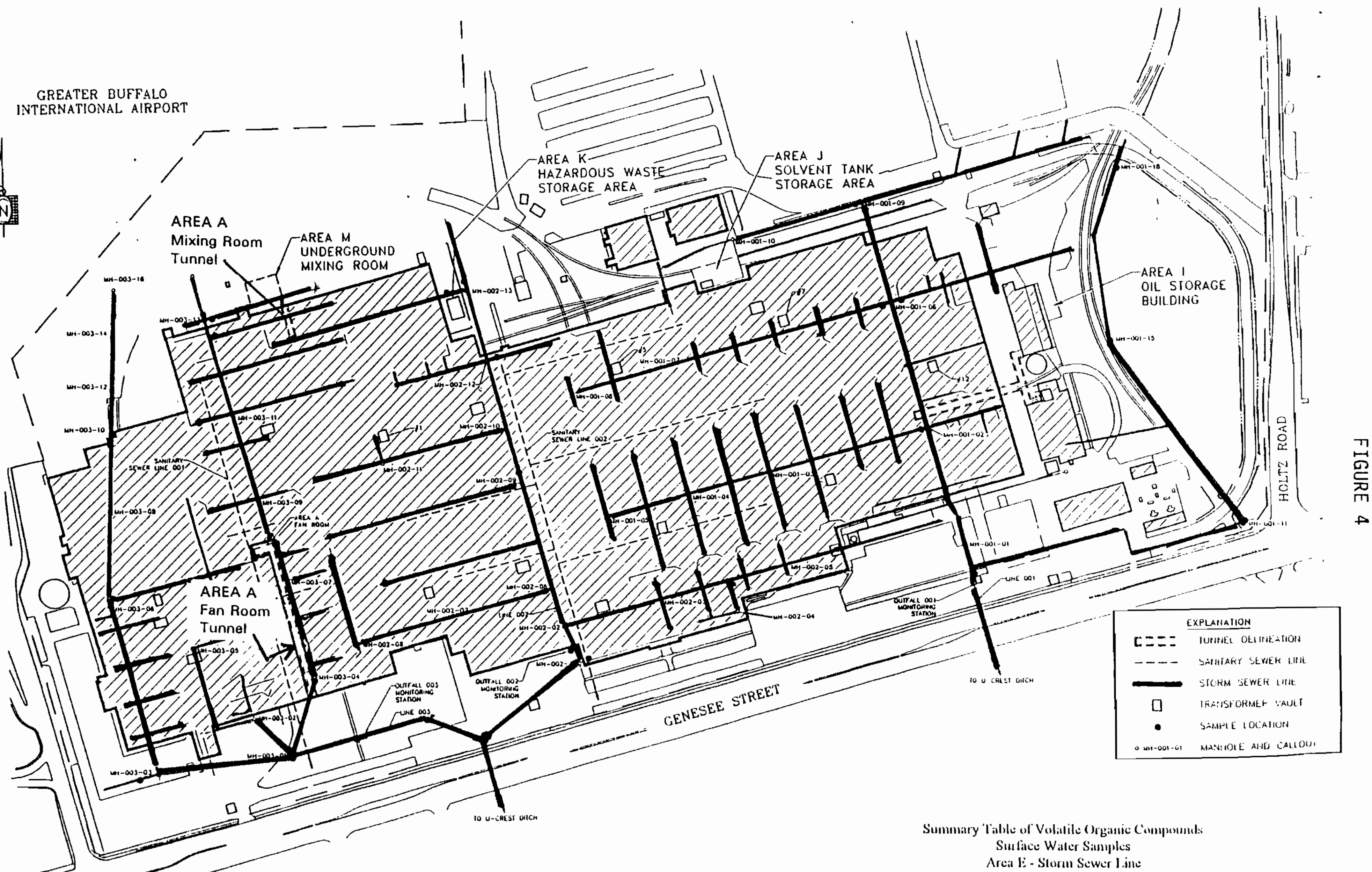



FIGURE 4

Summary Table of Volatile Organic Compounds
Surface Water Samples
Area E - Storm Sewer Line
Concentration values in parts per billion (ppb)

| | June 93 | Dec. 93 | Apr. 94 | June 94 | July 94 | Aug. 94 | Sept. 94 | Oct 94 |
|---|---|---|---|---|---|---|---|---|
| Outfall Monitoring Station 001 | | | | | | | | |
| Total Volatiles | 32 | 26 | 62 | 59 | 37 | 41 | 49 | 17 |
| Outfall Monitoring Station 002 | | | | | | | | |
| Total Volatiles | 33 | 25 | 46 | 20 | 25 | 202 | 49 | 83 |
| Outfall Monitoring Station 003 | | | | | | | | |
| Total Volatiles | 159 | 301 | 188 | 179 | 328 | 191 | 245 | 259 |

gas probes were installed at depths of two to four feet below the ground surface. The soil gas survey revealed the presence of elevated levels of total volatiles in these areas, as high as 33,000 parts per billion (ppb) beneath the Flying Tigers Restaurant parking lot and 14,000 ppb in Area Q. Groundwater sampling confirmed the soil gas results. Groundwater data revealed significantly elevated levels of volatile organic compounds in Area P (e.g. vinyl chloride at 12,000 ppb, dichloroethene at 22,000 ppb) as well as in Area Q (e.g. trichloroethene at 30,000 ppb). The contamination in these Areas is distinct/isolated and is believed to have resulted from random dumping. The soil gas/air pathway represents an additional concern to the threat of contaminant migration through groundwater.

The RI included a comprehensive evaluation of the hydrogeology at the site. The RI revealed the existence of a prominent overburden groundwater divide at this site. The divide extends from northwest to southeast and bisects the north-central portion of the site. This divide represents a hydraulic barrier to groundwater flow such that groundwater north of the divide generally flows toward Ellicott Creek and groundwater south of the divide generally flows southwest, toward Genesee Street. Soil at the site was shown to have low hydraulic conductivity. Groundwater flow velocity in the northern portion of the site is estimated at 0.29 ft/yr and 0.46 ft/yr (max.) in the southern portion of the site. The existence of this divide supports that the contamination detected in Areas A and E has the potential to migrate southward toward the U-Crest ditch, whereas the contamination detected in Areas P and Q has the potential to migrate toward Ellicott Creek.

During the course of the RI, significant concerns were raised by the Town regarding the contamination in the U-Crest ditch and the potential for future migration by the contamination identified at the site. Concerns were also voiced by representatives of the Federal Aviation Administration (FAA) and the Air Traffic Controllers Association (ATCA). Offices for the FAA and the ATCA are situated northeast of the site, in proximity to Areas P and Q. FAA and ATCA representatives expressed concerns associated with the possible presence of contaminated groundwater and/or vapors beneath their offices.

While the potential exists for off-site migration, analytical data suggests that to date, the groundwater contamination has been confined to the site. Monitoring of perimeter wells has shown that in general, groundwater at the periphery of the site is not contaminated. This is attributed in part to the low hydraulic conductivity of the overburden soil. The primary reason for the lack of off-site migration of contaminated groundwater in the southern portion of the site (Areas A and E), however, is believed to be the influence of the storm sewer system. The sewer system is acting as a groundwater interceptor, receiving groundwater via infiltration due to its position relative to the water table. The sewer system is capturing and controlling the contaminated groundwater before it migrates off-site. The result, however, has been the direct discharge of this contamination to the U-Crest ditch. The potential also exists for downward migration of contamination to the bedrock aquifer. Data suggests that to date, this has not occurred to an appreciable extent.

The proposed remedial objectives for Operable Unit No. 2 are listed on Table 1. The values listed in Table 1 represent the groundwater cleanup objectives for the contaminants which best characterize the overall groundwater contamination at the site.

### 4.2 Interim Remedial Measures:

Interim Remedial Measures (IRMs) are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

Several IRMs were implemented during the RI field program at the direction of the NYSDEC. IRMs were undertaken at three areas on the project site, which were identified during the PSA, to prevent or reduce the spread of contaminants or limit the need for more complex and costly future remedial actions. These IRMs included: removal of the underground varnish tank located south of the Heat Treatment/Plating Area (Area C); removal of the septic tank in the Gunnery Range (Area O); and pumping out of the Sump No. 4 located adjacent to the Underground Mixing Room (Area M). The work was performed on June 30 and July 1, 1993 (refer to Figure 2 for locations).

Based on the findings of the RI, an additional IRM was undertaken in April 1994. The RI revealed elevated levels of contaminants, including volatile compounds, in the storm sewer system within the main plant building. Similar contaminants were also detected outside the building in the immediate proximity of former tank storage areas (Areas I, J, and K) and the underground mixing room (Area M). Using mechanical plugs, storm sewer laterals which pass near these areas were plugged as an IRM to preclude the flow of contaminated groundwater into storm sewers from these areas. The storm sewer outfalls were monitored monthly subsequent to the installation of the plugs to gauge the effectiveness of the IRM. The monitoring revealed that the IRM did have a limited impact on the contaminant loading from Areas I, J and M. The monitoring program also revealed the direct relationship between groundwater table fluctuation, infiltration rate and contaminant loading on the storm water system. The data obtained from the IRM program supports that additional contaminant source areas are present beneath the main plant building, which are adversely impacting the storm sewer system. The Feasibility Study Report details the findings of the IRM/monitoring program.

Another IRM was conducted at the site in response to the identified presence of PCBs in the U-Crest ditch sediments. The PCBs were attributed, at least in part, to the presence of PCB transformers in the main plant building. The RI identified the existence of subsurface transformer vaults within the main plant building. A total of 24 inactive transformers were identified within 15 subsurface vaults at the site. Like the tunnel areas, five of these vaults were observed to be flooded, submerging the transformers. Testing revealed the presence of PCBs in the water within the vaults. Low levels of PCBs were also detected in the storm sewer sediments and the U-Crest ditch. In response to this information, at the request of the NYSDEC, the current site owner (BACA) implemented a transformer removal program in the Fall of 1994. The contaminated water within the vaults was pumped out and treated, the vault walls and floors decontaminated, the 24 transformers

## Table 1

**Westinghouse Electric Corporation Site**
**Operable Unit No. 2**
**Proposed Remedial Objectives for Groundwater**
**All units in parts per billion (ppb)**

| Contaminant | Proposed Remedial Objectives |
|---|---|
| 1,2-Dichloroethene (total) | 5 |
| 1,1,1-Trichloroethane | 5 |
| Trichloroethene | 5 |
| Vinyl Chloride | 2 |
| Toluene | 5 |
| Cadmium | 5 |
| Lead | 25 |

were decommissioned and properly disposed and a total volume of 6,033 gallons of PCB oil was removed for proper disposal.

### 4.3 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6 of the RI Report.

An exposure pathway is the mechanism by which an individual comes into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination (e.g. soil, groundwater); 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure (e.g. ingestion, inhalation); and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

An evaluation of the RI and exposure assessment data indicated that the significant potential routes of exposure at the site would be: 1) future direct contact with subsurface soil by site trespassers and future on-site workers; 2) direct contact with water and sediments from the U-Crest ditch by nearby residents; 3) direct contact with surface water and sediments in the electric manhole 5A (Area C), the flooded areas, the storm water sewer system and sanitary sewer systems within the main building, by site trespassers and future on-site workers.

It should be noted that the air pathway is not expected to result in significant human exposures or resultant health risks, due to the fact that the majority of the site is covered with buildings, pavement or vegetation. However, elevated levels of volatile organics in soil gas were detected beneath the parking lot of the Flying Tigers Restaurant (Area P). While exposure to contamination via inhalation has a limited potential currently as it is below the pavement, the usage of this parcel supports the need for remedial activity.

### 4.4 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site. The Habitat Based Assessment included in the RI (Section 5) presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources.

The Fish and Wildlife Impact Analysis (FWIA) determined that there are two habitats which could potentially be impacted by site related contaminants: Ellicott Creek and the U-crest ditch. Ellicott Creek is a high quality aquatic habitat whereas the U-crest ditch represents a low quality habitat. Due to the industrial nature of the site, however, impacts to the terrestrial environment are anticipated to be minimal.

Evaluation of analytical results from Ellicott Creek relative to applicable criteria revealed no evidence that storm water discharge from the northern storm sewer system has adversely impacted Ellicott Creek. Data indicates that no further investigation or any remedial efforts are necessary in Ellicott Creek.

Surface water samples collected from the U-Crest ditch indicated that surface water quality in the vicinity of the discharge points to the ditch is impacted by site related contaminants. However, the contaminant levels detected in a sample collected approximately 800 feet downstream of the 002/003 storm sewer discharge point generally exhibited lower concentration. Sediment samples from the U-crest ditch have been impacted by site related contaminants. Although the U-Crest ditch is not a high quality aquatic habitat, excavation of the sediments in the ditch has been recommended.

## SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include the Westinghouse Electric Corp., the Niagara Frontier Transportation Authority and the Buffalo Airport Center Associates.

The PRPs failed to implement the RI/FS at the site when requested by the NYSDEC. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

## SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. These goals are established under the overall goal of meeting all standards, criteria, and guidance (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Prevent the further migration of contaminated groundwater/surface water from the site.

- Prevent and/or minimize direct contact and/or ingestion (drinking) of contaminated groundwater at levels that exceed NYSDEC groundwater quality standards.

- Remediate the contaminated groundwater/surface water in such a manner that minimizes any possible direct human or environmental contact; and treat the contaminants to levels which can meet groundwater/surface water effluent and/or cleanup objectives.

## SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for Operable Unit No. 2 at the Westinghouse site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled *"Remedial Investigation/Feasibility Study Report, Westinghouse Electric Corporation, Volume 4: Feasibility Study for Operable Unit No. 2"*, dated June, 1995. A summary of the detailed analysis follows.

### 7.1: Description of Alternatives

The potential remedies are intended to address contamination associated with two distinct areas of the site. First, the contaminated groundwater beneath the main plant building, which is also impacting surface water in the U-Crest Ditch, and second, the identified groundwater contamination in the northern portion of the site. Potential remedial alternatives were selected which would satisfy the general criteria specified in 6 NYCRR Part 375 (ref. Section 7.2). The selection process also gave preference to technologies which could readily function in the complex site environment. That is, the site-specific features (physical conditions, geological/hydrogeological setting, proposed future usage, etc.), limit the technologies considered viable at this site. The potential remedies are discussed below.

In light of the distinct nature of the areas of contamination, for purposes of alternative screening and evaluation, two series of alternatives are presented below. The first series will address Areas A and E and the second series will address Areas P and Q. This will allow greater ease in comparison and selection of the most feasible alternative or combination of alternatives to address OU-2.

#### Areas A and E

Alternative No. 1 - No Action

The "No Action" Alternative is evaluated as a procedural requirement and as a basis for comparison. It would require continued assessment only, allowing these areas of the site to remain in an unremediated state. Under this alternative these areas (Areas A and E) would remain in their present condition and human health and the environment would not be provided any additional protection. There would be no cost associated with this alternative.

Alternative 2 - Limited Action

| | |
|---|---|
| Present Worth: | $ 435,000 |
| Capital Cost: | $ 89,000 |
| Annual O&M: | $ 16,000 |
| Time to Implement: | 6 months - 1 year |

The Limited Action Alternative would be comprised of the following seven components:

- Increase public awareness of the contamination problems at the site and the risks associated with the contamination.

- Improve and maintain the existing fence around the perimeter of the site and increase security to deter trespassing inside the building structure(s).

- Prior to the planned demolition of the various building structures, decommission and terminate the existing storm sewer system within the confines of the site boundaries to permanently discontinue discharge into the U-Crest ditch.

- Termination of all sanitary sewer lines at the building perimeter.

- Installation of additional perimeter monitoring wells to augment the existing monitoring system.

- Implementation of a long term groundwater and surface water monitoring program.

- Allow for the natural attenuation of organic compounds detected in groundwater.

The components of this Alternative are assumed to be continued for a duration of 30 years. The status of the nature and extent of the contamination would be assessed based on the results of the monitoring program.

Alternative 3 - Groundwater Hydraulic Gradient Control/Collection Via the Existing Storm Sewer System, Treatment, Disposal and Environmental Monitoring

| | |
|---|---|
| Present Worth: | $ 605,000 |
| Capital Cost: | $ 57,000 |
| Annual O&M: | $ 25,000 |
| Time to Implement: | 6 months - 1 year |

Hydraulic gradient controls would be used to limit the migration of contamination by altering groundwater flow patterns. This would be accomplished by pumping from groundwater wells or sump structures, creating a cone of depression thus altering the natural hydrogeologic equilibrium. This process can be used to modify groundwater levels and/or flow direction and prevent the potential for further migration of groundwater contamination. Data supports that the existing sewer system at the site historically has been functioning as a hydraulic gradient control. The storm sewer system has been receiving contaminated groundwater via infiltration, due to its position relative to the groundwater table. The result, however, has been the discharge of contaminated groundwater/surface water to the U-Crest ditch. This Alternative would involve maintaining and utilizing the existing sewer system as a hydraulic gradient control, with water treatment prior to discharge. Demolition of the main plant building and other structures as planned would not impact utilization of the sewer system, but would have to be accomplished so as to minimize disruption to the existing system. This would require that the main plant slab remain in place as a component of the remedy or that some alternative control(s) be employed to insure that the system's ability to function is not hindered. This Alternative would include the following actions:

- Termination of all underground utility lines (i.e. gas, electric, sanitary sewer) at the building perimeter to prevent horizontal migration of contaminants through these lines or associated bedding material.

- Utilization of the existing storm sewer system beneath the main plant building for hydraulic gradient control and collection of contaminated groundwater. All flow from outside catch basins, roof drains, etc. would be diverted to an alternate storm water management system to avoid unnecessary treatment costs.

- Treatment of the collected groundwater from the storm sewer outfalls would be performed by either the use of an on-site water treatment system or by connection to the local Publicly Owned Treatment Works (POTW). On-site treatment would be provided by an air stripper with appropriate air controls, should levels exceed the 0.3-0.5 lb/hr range. Treated water would likely be discharged into the U-Crest ditch.

- Implementation of a long term monitoring program.

The components of this alternative are assumed to be continued for a duration of 30 years. The status of the nature and extent of the contamination would be assessed yearly based on the results of the monitoring program.

Alternative 4 - Groundwater Hydraulic Gradient Control/Collection Via Augmentation to the Existing Storm Sewer System, Treatment, Disposal and Environmental Monitoring

| | |
|---|---|
| Present Worth: | $ 671,000 |
| Capital Cost: | $ 112,000 |
| Annual O&M: | $ 25,000 |
| Time to Implement: | |

The concept of this Alternative is consistent with that discussed in Alternative 3; however, the sewer system would be enhanced to improve the system effectiveness by allowing higher infiltration rates. Further, the system would be augmented to allow pumping from the existing subsurface tunnels (Fan Room and Underground Mixing Room Tunnel) to improve system efficiency. This Alternative would consist of the actions discussed in Alternative 3, with the following additional elements:

- Utilization of the existing storm sewer system beneath the main plant building for hydraulic gradient control and collection of contaminated groundwater, which would be augmented by drilling holes in the trunk lines to allow for greater groundwater infiltration/collection. Additionally, a sump pump and associated distribution lines would be installed in both the Fan Room Tunnel (Area A) and the Underground Mixing Room Tunnel

(Area M). The surface water/groundwater collected from these areas would be pumped to and discharged into the closest trunk or lateral line of the storm sewer system. All flow from outside catch basins, roof drains, etc. would be diverted to an alternate storm water management system to avoid unnecessary treatment costs.

The components of this alternative are assumed to be continued for a duration of 30 years. The status of the nature and extent of the contamination would be assessed yearly based on the results of the monitoring program.

Alternative 5 - Groundwater Hydraulic Gradient Control/Collection Via Extraction Wells, Treatment, Disposal and Environmental Monitoring

| | |
|---|---|
| Present Worth: | $ 798,000 |
| Capital Cost: | $ 187,000 |
| Annual O&M: | $ 25,000 |
| Time to Implement: | 6 months - 1 year |

The concept of this Alternative is consistent with that discussed in Alternative 3, however, extraction wells would be used in lieu of the existing sewer system to accomplish the hydraulic gradient control. This Alternative would be comprised of the following components:

- Termination of all underground utility lines (i.e. gas, electric, sanitary sewer) at the building perimeter to prevent horizontal migration of contaminants through these lines or associated bedding material.

- Prior to the planned demolition of the various building structures, decommission and terminate the existing storm sewer system within the confines of the site boundaries to permanently discontinue discharge into the U-Crest ditch.

- Installation of extraction wells within the building perimeter for collection of groundwater. It is estimated as many as 20 wells may be necessary to accomplish this task.

- Treatment of the collected groundwater from the storm sewer outfalls would be performed by either the use of an on-site water treatment system or by connection to the local POTW. On-site treatment would be provided by an air stripper with appropriate air controls, should levels exceed the 0.3-0.5 lb/hr range. Treated water would likely be discharged into the U-Crest ditch.

- Implementation of a long term monitoring program.

The components of this alternative are assumed to be continued for a duration of 30 years. The status of the nature and extent of the contamination would be assessed based on the results of the monitoring program.

**Areas P and Q**

Alternative No. 1A - No Action

The "No Action" Alternative is evaluated as a procedural requirement and as a basis for comparison. It would require continued assessment only, allowing these areas of the site to remain in an unremediated state.

Under this alternative these areas (Areas P and Q) would remain in their present condition and human health and the environment would not be provided any additional protection. There would be no cost associated with this alternative.

Alternative 2A - Groundwater Collection and Treatment

| | |
|---|---|
| Present Worth: | $ 1,388,000 |
| Capital Cost: | $ 474,000 |
| Annual O&M: | $ 38,000 |
| Time to Implement: | 6 months - 1 year |

This alternative would utilize pump and treat technology and include the following actions:

- Installation of extraction wells within the impacted aquifer for collection of contaminated groundwater. Approximately six wells are anticipated to be required to accomplish this task.

- Groundwater would be collected by the use of dedicated submersible pumps, installed in each of the extraction wells. The extracted groundwater would be pumped via a below-ground double walled piping network to an on-site treatment system, situated approximately halfway between Areas P and Q. The findings of the RI support that a catalytic oxidization unit would likely be required to provide additional air treatment to address the identified presence of vinyl chloride at elevated levels.

- Discharge of the treated groundwater would be either to the north storm sewer system, ultimately discharging to Ellicott Creek, or into the sanitary sewer system.

- Installation of additional perimeter monitoring wells to augment the existing monitoring system.

- Implementation of a long term monitoring program.

The components of this alternative are assumed to be continued for a duration of 30 years. The status of the nature and extent of the contamination would be assessed based on the results of the monitoring program.

Alternative 3A - Source Removal

| | |
|---|---|
| Present Worth: | $ 683,000 |
| Capital Cost: | $ 665,000 |
| Annual O&M: | $ 4,000 |
| Time to Implement: | 6 months - 1 year |

This Alternative would involve the excavation of contaminated "source area" soils with treatment of the soil by Low Temperature Thermal Desorption (LTTD), as part of the Operable Unit No. 1 remedy. The LTTD unit would be situated on-site and could readily accept the contaminated media from Areas P and Q. This Alternative would consist of the following actions:

- As a component of the design program, additional sampling would be conducted to accurately delineate the source areas. The estimated total volume of soil to be removed is 2,600 cubic yards. The remedial objectives utilized for the soil removal would be those selected in the OU-1 ROD.

- Contaminated subsurface soils from Areas P and Q would be excavated using a backhoe or crane. Shoring of excavation walls may be required during excavation activities to prevent collapsing. Dewatering activities would also likely be required. Tanker trucks would be used to temporarily store water from the excavations.

- The excavated soils would be transported by truck to the on-site staging area associated with the OU-1 Low Temperature Thermal Desorption Unit.

- The stockpiled soil would be treated using the on-site treatment unit. The off-gas from the process would be treated, most likely by carbon absorption.

- The treated soil would be disposed within a designated area of the site.

- Areas P and Q would be restored to their original condition.

## 7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study.

**The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.**

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Areas A and E

Alternatives 1 and 2 would not meet and/or comply with the chemical-specific SCGs or the remediation goals established for OU-2. Alternatives 3, 4 and 5 would each meet and/or comply with the chemical-specific SCGs by treating the groundwater to the target levels required under the NYSDEC groundwater quality standards.

Areas P and Q

Alternatives 1A would not meet and/or comply with the chemical-specific SCGs or the remediation goals established for OU-2. Alternative 2A would meet and/or complies with the chemical-specific SCGs by treating the groundwater to the target levels required under the NYSDEC groundwater quality standards. Alternative 3A would achieve remediation goals established for both OU-1 and OU-2.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Areas A and E

Alternative 1 would not provide adequate protection of human health and/or the environment. Specifically, the risks posed by the contaminated groundwater would persist. Alternative 2 would provide only limited protection to human health and the environment. Specifically, the potential risks posed by direct contact with contaminated water in the flooded portions of the building and the sanitary/storm sewer systems would remain under Alternative 2. The risks would be somewhat minimized by the installation of additional fencing, an increase of internal security for the vacant building structure(s), and the implementation of a sampling program. Alternatives 3 and 5 each would provide an equal level of protection to human health and the environment by collecting and treating the groundwater to levels required under the NYSDEC groundwater quality standards. Alternative 4 would provide an additional level of protection to human health (on-site workers and potential trespassers), in comparison with Alternatives 3 and 5, through the elimination of contaminated standing water in the tunnel areas. Additional protection to human health would be provided by Alternatives 3, 4 or 5 by the implementation of the long-term monitoring program. The long-term sampling program would be used to monitor the groundwater contamination at the site and verify the effectiveness of the collection and treatment systems.

Areas P and Q

Alternative 1A would not provide adequate protection of human health and/or the environment. Specifically, the future risks posed by the contaminated groundwater would persist. Alternatives 2A and 3A each would provide an equal level of protection to human health and the environment. Alternative 2A would significantly reduce future risks by collecting and treating the groundwater to target levels required under the NYSDEC groundwater quality standards. Additional protection of human health would be provided through the implementation of a long-term monitoring program. Alternative 3A would significantly reduce future risks through the excavation and treatment of contaminated subsurface source areas.

**The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.**

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

Areas A and E

This criterion would not be applicable to Alternative 1, since the "No Action" Alternative has no active remedial components. No significant short-term risks would be posed to on-site workers or the community by the implementation of any of the remaining four alternatives. The implementation of Alternative 4 would provide additional short-term protection to on-site workers and the community through the removal and treatment of standing contaminated water in the flooded tunnel portions of the building. The estimated time to implement the construction-oriented alternatives (Alternatives 3, 4 and 5), in each case is six months to one year.

Areas P and Q

This criterion would not be applicable to Alternative 1A, since the "No Action" Alternative has no active remedial components and therefore no significant short-term risks would be posed to on-site workers or the community. Similarly, no significant short-term risks would be posed to on-site workers or to the community during implementation of either Alternative 2A or 3A, beyond those associated with worker safety, dust suppression and other general protective measures. Appropriate personal protective equipment would be required for on-site workers throughout implementation of each remedial action. Appropriate engineering controls would be employed, as necessary, to address construction-related impacts (dust, emissions, etc.). The estimated time to implement the construction-oriented alternatives (Alternatives 2A and 3A), in each case is six months to one year.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Areas A and E

Alternatives 1 and 2 would not be effective on a long-term basis. In addition, Alternatives 1 and 2 would not meet NYSDEC preference for a permanent remedy. Alternatives 3, 4 and 5 would be considered effective in the long-term and would satisfy regulatory preference for a permanent remedy, with the contaminated media being treated. The alternatives are considered effective and permanent because the three alternatives rely on the use of collection and treatment technologies. Alternatives 3, 4 and 5 would reduce potential risks by preventing and/or controlling the migration of contaminated groundwater. Alternatives 3 and 4 are considered to be slightly more effective than Alternative 5, due to uncertainties associated with the construction and operation of the extraction well system (low hydraulic conductivity of soil, etc.).

Areas P and Q

Alternative 1A would not be effective on a long-term basis and does not meet the NYSDEC preference for a permanent remedy. Alternative 2A would be considered somewhat effective in the long-term and would satisfy regulatory preference for permanent remedy. Alternative 2A would also reduce potential risks by controlling migration of contaminated groundwater. Alternative 3A would be considered to be the most effective in the long-term and would satisfy regulatory preference for a permanent remedy. Alternative 3A would reduce potential risks by elimination of contaminated subsurface source areas and would also significantly prevent or reduce groundwater degradation.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Areas A and E

Alternatives 1 and 2 would not directly reduce the toxicity, mobility, or volume of contaminated groundwater. Alternatives 3, 4 and 5 would reduce the toxicity, mobility, or volume of contaminated groundwater through the collection and treatment processes. The migration potential of the contaminated groundwater away from the building source areas would be prevented by the use of hydraulic gradient control measures. If the existing hydraulic gradient controls were eliminated (i.e. the elimination of infiltration into the storm sewer system and subsequent discharge from storm sewer system), the potential for additional flooding of the lower portions of the building and the migration of contaminants away from the building would be significantly increased. If the on-site water treatment system option were selected, Alternatives 3, 4 and 5 may generate residual waste streams (i.e. contaminated air/vapor from the air stripper unit) that could require additional treatment.

Areas P and Q

Alternatives 1A would not directly reduce the toxicity, mobility, or volume of contaminated groundwater. Alternative 2A would reduce the toxicity, mobility, or volume of contaminated groundwater through the collection and treatment processes. Alternative 2A would minimize the migration potential of the contaminated groundwater away from the source areas by the use of extraction wells. If the on-site water treatment system option is selected, Alternative 2A would likely generated residual waste streams (i.e. contaminated air/vapor from the air stripper unit) that require some type of additional treatment. Alternative 3A would reduce the toxicity, mobility, and volume of contaminated subsurface soil source areas and impacted groundwater. The treatment processes would significantly reduce the toxicity of the contaminated subsurface soils excavated as part of Alternative 3A.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Areas A and E

Alternative 1 contains no technical components and, accordingly, would be easy to implement. Likewise, Alternative 2 would be relatively easy to implement. Alternatives 3, 4 and 5 would each be technically and administratively feasible and relatively easy to implement. These three alternatives could each be completed using standard construction techniques, albeit with varying degrees of effort and time, with Alternative 5 requiring more effort than Alternatives 3 and 4.

Areas P and Q

Alternative 1A would have no technical components and, accordingly, be easy to implement. Alternatives 2A and 3A would each be technically and administratively feasible and would be relatively easy to implement. These two alternatives could each be completed using standard construction techniques. The proposed remedial components for Alternative 3A would be designed and implemented in conjunction with Operable Unit No. 1.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision.

Areas A and E

Estimated costs for the five remedial alternatives for Areas A and E have been summarized in Table 2. Alternative 1-No Action and Alternative 2-Limited Action would be the least expensive of the alternatives considered. The cost for Alternative 1 was determined to be negligible, while the cost for Alternative 2 was estimated to be approximately $435,000. The most expensive of the alternatives considered was Alternative 5, which had an estimated 30-year present worth cost of $798,000.

Areas P and Q

Estimated costs for the three remedial alternatives for Areas P and Q have also been summarized in Table 2. Alternative 1A-No Action was the least expensive of the alternatives considered. The cost for Alternative 1A was determined to be negligible. The most expensive of the alternatives considered was Alternative 2A-Groundwater Collection and Treatment, which had an estimated 30-year present worth cost of $1,388,000.

**This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is focused upon after public comments on the Proposed Remedial Action Plan have been received.**

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and how the Department will address the concerns raised. If the final remedy selected differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

## SECTION 8: SUMMARY OF THE PREFERRED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is proposing a combination of **Alternative No. 4, Hydraulic Gradient Control via Augmentation of the Existing Storm Sewer System for Areas A and E, and Alternative No. 3A, Source Removal for Areas P and Q**, as the remedy for this operable unit of the site.

The proposed remedy would: comply with the SCGs; be protective of human health and the environment; be effective in the long-term and permanent; and, relative to other potentially effective alternatives, would be more easily implemented. Minimum uncertainties or expected technical delays would be anticipated with the proposed remedy, relative to the other technologies evaluated. Further, the proposed remedy would meet the remediation goals for this site and would be consistent with the preference

**Table 2**

**Westinghouse Electric Corporation**
**Operable Unit No. 2**

| Remedial Alternatives | Capital Cost | Annual O&M | Total Present Worth |
|---|---|---|---|
| **Areas A and E** | | | |
| No Action | $0 | $0 | $0 |
| Limited Action | $89,000 | $16,000 | $435,000 |
| Gradient Control via Existing Storm Sewers | $57,000 | $25,000 | $605,000 |
| Gradient Control via Storm Sewer Augmentation | $112,000 | $25,000 | $671,000 |
| Gradient Control via Extraction Wells | $187,000 | $25,000 | $798,000 |
| **Areas P and Q** | | | |
| No Action | $0 | $0 | $0 |
| Groundwater Collection and Treatment | $474,000 | $38,000 | $1,388,000 |
| Source Removal | $665,000 | $4000 | $683,000 |

for remedies which permanently reduce toxicity, volume, or mobility.

The estimated present worth cost to implement the remedy is $1,354,000. The cost to construct the remedy is estimated at $777,000 and the estimated average annual operation and maintenance cost for 30 years is $29,000.

The elements of the proposed remedy are as follows:

1. A remedial design program to provide the details necessary for the construction, operation and monitoring of the remedial program. Uncertainties identified during the RI/FS would be resolved.

2. Termination of all underground utility lines (i.e. gas, electric, sanitary sewer) at the building perimeter to prevent horizontal migration of contaminants through these lines or associated bedding material.

3. Augmentation and utilization of the existing storm sewer system beneath the main plant building for hydraulic

gradient control and collection of contaminated groundwater. The existing system would be augmented by drilling holes in the trunk lines to allow for greater groundwater infiltration and collection.

4. Installation of a sump pump and associated distribution lines in both the Fan Room Tunnel (Area A) and the Underground Mixing Room Tunnel (Area M). The surface water/groundwater collected from these areas would be pumped to and discharged into the closest trunk or lateral line of the storm sewer system. All flow from outside catch basins, roof drains, etc. would be diverted to an alternate storm water management system to avoid unnecessary treatment costs.

5. Treatment of the collected groundwater from the storm sewer outfalls would be performed by either the use of an on-site water treatment system or by connection to the local POTW. On-site treatment consisting of an air stripper, would likely result in discharge into the U-Crest ditch.

6. Excavation of contaminated soil from Areas P and Q (estimated volume 2,600 cy) with transportation of the material to the dedicated on-site staging area. Approximate areas to be addressed are identified on Figure 3. Final volumes and area would be defined by compliance with the remedial objectives included in the Record of Decision for Operable Unit No. 1.

7. Dewatering of the soil as necessary, with temporary storage or on-site treatment of the accumulated water.

8. Treatment of the soil by the on-site low temperature thermal treatment unit required to implement the remedy selected for Operable Unit No. 1 by the March 1995 ROD. The off-gas from the process would be treated by carbon adsorption or other appropriate control technology prior to discharge.

9. The treated soils would be disposed within a designated area of the site.

10. Site restoration would include: demobilization of equipment; site grading and establishment of vegetative cover and/or pavement repair; site cleanup; and implementation of a groundwater monitoring program.