Department of Environmental Conservation

Division of Hazardous Waste Remediation

Proposed Remedial Action Plan

Aro Corporation Site
3695 Broadway
Town of Cheektowaga, Erie County
Site Number 915147

February 1995

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor*   LANGDON MARSH, *Commissioner*

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PROPOSED REMEDIAL ACTION PLAN

ARO CORPORATION
Town of Cheektowaga, Erie County
New York
Site No. 915147
Issued: February 1995

SECTION 1: <u>PURPOSE OF THE PROPOSED PLAN</u>

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYS DOH) is proposing a plan for remediating the soil, sediments, groundwater and surface waters at the former Aro Corporation facility in Cheektowaga.

The Aro facility had been contaminated with spilled degreasing solvents. The volatile chemicals that make up the solvents were found in the soil and groundwater beneath the facility and in the sediments and surface water of a nearby drainage ditch. The volatile contaminants may be hazardous to humans and wildlife if they are inhaled, ingested or come in contact with the skin. Remediation is necessary to eliminate the risk of public exposure to the contaminants and to restore groundwater quality.

To accomplish this, it is proposed that the contaminants be removed from the soils through the application of a technology known as soil vacuum extraction.

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 by the New York State Environmental Conservation Law (ECL), 6NYCRR 375. This document is a summary of the information that can be found in greater detail in the Remedial Investigation (RI) and Feasibility Study (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 reports 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 Town Council Office
Second Floor, Cheektowaga Town Hall
Broadway and Union Roads
Cheektowaga, NY 14227
Office hours: 9 AM - 5 PM, Mon. - Fri.

NYSDEC Region 9 Office
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7220
* By appointment only *

Written comments on the PRAP can be submitted to Mr. David Locey, NYSDEC Project Manager at the above address.

DATES TO REMEMBER:

February 8, 1995 to March 10, 1995
Public comment period on RI/FS Report, PRAP, and preferred alternative.

February 16, 1995, 7 PM
Public meeting at the Town of Cheektowaga, Town Hall, Broadway, Cheektowaga, New York.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Aro Corporation, Life Support Products Division facility is located on a 6.9 acre parcel of land in the town of Cheektowaga (a suburb of Buffalo), Erie County, in Western New York State (Figure 1). The property is bordered on the north by Broadway Avenue (Route 130), on the east and west by private residences, and on the south by power company and railroad right-of-ways. The area surrounding the site is zoned as light industrial/residential. There are residences immediately to the east, west, and north of the site, and an operating rock quarry south of the railroad right-of-way.

The main facility building covers approximately 69,000 square feet of the property. The building was used for offices, manufacturing and related operations. An approximately 4,800 square foot, sheet-metal maintenance and storage building is located southwest of the main facility (Figure 2). Other features on the property include a paved visitor parking area north of the main facility, a larger paved employee parking lot to the south and two delivery/pickup areas on the south side of the building. Areas south of the employee parking lot are open fields. The topography in the vicinity of the site is generally flat, with a gentle slope to the south.

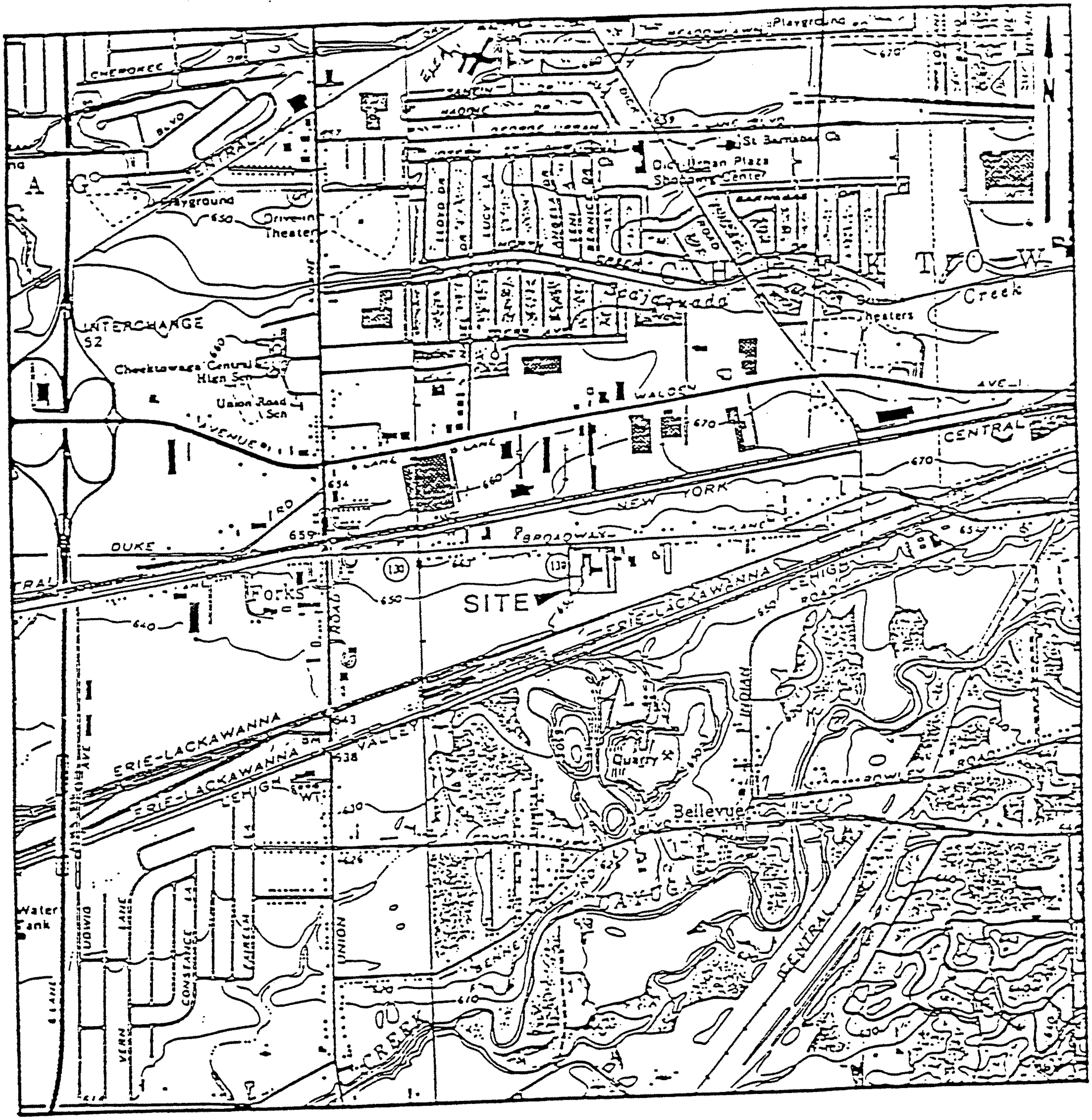
A storm water drainage ditch flows southward along the east property boundary and westward along the southern property boundary. Another drainage ditch exits a backfilled culvert on the south side of the parking lot and flows south, into the west-flowing portion of the storm water ditch. The backfilled culvert contains stormwater and sanitary sewers.

The native soils beneath the site consist of two layers of till. Till is a term used to describe soil consisting of clay, silt and gravel deposited by glacial ice. The upper till is described as a red-brown to gray-brown silt and clay with varying amounts of sand and gravel. The lower till is a gray to gray-brown or brown silt, with generally greater amounts of sand and gravel, and a higher density than the upper till. Embedded cobbles and boulders were also found in the lower till, near the top of the underlying bedrock. Groundwater elevations in the two layers were similar; groundwater flows to the south. The upper portion of the bedrock is relatively impermeable. No active, private wells were found within a one mile radius of the site. Residences and commercial properties in the area are supplied with water by a municipal system.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Aro purchased the facility in 1958 from the Firewell Corporation, which initiated development of the vacant lot in 1955. Firewell was primarily a furnace manufacturer, but they also manufactured equipment for baling cardboard. Aro manufactured life support equipment, cryogenic storage vessels, breathing regulators and testing equipment. From March 1977 to February 1988, Aro also operated an environmental laboratory. In February 1990, Aro Corporation was purchased by the Ingersoll-Rand Company. In October 1993, Ingersoll-



SOURCE : USGS 1:24,000 Topographic Quadrangles,
Lancaster, N.Y., dated 1965; Buffalo, NE, N.Y., dated 1965.

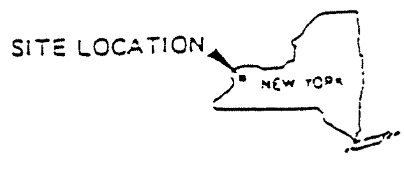
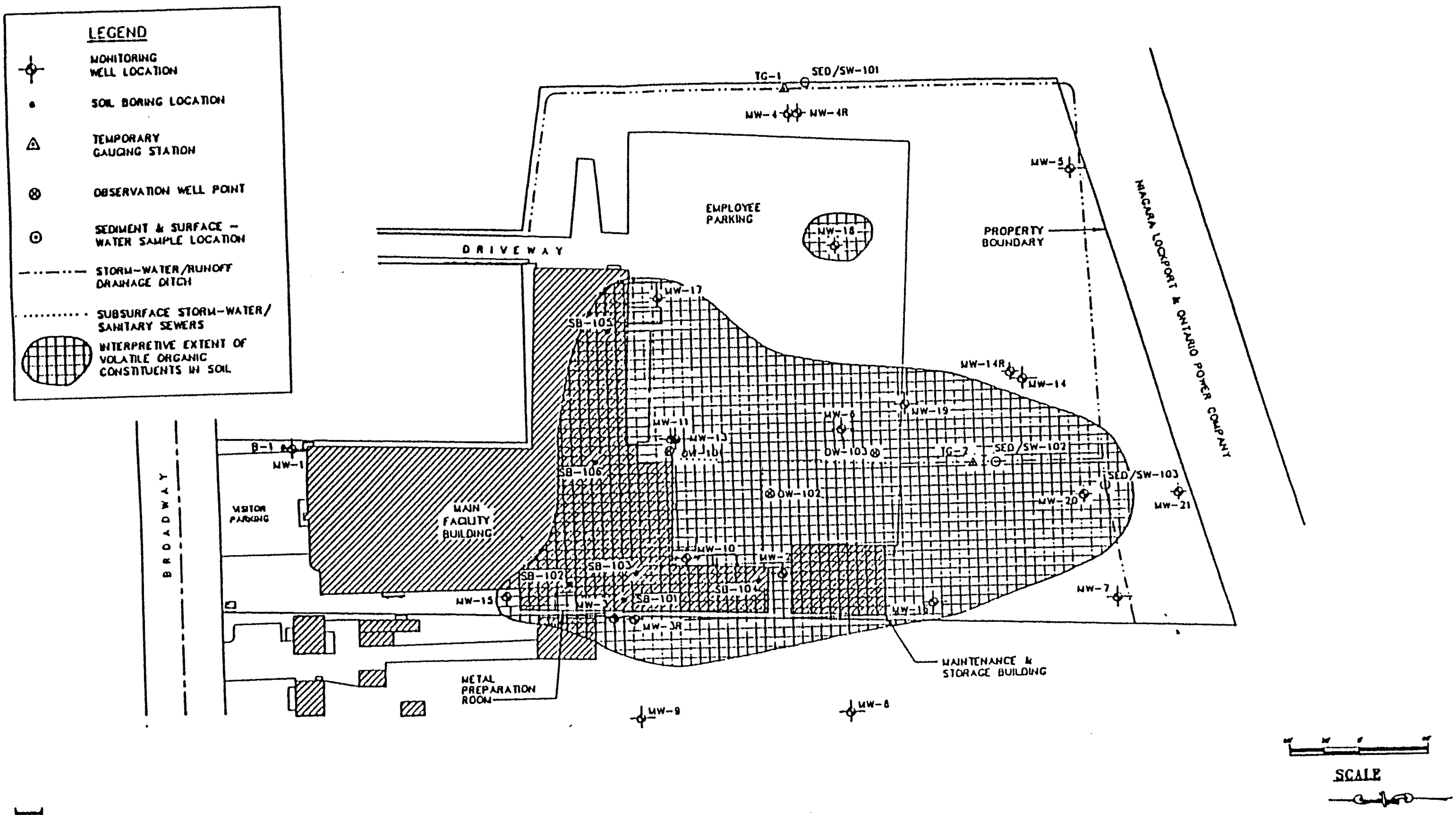


FIGURE 1

SITE LOCATION

ARO Corporation Site
Buffalo, New York



NOTE

1.) ADDITIONAL SUBSURFACE UTILITIES NOT SHOWN ON THIS FIGURE, EXIST AT THE FACILITY

SOURCES:
(1.) TALLAMY, VAN KUREN, GERTIS & ASSOCIATES, Dwg. No.D-15645 (FEBRUARY 18,1981)
(2.) KRENBIEL ASSOCIATES Dwg. No.D-2300 (JUNE 18,1983)
(3.) LAW ENGINEERING: REMEDIAL INVESTIGATION REPORT (DECEMBER,1992)

CAPSULE
ENVIRONMENTAL ENGINEERING, INC.

TITLE INTERPRETIVE EXTENT OF VOLATILE CONSTITUENTS IN SOIL
ARO CORPORATION
BUFFALO, NEW YORK

	MEC		11/18/94	128-098	FIG [illegible]	[illegible]

FIGURE 2

Rand sold certain business assets of Aro to Carlton Industries, leasing the facility to Carlton. Manufacturing operations were gradually moved out the facility and in October 1994, the facility was vacated. Ingersoll-Rand is currently marketing this property for use as a commercial and/or light manufacturing/warehousing operation.

Aro manufacturing processes included machining, arc welding, soldering, cleaning parts with detergents and degreasing solvents, applying corrosive-resistant coatings, painting and assembling.

Between 1956 and 1984, several additions were made to the original building. As the additions were made, the location of the prototype machining and production operations were moved from one part of the facility to another, before eventually locating in the west side of the facility. In the so-called metal preparation room, machined parts were cleaned with the degreasing solvent, trichloroethene (TCE). TCE was replaced with a chlorofluorocarbon (CFC) degreaser in 1985. Paint stripping had also been conducted at the facility, using a product containing methylene chloride, formic acid, phenols and toluene.

3.2: <u>Remedial History</u>

In January 1990, prior to its purchase of the ARO property, Ingersoll-Rand commissioned an environmental assessment of the site. The results of that initial investigation prompted several environmental studies of the site:

January 1990 - Subsurface soil samples were collected beneath cracks and expansion joints in the concrete floor of the metal preparation room. The samples were analyzed for phenols, metals and volatile organic compounds.

March & May 1990 - To evaluate the extent of the contamination found in the January sampling, additional subsurface soil samples were collected, sampling radially outward from the metal preparation room.

August 1990 - Three groundwater monitoring wells were installed to the top of bedrock at locations north and south of the facility and immediately west of the metal preparation room. Soil and groundwater samples were analyzed for volatile organic compounds.

October & November 1990 - To evaluate probable source areas of contamination, hand augers were used to advance boreholes and sample soil and groundwater in three areas of the site: the metal preparation room; the northwest corner of the site near a closed septic filter bed and the southeast portion of the site near a second septic system. A limited number of soil vapor samples were also collected. All samples were analyzed for volatile organic compounds.

TCE was found in the soil beneath the metal preparation room and in the groundwater from a monitoring well west of the metal preparation room. In October 1990, the NYSDEC was notified of the results of the site investigations. On May 9,1991 the NYSDEC categorized the Aro site a significant threat to the public health and environment. Aro/Ingersoll-Rand agreed to investigate further, to determine the full extent of the contamination and the means of remediating the contamination.

A Draft Work Plan for the Remedial Investigation (RI) of the site was submitted to NYSDEC in April 1991, and revised in August 1991. In December 1990 and January 1991, while the RI work plan was finalized, ten additional groundwater monitoring wells were installed on site. The additional soil and groundwater data from these wells was incorporated into the RI work plan.

SECTION 4: CURRENT STATUS

4.1 Summary of the Remedial Investigation

The RI was conducted in phases, the first of which was carried out between March and September 1992. A report entitled "Remedial Investigation Report for Aro Corporation - Life Support Division, December 1992" described the investigation activities and findings of this phase of the RI. Upon NYSDEC review, the report's assessments were revised (Revised Remedial Investigation Report, August 1993) and an additional investigation was undertaken. The second phase of the RI was conducted in July 1993, and the findings described in the report entitled "Remedial Investigation Supplemental Report, October 1993". The next phase of the RI was conducted in May 1994 and the findings described in the "Revised Remedial Investigation Report, July 1994". Additional samples were collected from on-site drainage ditches and existing monitoring wells in May and August 1994, the results were later appended to the July 1994 RI report.

The RI Investigation activities included:

- A limited soil gas survey.
- Soil borings and the installation of groundwater monitoring wells.
- The sampling and chemical analysis of soil, drainage ditch sediments, surface water and groundwater.
- Characterization of the aquifer.
- Identification of the natural resources near the site.
- Assessment of the potential for off-site contaminant migration via air emissions.

The analytical data obtained from the RI was compared to environmental Standards, Criteria, and Guidance (SCGs). SCGs are the various laws, regulations, and policies that apply or are relevant to groundwater, surface water, soil, sediments, and air. Regulatory standards exist for groundwater and surface water. For the evaluation and interpretation of analytical results for soil, sediment, and air, NYSDEC cleanup guidelines, background conditions, and risk-based remediation criteria were used to develop remedial action objectives (RAOs)(Table 1).

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

Chemical concentrations are reported in parts per billion (ppb) or parts per million (ppm). For comparison purposes, SCGs are given for each medium.

Soil

Elevated levels of volatile organic compounds (VOCs) were found in the subsurface soil at the site, primarily beneath the metal preparation room and outside the facility, near monitoring well location MW-3 and the shipping/loading area near monitoring well location MW-13 (Figure 2). The VOCs most frequently encountered were trichloroethene (TCE), 1,2 dichlorothene (DCE) and vinyl chloride (VC).

Concentrations of TCE found in the subsurface soil ranged from 0.14 to 250 ppm. The highest of TCE was found at a depth of 20.7 feet, at monitoring well location MW-3R, near the metal preparation room. Concentrations exceeding the 0.9 ppm TCE remedial action objective were also found in the backfilled soils of subsurface sewers on site.

A limited number of surface soil samples were collected by the NYS DOH from the area near the metal preparation room, no VOCs attributable to the Aro site were detected.

The levels of metals found in the on-site soils, were generally in the range of concentrations found in natural undisturbed soils. Isolated samples from beneath the facility near the metal preparation room, contained chromium and mercury at concentrations of 110 ppm and 0.39 ppm respectively. Typical, natural levels of chromium and mercury range from 7 to 20 ppm and 0.08 to 0.2 respectively.

It is estimated that 139,000 cubic yards of soil have been contaminated. Figure 2 depicts the areal extent of the contamination.

Groundwater

The first round of groundwater samples collected during the RI were quite cloudy or turbid. Unfiltered samples typically contained levels of several metals in excess of New York State ambient water quality standards.

With additional pre-sampling purging, a second round produced less turbid samples. The concentrations of metals found generally satisfied the water quality criteria. The exceptions included the following metals: iron, magnesium and sodium. The respective water quality criteria thresholds of 300, 35,000 and 20,000 ppb were exceeded in most of the wells sampled, including the upgradient well MW-1. Concentrations of 810 ppb iron, 48,500 ppb magnesium and 581,000 ppb sodium were found in the groundwater from MW-1. These elevated levels might be a natural consequence of the levels found in the soils or they may indicate an off-site source of contamination.

A more significant concern were the levels of VOCs found in the groundwater. Again the most frequently encountered VOCs were TCE, 1,2 DCE and VC. The highest concentrations of TCE were found in monitoring wells MW-3 and MW-13 and well points set in the bedding of on-site sewers. At MW-3, as much as 1,100,000 ppb of TCE was found in the groundwater, well above the 5 ppb water quality criteria threshold.

When MW-3 was resampled in August 1994, a small quantity of non-aqueous phase liquid (NAPL), the waste solvent, was found in the groundwater sample. It has been suggested that the metal preparation room and the loading/shipping area near MW-13 are the sites of previous spills. Previous efforts to locate NAPL in the soil or groundwater near the metal preparation room had been unsuccessful.

Despite the relatively dense nature of the soil, and the soil's estimated low hydraulic conductivity, groundwater contamination was found further from the suspected spill areas than expected (see Figure 3). The bedding of on-site sewers may be acting as preferential pathway for the contaminant migration to the south. The stormwater sewers on site discharge to the open drainage ditch (see Figure 2). Measurements of groundwater elevations indicated that groundwater is recharged from a short section of this ditch; between the edge of the rear parking lot to the east-west section of the ditch.

The bedrock beneath the site is relatively dry or unsaturated and is believed to be limiting the vertical migration of contaminants.

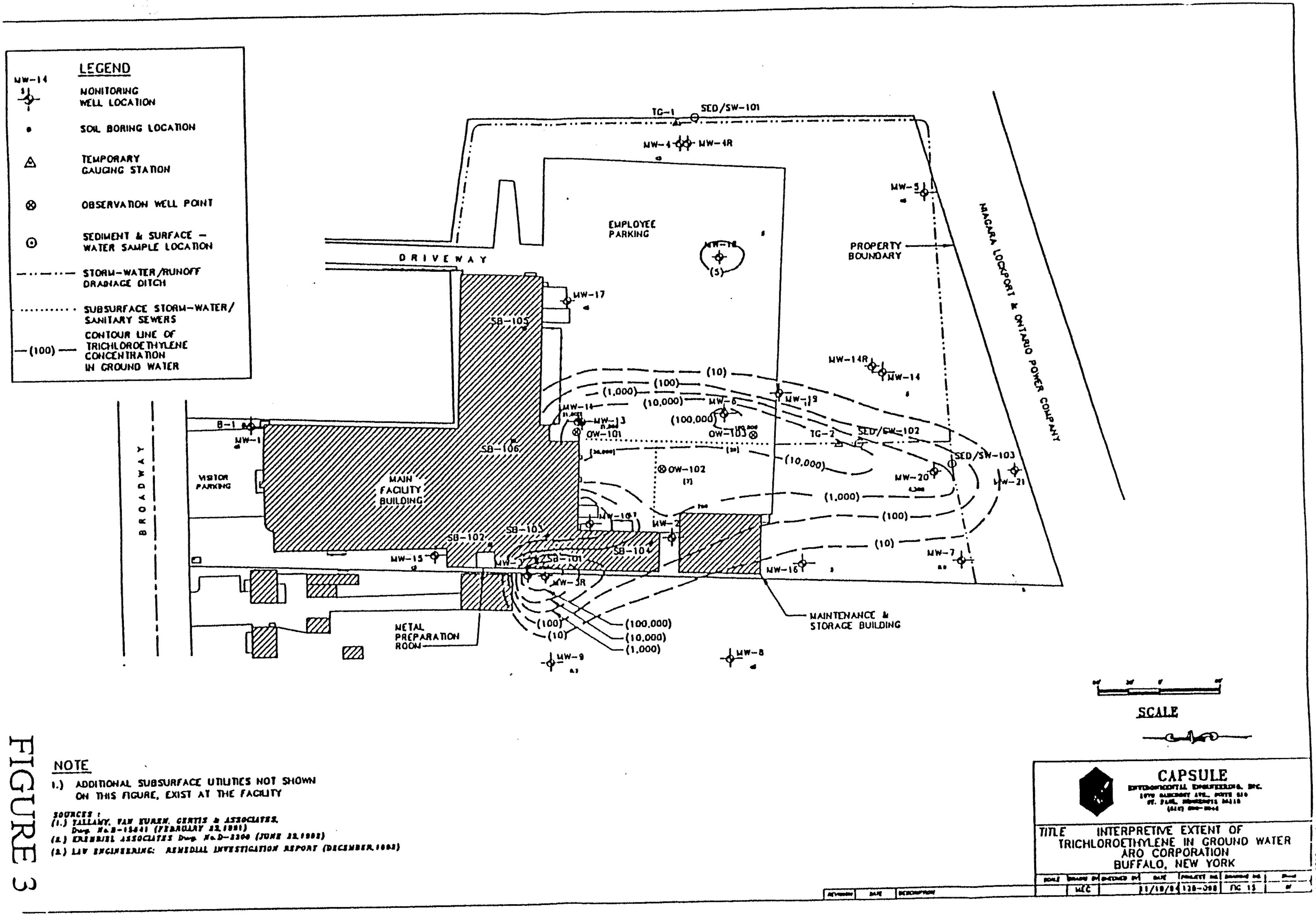

LEGEND
MW-14
MONITORING WELL LOCATION
SOIL BORING LOCATION
TEMPORARY GAUGING STATION
OBSERVATION WELL POINT
SEDIMENT & SURFACE – WATER SAMPLE LOCATION
STORM-WATER/RUNOFF DRAINAGE DITCH
SUBSURFACE STORM-WATER/ SANITARY SEWERS
—(100)— CONTOUR LINE OF TRICHLOROETHYLENE CONCENTRATION IN GROUND WATER
TG-1
SED/SW-101
MW-4
MW-4R
MW-5
EMPLOYEE PARKING
MW-18
(5)
PROPERTY BOUNDARY
NIAGARA LOCKPORT & ONTARIO POWER COMPANY
DRIVEWAY
MW-17
SB-105
MW-14R
MW-14
(10)
(100)
(1,000)
(10,000)
(100,000)
MW-19
MW-6
MW-11
MW-13
OW-101
OW-103
TG-2
SED/SW-102
SED/SW-103
SB-106
OW-102
(10,000)
MW-20
MW-21
(1,000)
(100)
(10)
BROADWAY
B-1
MW-1
VISITOR PARKING
MAIN FACILITY BUILDING
MW-10
MW-2
SB-103
SB-102
SB-104
SB-101
MW-15
MW-3
MW-3R
MW-16
MW-7
METAL PREPARATION ROOM
(100)
(10)
(100,000)
(10,000)
(1,000)
MAINTENANCE & STORAGE BUILDING
MW-9
MW-8
SCALE
NOTE
1.) ADDITIONAL SUBSURFACE UTILITIES NOT SHOWN ON THIS FIGURE, EXIST AT THE FACILITY
SOURCES :
(1.) TALLAMY, VAN KUREN, GERTIS & ASSOCIATES, Dwg. No.B-15641 (FEBRUARY 23,1981)
(2.) KRENRIEL ASSOCIATES Dwg. No.D-2300 (JUNE 23,1983)
(3.) LIV ENGINEERING: REMEDIAL INVESTIGATION REPORT (DECEMBER,1983)
CAPSULE
TITLE INTERPRETIVE EXTENT OF TRICHLOROETHYLENE IN GROUND WATER ARO CORPORATION BUFFALO, NEW YORK
MLC
11/18/94
128-098
FIG 15

FIGURE 3

Surface Water and Sediment

TCE was found in surface water sampled from the drainage ditch. At location SW 102, approximately 230 ppb of TCE was found, well above the 11 ppb surface water quality standard. The ditch sediments, however, seemed to be less severely impacted; the highest concentration of TCE detected was 0.17 ppm, found at location SED 104. The recommended sediment cleanup objective for TCE is approximately 0.1 ppm.

The sediment criteria adopted by the NYSDEC for assessing metals contamination is based on the varying severity of expected impacts to aquatic organisms. Mercury was found in the ditch sediments at concentrations ranging from 0.36 to 0.83 ppm; these concentrations are within the sediment criteria range of 0.15 to 1.3 ppm. Elevated levels of lead and zinc were found in the sediments both upstream and downstream of the ARO facility, which may suggest an off-site source for these contaminants. The surface water in the ditch appeared to be less effected. With the exception of iron, none of the surface water quality standards for metals were exceeded.

Air

Exterior ambient air monitoring found total VOC concentrations on site ranging from background levels to approximately 0.4 ppm. To further evaluate the potential effects on ambient air quality, resulting from the release of site contaminants, computer model estimates of VOC emissions were made. The emissions were based on the maximum soil concentrations found in three source areas on site. Maximum soil concentration values were used to provide a conservative, worst-case basis. The estimated atmospheric concentrations of the three principal VOCs (TCE, DCE and VC) were then compared to the ambient guideline concentrations (AGCs) established in the NYSDEC Air Cleanup Criteria. None of the three VOCs exceeded their respective AGCs.

4.2 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 the RI and FS reports.

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

No current exposure pathways are known to exist at this site. However, future exposure pathways could include:

- Dermal (skin) contact with, incidental ingestion (eating) and/or inhalation (breathing) of, VOCs from soil and groundwater, by underground utility workers or individuals engaged in any other work involving the excavation of soil.

- Dermal contact with, and/or inhalation of, VOCs from soil, sediment, surface water by off-site residents and on-site workers.

Of the contaminants detected at the Aro site, the chemicals of potential concern are trichloroethene (TCE), 1,2-dichloroethene (DCE), and vinyl chloride (VC). The US Environmental Protection Agency (EPA) classifies TCE as a Group B2 carcinogen, which is a probable human carcinogen, based on a combination of sufficient evidence for animals and inadequate data for humans. The EPA classifies 1,2-DCE as a Group D carcinogen, a group where there is inadequate evidence of animal carcinogenicity. VC is classified a Group A carcinogen, which is a human carcinogen based on sufficient evidence from epidemiological studies.

The VOC contamination has been attributed to spillage in production areas, particularly the metal preparation room, and shipping/loading area near monitoring well MW-13. The more highly contaminated soil was found below ground surface. Relatively low levels of VOCs were detected in the drainage ditch sediments and surface water. The site risk assessment concluded that the frequency of exposure to the subsurface soil was minimal, limited to instances of future excavation or construction activities which might disturb the surface of contaminated areas. Exposure to contaminated sections of the drainage ditch was also considered infrequent.

The extent of groundwater contamination is limited to the Aro property and two adjacent residential properties. The residents do not currently use local groundwater due to the availability of a public water supply. Sampling of basement sumps by the NYS DOH found no VOCs in the water. In fact, the basements are located upgradient of the contaminant source areas on the Aro site. While the groundwater exposure pathway is currently incomplete, there is the potential for exposure with future construction and excavation on site or downgradient of contaminant source areas.

4.3 Summary of Environmental Exposure Pathways

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

No special resources, such as significant habitats, endangered species, lakes, or wild and scenic rivers were identified within a 2 mile radius of the site. The industrial, commercial and suburban land use setting of the area within a half-mile radius limits the potential for wildlife species occurrence. Natural areas within the half-mile radius are limited to a strip of scrub-shrub and emergent wetlands immediately south and southwest of the site. The drainage ditch from the Aro property continues off site through this emergent wetland area. The drainage ditch presents a point of exposure.

The concentrations of VOCs found in the water and sediments of the drainage ditch were low enough that it was concluded these contaminants would have a minimal impact on natural resources. The concentration of metals in the ditch sediments, however, were high enough to have severe effects on wildlife which may be exposed. However, the data also indicated that the elevated concentration of metals were either naturally occurring or introduced to the drainage ditch from an upstream location. As previously noted, the industrial, commercial and suburban land use in the area limits the potential for wildlife species occurrence.

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 waste haulers. The PRP for the Aro site is the Aro Corporation.

On February 21, 1992 the NYSDEC entered into a Consent Order (Index #B9-0353-90-11) with the Aro Corporation, a subsidiary of Ingersoll-Rand Company. The Order obligated

Aro to implement an RI/FS remedial program. After a remedy has been selected, the NYSDEC will approach the PRP to implement that remedy under another Consent Order.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6NYCRR 375-1.10. These goals are established under the guideline 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 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:

- Reduce, control, or eliminate the contamination present within the soils on site.
- Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the contaminated soils on site.
- Eliminate the potential for direct human or animal contact with the contaminated soils on site.
- Prevent, to the extent practicable, migration of contaminants from on-site source areas to groundwater.
- Provide for attainment of SCGs for surface water and groundwater quality (see Table 1).

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the ARO site were identified, screened and evaluated in the Feasibility Study, May 3 1993 (revised by letters dated July 1994 - October 1994). This evaluation is presented in the Feasibility Study Report. A summary of the detailed analysis follows.

7.1: Description of Alternatives

The potential remedies described below, are intended to address the contaminated soil and groundwater at the site. Remediation of the surface water would occur as a consequence of treating and/or removing contaminants from the soils and groundwater on site. VOCs were found in the ditch sediments at concentrations above sediment RAOs (but below soil RAOs) at only one of four locations sampled. Natural degradation processes should eliminate the VOCs from the sediments. However, as part of the remedial design, the ditch sediments and surface water would be monitored and the need for treatment and/or removal evaluated.

A. Remedial Alternatives for Groundwater

Alternative 1G - No Action

Present Worth	$369,146*
Capital Cost	$10,000
Annual O&M	$22,000
Time to Construct	3 months

* Present worth based on a 30 year period of operation and an interest rate of 5%

This alternative would require implementation of a groundwater monitoring program. Under this program a data base of groundwater conditions would be created for periodically reevaluating health and environmental risks and assessing whether future remedial actions may be required.

Since contamination would continue to be released to the environment, this alternative would not provide adequate protection for human health or the environment. This alternative would therefore be unacceptable. The "no action" alternative is the baseline by which all other alternatives are compared.

Alternative 2G - Institutional Controls

Present Worth	$380,146
Capital Cost	$21,000
Annual O&M	$22,000
Time to Construct	3 months

Under this alternative, restrictions on local use of groundwater would be pursued. This alternative would also include a groundwater monitoring program, to provide a data base for reevaluating health and environmental risks and assessing whether future remedial actions may be required.

Since contamination would continue to be released to the environment, this alternative would not provide adequate protection for the environment. This alternative would therefore be unacceptable.

Alternative 3G - Groundwater Collection Trench

Present Worth	$2,604,749
Capital Cost	$935,000
Annual O&M	$108,000
Time To Construct	6 months

This alternative (Alternative 4 in the FS) would consist of the installation of a groundwater collection trench downgradient (south and west) of the contaminant source areas to intercept the flow of contaminated groundwater from the site. The collected groundwater would be treated by air stripping and/or carbon adsorption to levels acceptable for discharge to the local sanitary sewer system.

Alternatively, treated water could be discharged to the drainage ditch if the requirements for a State Pollution Discharge Elimination System (SPDES) permit are satisfied.

The collection trench would consist of a series of perforated pipes located in the bottom of a trench, south and west of the site. As part of this alternative, on-site sewers would be repaired and perforated pipe placed along side the sewers to collect contaminated groundwater in the sewer bedding. The short section of the on-site which discharges to the groundwater, would be lined with impermeable material and perforated collector pipe. The groundwater collection trench would extend from the ground surface to the top of bedrock. The bedrock is relatively impermeable and not expected to offer a significant pathway for contaminant migration. The trench would be backfilled with a permeable material such as crushed stone or pea gravel.

Alternative 4G - Groundwater Recovery Wells

Present Worth	$6,265,784
Capital Cost	$3,200,000
Annual O&M	$199,000
Time to Construct	6 months

By this alternative (Alternative 5 in the FS), groundwater would be collected from locations downgradient of contaminant source areas by pumping the groundwater from a series of closely spaced wells. The collected groundwater would be treated by air stripping and/or carbon adsorption to levels acceptable for discharge to the local sanitary sewer system. Alternatively, treated water could be discharged to the drainage ditch if the requirements for a State Pollution Discharge Elimination System (SPDES) permit are satisfied.

As part of this alternative, on-site sewers would be repaired and perforated pipe placed along side the sewers to collect contaminated groundwater in the sewer bedding. The short section of the on-site drainage ditch which discharges to the groundwater, would be lined with impermeable material and perforated collector pipe.

Alternative 5G - Groundwater Collection via Soil Vacuum Extraction (SVE)

Present Worth	$1,898,156*
Capital Cost	$855,000
Annual O&M	$100,500
Time to Construct	12-14 months

* Present worth based on a 15 year period of operation and an interest rate of 5%

Under this alternative (Alternative 6 in the FS), groundwater would be collected from a series of closely spaced wells, as a part of the dewatering operations performed during installation and operation of the SVE system (soil cleanup Alternative 6S) which is discussed later in this proposal. The collected groundwater would be treated by air stripping and/or carbon adsorption to levels acceptable for discharge to the local sanitary sewer system. Alternatively, treated water could be discharged to the drainage ditch if the requirements for a State Pollution Discharge Elimination System (SPDES) permit are satisfied.

As part of this alternative, on-site sewers would be repaired and a short section of the on-site drainage ditch would be lined with impermeable material and perforated collector pipe.

This alternative differs somewhat from alternative 4G, in that the recovery of groundwater would be enhanced by the vacuum applied to the soils for extracting the soil vapor. Alternative 5G could achieve the RAOs sooner than the other alternatives, the cost of this alternative was therefore based on an assumed 15 year period of operation.

Alternative 5G is actually a part of a remedial alternative to address soil; alternative 6S, described below. The costs given here for alternative 5G include the costs for both groundwater and soil treatment and are identical to the costs described under alternative 6S.

B. Remedial Alternatives for Soil

Alternative 1S - No Action

Present Worth	$0
Capital Cost	$0
Annual O&M	$0
Time to Construct	0 months

Under this alternative, site conditions would remain essentially the same; contamination would continue to be released into the environment. No site monitoring would be conducted. This alternative would not provide adequate protection for human health or the environment and would therefore be unacceptable. The "no action" alternative is the baseline by which all other alternatives are compared.

Alternative 2S - Institutional Controls

Present Worth	$34,300
Capital Cost	$34,300
Annual O&M	$0
Time to Construct	3 months

Under this alternative, deed notices on the Aro property and adjacent residential property would be pursued, to preclude the disturbance of contaminated soil. The contaminated soil would, however, continue to impact groundwater. Since it does not adequately protect the environment or public health, this alternative would be unacceptable.

Alternative 3S - Soil Volatilization

Present Worth	$3,625,749*
Capital Cost	$1,956,000
Annual O&M	$108,000
Time to Construct	12 months

* Present worth based on a 30 year period of operation and an interest rate of 5%

Under this alternative, highly contaminated soils in select, accessible areas of the site (i.e. "hot spots") would be treated in place using air to volatilize or vaporize the contaminants. The air would be introduced to the soil with mixing augers. The VOCs released from the soil would be collected at ground surface with a shroud placed over the augers. The collected VOC emissions would then be treated by chemical/physical means.

The areas to be addressed are located outside the facility, adjacent to the metal preparation room and the shipping/loading area near monitoring well MW-13. Other "hot spots" were located near monitoring wells MW-18 and MW-19.

Only the "hot spots" would be treated by this process, contaminated soils beneath the building would be left in place. To prevent contaminants from migrating into the treated areas, a groundwater collection trench (groundwater alternative 3G) would need to be installed, between treated and untreated areas. The cost for groundwater collection and treatment has been included.

Alternative 4S - Limited Excavation with Incineration (Off Site)

Present Worth:	$15,967,749
Capital Cost:	$14,298,000
Annual O&M:	$108,000
Time to Construct:	12 months

Incineration (On Site)

Present Worth	$7,023,749
Capital Cost	$5,354,000
Annual O&M	$108,000
Time to Construct	12 months

This alternative (Alternative 4 in the FS) would involve the excavation "hot spots" as a means of facilitating remediation of the site, by eliminating the major source of the soil and groundwater contamination. The excavated soils would be either shipped off site for incineration and disposal or incinerated on site and the treated soil backfilled on site.

The areas to be excavated are located outside the facility, adjacent to the metal preparation room and the shipping area near monitoring well MW-13. Other "hot spots" were located near monitoring wells MW-18 and MW-19.

Only the "hot spots" would be treated by this process, contaminated soils beneath the building would be left in place. To prevent contaminants from migrating into the treated areas, a groundwater collection trench (groundwater alternative 3G) would need to be installed, between the treated and untreated areas. The cost for groundwater collection and treatment has been included.

Alternative 5S - Limited Excavation and Thermal Desorption

Present Worth	$5,619,749
Capital Cost	$3,950,000
Annual O&M	$108,000
Time to Construct	6 months

Under this alternative, soils would be excavated from the "hot spots" and treated on site by low temperature thermal desorption to meet the RAOs (Table 1). The treated soil would be returned to the Aro property for disposal.

The low temperature thermal desorption system would heat the contaminated soil and drive off the volatile compounds. The soil would be excavated, staged and fed to the unit in a controlled manner. The soil might need to be conditioned to produce a more homogeneous material before processing, to insure that all soil particles are treated. The VOCs emitted from the heated soil would be collected and treated or disposed. Treated soil would be placed back on Aro property and covered with clay soil.

Only the "hot spots" would be treated by this process, contaminated soils beneath the building would be left in place. To prevent contaminants from migrating into the treated areas, a groundwater collection trench (groundwater alternative 3G) would need to be installed, between treated and untreated areas. The cost for groundwater collection and treatment has been included.

Alternative 6S - Soil Vacuum Extraction

Present Worth	$1,898,156*
Capital Cost	$855,000
Annual O&M:	$100,500
Time to Construct:	12-14 months

* Present worth based on a 15 year period of operation and an interest rate of 5%

Soil vacuum extraction (SVE) technology involves the removal of chemicals in the subsurface through application of a vacuum. The applied vacuum enhances the volatilization or release of compounds from the soil and water contained in the soil pore spaces.

Under this alternative (Alternative 8 in the FS) vacuum extraction wells would be installed at various locations and depths on site, including beneath the facility. Contaminated groundwater and soil vapor would be removed through these wells and treated by air stripping and/or carbon adsorption. This alternative is identical to groundwater alternative 5G, the costs are the same. In the evaluation of alternatives to follow, this alternative will be referred to as alternative 5G/6S.

Vacuum extraction might be enhanced with the injection of air into the soils. The permeability of the soils might also be improved, and vacuum extraction also enhanced, with the fracturing of soils by means of air injection. A pilot scale study of the SVE technology would be required to determine the effectiveness of a full scale system.

Alternative 6S is the only alternative which would address all the of the soils and groundwater contaminated at levels above the remedial action objectives.

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 (6NYCRR 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 FS.

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

A. Groundwater

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. The significant SCGs identified for the Aro site are listed in Table 4.

Alternatives 3G, 4G and 5G/6S would each comply with SCGs, by treating groundwater with the goal of attaining cleanup levels prescribed by the NYSDEC ambient groundwater quality standards. Alternatives 1G and 2G would not meet the chemical-specific SCGs.

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.

Alternatives 1G and 2G would not adequately protect human health and/or the environment. NAPL within the on-site soils would continue to contaminate the groundwater for a long period of time and the contaminated groundwater would continue to migrate off site. Human exposure to the contaminated groundwater or VOC emissions might occur with future excavations on site or downgradient of the contaminant source areas.

Alternatives 3G, 4G and 5G/6S would provide protection by collecting groundwater, treating it to remove the contaminants, and thereby eliminating the potential for future public exposure.

Alternative 5G/6S would offer a more permanent remedy than either 3G or 4G. Alternatives 3G and 4G would isolate the groundwater contamination behind a barrier of trenches and wells, whereas the SVE technology of alternative 5G/6S would also eliminate the source of the groundwater contamination by separating and removing the contaminants from the soils. With the application of a vacuum, the recovery of groundwater would be enhanced; alternative 5G/6S would achieve the RAOs sooner than either alternative 3G or 4G.

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

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

Since alternatives 1G and 2G would not involve any construction, there would be no additional short-term impacts to human health and the environment. However, to achieve the groundwater RAOs, both alternatives would rely on the slow, natural processes of contaminant dispersion and degradation. In their implementation, both alternatives would be ineffective in protecting the environment.

All three remaining alternatives would take years to restore groundwater quality. However, as noted earlier, alternative 5G/6S might be able to achieve RAOs sooner than either 3G or 4G. It is difficult to estimate before a pilot studies have been completed, but from previous applications of the technologies involved, alternative 5G/6S might achieve RAOs in 15 years as opposed to 30 or more years for alternatives 3G or 4G.

VOC dust and vapor emissions could result from the construction of the collection trench (3G) or the operation of the groundwater treatment and SVE systems (3G,4G and 5G/6S). The engineering controls, the methods and equipment, for addressing dusts and emissions are both reliable and effective. Therefore, short-term risks are not considered to be limiting factors.

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 those risks, and 3) the reliability of the controls.

Under both alternatives 1G and 2G, wastes would remain on site. Whereas 1G would provide no controls to limit the risks of future public exposure, the deed notices provided under alternative 2G might not be adequate in the long term. Therefore, alternatives 1G and 2G would not satisfy this criterion.

Alternatives 3G, 4G and 5G/6S would each remove contaminants from groundwater for treatment or disposal; all three are considered permanent remedies. However, the effectiveness of all three alternatives would be greatly dependent upon the permeability of the soil and the ease with which groundwater is conducted through the soil.

The permeability of the Aro site soils is low, and groundwater extraction rates from wells (alternative 4G) would be low. Extraction rates could be improved by pumping under a vacuum (alternative 5G/6S). However, the hydrological characteristics of the Aro soils also vary with location and depth; pumping wells may only recover groundwater from the more permeable zones. A trench cut to the top of the underlying bedrock (alternative 3G) would effectively intercept groundwater in all zones, however its efficacy would be impacted by the low permeability of site soils.

The non-aqueous phase liquid (NAPL) found at the site may not necessarily flow to wells or trenches and would present a continued, concentrated source of groundwater contamination. The more effective method of recovering "residual NAPL" may be to induce its evaporation from dewatered soils via SVE (alternative 5G/6S). A pilot scale SVE study would have to be conducted to determine the effectiveness of the technology under the existing site specific conditions.

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

Alternatives 3G and 4G would permanently reduce the toxicity and mobility of contaminants through collection and treatment of the contaminated groundwater. Alternative 5G/6S (SVE) would also address the contaminated soils , permanently reducing or eliminating the source of the groundwater contamination and ultimately reducing the volume of groundwater to be treated. Alternatives 3G, 4G and 5G/6S would each generate a residual waste stream (i.e., contaminated air and spent activated carbon) but those waste streams can be adequately controlled. Alternatives 1G and 2G would reduce the toxicity of the contaminants, in large part, through dilution (i.e., by increasing the volume of contaminated groundwater).

6. <u>Implementability</u> - The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction and the reliability of the specific technology. Administratively, the availability of the necessary personnel and equipment is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternatives 3G, 4G and 5G/6S would involve construction on neighboring properties and the potential administrative difficulties with obtaining access. Technical difficulties associated with construction of a trench (3G) would include controlling dusts and emissions, and excavating through saturated soils. Fewer engineering controls would be required with recovery wells (alternatives 4G and 5G/6S), the need for extensive pilot scale studies would however reduce the implementability of these alternatives. The "no action" alternative (1G) would be both technically and administratively implementable. Deed notices (alternative 2G) may be difficult to obtain for neighboring properties.

7. <u>Cost</u> - Capital and operation and maintenance (O&M) costs are estimated for each alternative and compared on a present worth basis. A 30 year period of operation and an interest rate of 5% are assumed, for comparison purposes only. 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 deciding factor.

Long-term monitoring of the site, and the associated costs, would be included with all of the alternatives. The "no action" and institutional control alternatives (1G and 2G respectively) would be the least expensive options. The groundwater collection trench (alternative 3G) would be less than half as expensive as recovery wells (alternative 4G). It is assumed that alternative 5G/6S would achieve RAOs sooner than the other alternatives; with a shorter period of operation, alternative 5G/6S would be the least expensive of the "action" alternatives. A summary of preliminary cost estimates for the groundwater alternatives is presented in Table 2, the costs for alternative 5G/6S are based on a 15 year period of operation.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan (PRAP) are evaluated. Following a public meeting on the PRAP, a " Responsiveness Summary" will be prepared that outlines public comments received and how the Department will address these comments. 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.

B. Soils

1. Compliance with New York State Standards, Criteria and Guidance (SCGs) - The remedial action objectives (RAOs) that have been established for soils are included in Table 1. The goal is to prevent the degradation of groundwater due to the leaching of contaminants from the soil. Contact with the contaminated soil or groundwater would pose an unacceptable risk to human health and the environment. Alternatives 1S and 2S would not meet these objectives.

Alternatives 3S, 4S and 5S each involve the treatment of contaminant source areas, satisfying the RAOs in only these select areas of the site. However, since these alternatives would only be a part of a site remedial action (i.e., they are to combined with groundwater alternative 3G) this threshold criterion would be satisfied.

Air quality controls may be required for implementation of alternatives 3S through 6S/5G to control VOC discharges to acceptable levels. Alternatives 4S and 5S would be expected to comply with Resource Conservation Recovery Act (RCRA) requirements for on-site disposal of treatment residuals.

2. Protection of Human Health and the Environment - Contact with the contaminated soil at the Aro site would pose an unacceptable risk to human health and the environment; Contaminated soils are adversely impacting groundwater quality. Future construction, excavations or other activities that might disturb the contaminated subsurface soils, would pose an unacceptable risk to the public health. The "No Action" alternative (1S) would therefore not satisfy this criterion. Institutional controls (alternative 2S) such as deed notices, might reduce exposure to contamination but are not strictly enforceable and therefore inadequate in the long term.

Alternatives 3S, 4S and 5S would permanently address only the accessible "hot spots" of soil contamination. Soils contaminated at concentrations exceeding the RAOs would remain. These soils are located beneath the Aro facility, unlikely to be disturbed or exposed and therefore of little risk to the public health. However, these untreated soils would continue to impact groundwater quality. Only in combination with a groundwater collection and treatment system (alternative 3G), would alternatives 3S, 4S and 5S offer adequate levels of protection. Alternative 5G/6S however, would address all of the contaminated soils, achieve the RAOs in a shorter time frame and thereby offer greater degree of protection than the other alternatives.

3. Short-term Impacts and Effectiveness - Since no construction or intrusive activities would occur, alternatives 1S and 2S would have the fewest impacts upon the community and the environment. However, these alternatives would be the least effective in achieving soil cleanup goals within an acceptable period of time, relying on the slow, natural processes of contaminant degradation.

Alternatives 4S and 5S would require excavation of contaminated soils, which could result in the generation of contaminated dusts and VOC emissions. However, dusts and emissions can be easily controlled by wetting dry soils, containing excavated soils and/or scheduling excavations during the cooler months of the year.

Alternative 3S actually relies on the generation of VOC emissions. There is some concern whether or not the equipment for this innovative technology would adequately control the emissions.

Alternative 5G/6S would involve less excavation or disturbance of contaminated soils than alternatives 3S, 4S and 5S. It would also achieve RAOs in a shorter period of time; the other three alternatives address only the accessible "hot spots", soils beneath the building would reach RAOs only after having leached or dissolved in the groundwater.

4. Long-Term Effectiveness and Permanence - Alternatives 1S and 2S would leave contaminated soils untreated, neither alternative would be effective in limiting the risk to the public health or the environment in the long term.

Alternatives 3S, 4S and 5S would involve the excavation and treatment of contaminated soils only from accessible "hot spots" on the site. Highly contaminated soils would remain under the building, RAOs would be achieved only after the contaminants had been released to the groundwater. Alternative 3S also involves an innovative technology, there is some uncertainty that it would achieve the RAOs even in the treated "hot spot" areas.

Alternative 5G/6S (SVE) would offer a greater degree of permanence than alternatives 3S, 4S and 5S in that all of the contaminated soils, including those beneath the building, would be treated directly. SVE is a proven technology, successfully applied in field applications for the remediation of VOCs. There is, however, some uncertainty that SVE would prove as effective at the Aro site, with its relatively impermeable soils and the presence of NAPL. A pilot scale SVE treatability study would need to be conducted at the ARO site to determine the effectiveness of the technology under existing site specific conditions.

5. Reduction of Toxicity, Mobility or Volume - Excavation and thermal treatment of soils from "hot spots" (alternatives 3S, 4S and 5S), combined with groundwater collection and treatment, would effectively reduce the mobility and toxicity of site contaminants.

Alternative 5G/6S would also reduce the volume of contaminated groundwater to be treated by directly addressing contamination sources beneath the buildings.

Alternatives 1S and 2S would do little or nothing to limit the mobility of site contaminants, toxicity would be reduced only through dispersion and natural degradation processes.

6. Implementability - Installing and operating SVE extraction wells (alternative 5G/6S) would require fewer engineering controls than the excavation and on-site thermal treatment alternatives (3S, 4S and 5S). Incineration,

thermal desorption and SVE technologies have been used successfully at other sites to address VOC contamination. A pilot scale study of SVE would be required to determine the technology's effectiveness at treating the dense soils found at the Aro site. Soil volatilization (3S), an innovative application of thermal treatment, might not be able to achieve soil clean-up goals. Obtaining the necessary permits for on-site incineration (4S) would be difficult. Off-site incineration capacity is limited, as is the availability of mobile treatment equipment for incineration, thermal desorption (5S), and soil volatilization (3S). Equipment for the SVE technology is readily available from many sources.

7. Cost - There are no direct costs associated with the "no action" alternative (1S) and the costs for institutional controls (2S) are minimal. Of the remaining alternatives, 5G/6S (SVE) is the least expensive at approximately $1.9 million. Alternative 4S offers the most expensive options; incineration on site would cost $7 million, while off-site incineration would cost $16 million. A summary of preliminary cost estimates for the soil alternatives is presented in Table 3.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. Following a public meeting on the PRAP, a "Responsiveness Summary" will be prepared that outlines public comments received and how the Department will address these comments. 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 Alternative 5G/6S (Soil Vacuum Extraction) for soil and groundwater, as the remedy for this site**.

The risk assessment conducted during the RI indicated that unacceptable health risks would result with future construction activities which disturb contaminated subsurface soils. The potential also exists for the contaminated groundwater to continue migrating from source areas, exceeding presently established groundwater quality thresholds. Although a public potable water system is currently in place, it is possible (although unlikely) that others may use the groundwater as a drinking water source in the future. Seepage of contaminated groundwater into excavations or the basements of homes which might later be built downgradient of source areas is another, albeit unlikely, possibility. The "no action" and institutional control alternatives for soil and groundwater would not address these risks.

Alternative 5G/6S would offer a greater measure of overall protection for human health and environment than other alternatives by effectively removing contamination from the source areas, in a shorter period of time. SVE was considered the most effective means for addressing the highly contaminated soils and NAPL beneath the building, an area where excavation would be impractical. Given the relatively impermeable nature of the soils at the Aro site, a pilot scale study would be required to determine the effectiveness of SVE under site conditions.

With the exception of the "no action" and institutional control alternatives, alternative 5G/6S would also be the least expensive option. The estimated present worth cost to implement the proposed remedy would be $1,898,156. The cost to construct the remedy is estimated to be $855,000 and the estimated average annual operation and maintenance cost is $100,500.

The preferred remedy would be expected to achieve clean-up goals in a shorter period of time than the other alternatives considered. It is difficult to estimate the time required to clean up the site before the pilot study has been completed. If the pilot study indicates that SVE is as effective at the Aro site as it has been demonstrated at other sites, RAOs could be achieved within 15 years. The costs of the proposed remedy have been based on the 15 year period of operation.

The elements of the proposed remedy are as follows:

* Installation of a pilot scale Soil Vacuum Extraction system beneath the site, consisting of groundwater and soil vapor extraction wells.

* Evaluation of the pilot scale results, modification of the system design (if necessary) and construction of full-scale system.

* Removal of soil vapors and groundwater via the SVE system.

* Physical/chemical treatment of the extracted groundwater and vapor, with discharge of the treated water to the local sanitary sewer system, or the drainage ditches under a SPDES permit.

* Implementation of a long-term monitoring program which would allow the effectiveness of the preferred remedy to be monitored. This long-term monitoring program would be a component of the operations and maintenance for the site and would be developed in accordance with a Remedial Design.

If the pilot scale study indicates that the soil vacuum extraction technology is ineffective in treating the soils of the Aro site, an alternative remedy would be proposed. The alternative remedy may be one of those considered in the FS, or combination of alternatives suggested by the results of the pilot study. The public would be provided with an opportunity to review and comment on the selection of an alternative remedy and the Record of Decision amended.

TABLE 1

ARO CORPORATION SITE
TOWN OF CHEEKTOWAGA, ERIE COUNTY, NEW YORK

REMEDIAL ACTION OBJECTIVES

Media	Parameter	RAO
Soil [1]	Trichloroethene (TCE)	0.9 ppm
	1,2 Dichloroethene - Total (DCE)	0.4 ppm
	Vinyl Chloride (VC)	0.2 ppm
	Total Volatile Organic Compounds (VOCs)	10 ppm
Groundwater [2]	TCE	5 ppb
	DCE	5 ppb
	VC	2 ppb
Surface Water [3]	TCE	11 ppb
	DCE	5 ppb
	VC	2 ppb

[1] Soil RAOs based on an average Total Organic Carbon (TOC) concentration of 2%.

[2] Other compounds, not listed, would have RAOs in compliance with NYSDEC Ambient Groundwater Quality Standards

[3] The surface water in the drainage ditch is regulated as a class D surface water. At this time there are no standards for DCE and VC, the RAOs given here are the groundwater standards. The RAO for TCE is the class C surface water standard.

TABLE 2

ARO CORPORATION SITE
TOWN OF CHEEKTOWAGA, ERIE COUNTY, NEW YORK

SUMMARY OF PRELIMINARY COST ESTIMATES

GROUNDWATER

Alternative	Description	Capital Cost	Annual O&M	Estimated Present Worth[1]
1G	- No action - Monitoring	$10,000	$22,000	$369,146
2G	- Institutional controls - Monitoring	$21,000	$22,000	$380,146
3G	- Collection trench - Drain sewer bedding - Monitoring	$935,000	$108,000	$2,604,749
4G	- Recovery wells - Monitoring	$3,200,000	$199,000	$6,265,784
5G [2]	- Recover via SVE - Monitoring	$855,000	$100,500	$1,898,156

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[1] Present Worth of alternatives 1G - 4G based on a 30 year period of operation and an interest rate of 5%. Present Worth of alternative 5G based on 15 year period of operation and interest rate of 5%.

[2] Costs include the extraction and treatment of both groundwater and soil vapor.

TABLE 3

ARO CORPORATION SITE
TOWN OF CHEEKTOWAGA, ERIE COUNTY, NEW YORK

SUMMARY OF PRELIMINARY COST ESTIMATES

SOIL

Alternative	Description	Capital Cost	Annual O&M	Estimated Present Worth [1]
1S	- No action	$0	$0	$0
2S	- Institutional controls	$34,300	$0	$34,300
3S [2]	- Volatilization of "hot spots" in place - Monitoring	$1,956,000	$108,000	$3,625,749
4S	- Excavation & incineration of "hot spots" - Monitoring	Off site $14,298,000 On site $5,354,000	$108,000 $108,000	$15,967,749 $7,023,749
5S	- Excavation & thermal desorption of "hot spots" - Monitoring	$3,950,000	$108,000	$5,619,749
6S [3]	- Soil vacuum extraction - Monitoring	$855,000	$100,500	$1,898,156

[1] Present Worth of alternatives 1S - 5S based on a 30 year period of operation and an interest rate of 5%. Present Worth of alternative 6S based on a 15 year period of operation and interest rate of 5%.

[2] The costs for a groundwater collection trench and treatment system is included in the costs of alternatives 3S - 5S.

[3] Costs include the extraction and treatment of both groundwater and soil vapor.

TABLE 4
ARO CORPORATION SITE
TOWN OF CHEEKTOWAGA, ERIE COUNTY, NEW YORK
STANDARDS, CRITERIA & GUIDANCE (SCGs)

SCG	COMMENTS	STD./GUID.
Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants	The selected remedial alternative may result in the release of contaminants to the atmosphere. This SCG establishes acceptable ambient levels.	GUIDANCE
6 NYCRR Part 212 - General Process Emission Sources	Air emission limits/permit requirements.	STANDARD
6 NYCRR Part 376 - Land Disposal Restrictions - 1/31/92	The selected remedial alternative may involve off-site disposal of hazardous waste, which are subject to land disposal restrictions.	STANDARD
6 NYCRR Subpart 373-1 - Hazardous Waste Treatment, Storage and Disposal Facility Permitting Requirements - 1/31/92	As stated.	STANDARD
6 NYCRR Subpart 373-2 - Final Status for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities - 1/31/92	May be applicable for an on-site treatment alternative.	STANDARD
Technical and Administrative Guidance Memorandum (TAGM) HWR-92-4046: Determination of Soil Cleanup Objectives and Cleanup Levels - 1/24/94	Provides recommended soil cleanup objectives for inactive hazardous waste disposal sites.	GUIDANCE
TAGM HWR-92-4030: Selection of Remedial Actions at Inactive Hazardous Waste Sites - 5/92	Provides guidelines for the evaluation and selection of remedial alternatives.	GUIDANCE
TAGM HWR-89-4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Sites - 10/27/89	Provides guidance for the monitoring of fugitive dust during remedial actions, and steps to take to suppress.	GUIDANCE
6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Site Remedial Program - 5/92	Outlines the requirements for remediating inactive hazardous waste disposal sites.	STANDARD
Technical and Operations Guidance and Series (TOGS) 1.3.8: New Discharges to Publicly Owned Treatment Works - 10/26/94	Provides limits on new or changed discharges to POTWs with strict requirements regarding bioaccumulative and persistent substances.	GUIDANCE
TOGS 1.1.1: Ambient Water Quality Standards and Guidance Values - 10/93	Provides water quality criteria not published as regulation.	GUIDANCE
6 NYCRR Parts 700-705 - NYSDEC Water Quality Regulations for Surface Waters and Groundwater - 9/1/91	Water classifications and standards applicable for determining cleanup criteria.	STANDARD
6 NYCRR Parts 750-757 - Implementation of National Pollution Discharge Elimination System in NY State	May be applicable if the selected alternative requires a surface water discharge.	STANDARD
29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response	Outlines the health and safety precautions required during the site remedial program.	STANDARD
USEPA Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual - 12/89	Provides guidelines for conducting human health risk assessments.	GUIDANCE

APPENDIX

INDEX OF ADMINISTRATIVE RECORD

ARO CORPORATION SITE
TOWN OF CHEEKTOWAGA,ERIE COUNTY, NEW YORK

1. **Revised Remedial Investigation Work Plan,** Ingersoll-Rand Co., Aro Corporation-Life Support Division, Buffalo, NY, dated August 1991.

2. **Remedial Investigation Stratigraphy Report,** Ingersoll-Rand Co., Aro Corporation-Life Support Division, Buffalo, NY, dated April 1992.

3. **Remedial Investigation Report,** Aro Corporation-Life Support Division, Cheektowaga, NY, dated December 1992.

4. **Revised Remedial Investigation Report,** Aro Corporation-Life Support Division, Buffalo, NY, dated August 1993.

5. **Revised Remedial Investigation Report,** Aro Corporation-Life Support Division, Buffalo, NY, dated May 1994.

6. **Feasibility Study Report,** Aro Corporation-Life Support Division, Buffalo, NY, dated May 1994. Revised by appended letters dated July 1994 - October 1994.