Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Carborundum Globar Site
Town of Niagara, Niagara County
Site Number 9-32-036
Operable Units One and Two

October 2000

New York State Department of Environmental Conservation

GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Carborundum Globar Inactive Hazardous Waste Site
Operable Units 1 and 2
Town of Niagara, Niagara County, New York
Site No. 9-32-036

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Carborundum Globar class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Carborundum Globar inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site have been addressed by implementing the interim remedial measure identified in this ROD, therefore the site no longer represents a current or potential significant threat to public health and the environment. To simplify the selection of remedial alternatives, the site was divided into three Operable Units, which are:

OU #1 - Site Soil
OU #2 - Groundwater
OU #3 - Off-site Soil East of Site

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) and the implementation of the IRM for the Carborundum Globar site and the criteria identified for evaluation of alternatives, the NYSDEC has selected No Further Action for Operable Unit 1, Site Soils and No Further Action with groundwater monitoring for Operable Unit 2, Site Groundwater. The components of the remedy for Operable Unit 2 are as follows:

1. Development of a groundwater monitoring program and preparation and submittal to the NYSDEC of an annual report;

2. Installation of required monitoring wells;

3. Periodic collection and analysis of groundwater and sewer samples;

4. Evaluation of the progress of the natural attenuation process in achieving the remedial goals for the site groundwater. If this evaluation indicates insufficient progress, then additional or a more aggressive action will be required; and

5. Evaluation of the necessity for deed restrictions should site zoning change.

Operable Unit 3 is an area of contaminated soil east of the Carborundum Globar site. A separate investigation will be undertaken to assess the significance of the contamination and identify remedial options to address this area.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

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

10/27/00
Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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Record of Decision
Operable Unit 1 and 2

Carborundum Globar
Town of Niagara, Niagara County, New York
Site No. 9-32-036
October 2000

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health, has selected this remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the former Carborundum Globar class 2 inactive hazardous waste site. As more fully described in Sections 3 and 4 of this document, plant operations resulted in the disposal of trichloroethylene at the site, some of which was released into the groundwater and has migrated from the site into the Hyde Park Blvd. and Rhode Island Street area. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- a significant threat to human health if people are exposed to contaminated groundwater from the site; and

- a significant environmental threat associated with the possible impacts of contaminants on the Niagara River.

During the course of the investigation certain actions, known as Interim Remedial Measures (IRMs), were undertaken at the Carborundum Globar site in response to the threats identified above. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. The IRM undertaken at this site involved the excavation and off site disposal of trichloroethylene contaminated soil that was identified as the source of the site's groundwater contamination.

Based on the success of the above IRM, the findings of the investigation of this site indicate that the site no longer poses a threat to human health or the environment, therefore the following actions were selected as the remedy for this site.

- Operable Unit #1 (OU #1) Soil: The NYSDEC selected No Further Remedial Action for the on-site soil. An interim remedial measure (IRM) completed in August 1999 removed most of the contaminated soil from the site. The remaining soil contamination is at a depth (10-24 feet below the ground surface) that does not pose a threat from direct contact to the health of the site employees or the nearby residents.

- Operable Unit #2 (OU #2) Groundwater: The NYSDEC selected No Further Remedial Action with a groundwater monitoring program to assess the effectiveness of the IRM that removed most of the source of groundwater contamination at the Carborundum Globar site. It is expected since the contamination source has been removed that natural attenuation will continue and will effectively reduce the concentrations of contaminants in the groundwater and eventually attain the remedial goals for groundwater. A groundwater and sanitary sewer monitoring program will require periodic sampling and preparation of annual reports for NYSDEC review to document the effectiveness of the remedy. With the 5th annual report, after a data base is established, the NYSDEC will evaluate the progress of the natural attenuation process in achieving the remedial goals for the site groundwater. If this evaluation indicates insufficient progress, then additional or a more aggressive action will be required.

- Operable Unit #3 (OU#3) Soil East of Site: Soil contamination was found to extend off site to the east during the performance of the IRM on OU #1. OU #3 will undergo additional study, and if necessary a subsequent ROD will be issued.

The proposed remedies, discussed in detail in Section 8 of this document, are intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD), in conformity with applicable Standards, Criteria, and Guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The former Carborundum Globar facility is a 5 acre active manufacturing plant located in the Town of Niagara at the intersection of Hyde Park Boulevard and Rhode Island Street. (Please see Figure 1) There are residential communities to the south and east of the site and mixed industrial properties to the north. Hyde Park Boulevard, which is the boundary between the Town of Niagara and the City of Niagara Falls, is immediately to the west. A mixed commercial and residential use is located on the City's side of Hyde Park Blvd. The Carborundum Globar site is a Class 2 site and is on the New York State Registry of Inactive Hazardous Waste Disposal Sites (site #932036). Two other hazardous waste disposal sites are nearby. The Union Carbide (site #932035) is a Class 4 site that has been properly closed but requires continued operation, maintenance, and/or monitoring. The Vanadium Site (site #932001) is a class 2 site at which hazardous waste constitutes a significant threat to human health and /or the environment.

Three Operable Units (OU) have been established to address contamination issues at the Carborundum Globar site. An Operable Unit represents a portion of the 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 site contamination. These operable units are described in Section 3.2.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Carborundum Company purchased the plant from the Globar Company in 1936 and manufactured heating elements and electronic components from silicon carbide. The Carborundum Company was purchased by BP America and the Globar facility was subsequently sold to CESIWID, Inc. in 1993.

CESIWID Inc. has since sold the plant to Kanthal-Globar which continues to produce similar products. BP America retained the responsibility for pre-existing conditions when they sold the facility to CESIWID.

In 1993, the Carborundum Company completed a Preliminary Site Assessment of the facility to determine if hazardous wastes had been disposed at the site. The study found the presence of hazardous waste resulting from past spills and leaks from bulk chemical storage generally located in the gravel topped portion of the former storage area of the plant site. (Please see figure 2). Historical releases in this area have contaminated site soils and underlying groundwater.

3.2: Remedial History

In 1985 the Carborundum Company installed monitoring wells and collected soil and groundwater samples to assess soil and groundwater contamination on the site. Carborundum then petitioned New York State to remove the facility from the Registry of Inactive Hazardous Waste Disposal Sites. The NYSDEC rejected this petition.

In December 1987 the USEPA performed a Preliminary Assessment of the Globar facility. The USEPA then referred the facility to the State of New York who subsequently utilized URS Consultants to conduct a Preliminary Site Assessment Task 1 (Data records Search and Assessment) in 1990. As a result of these studies the site remained on the Registry of Inactive Hazardous Waste Disposal Sites as a Class 2a. A Class 2a site is a site at which additional information is needed to properly classify.

In 1992 and under an order on consent (legal agreement) with the NYSDEC, the Carborundum Company performed a Preliminary Site Assessment (PSA) of the facility. This PSA determined that hazardous waste was present on the site and the site was upgraded to a Class 2 Inactive Hazardous Waste Disposal site in the registry.

In September 1995, BP America and the New York State Department of Environmental Conservation executed an Order on Consent to undertake a Remedial Investigation/Feasibility Study (RI/FS) to assess the nature and extent of contamination at the facility and evaluate remedial alternatives for site cleanup. The Remedial Investigation work began in August 1995 and the Remedial Investigation Report (RI) was issued in January 1997. Subsequently, a supplemental investigation was undertaken, with the findings published in the Phase II Remedial Investigation Report (Phase II RI) dated May 1998. As a result of the Remedial Investigations an Interim Remedial Measure (IRM) was undertaken in the Summer of 1999 to remove the source of groundwater contamination found on the facility. A Feasibility Study (FS) was completed in January 2000 that discussed the results of the IRM program and evaluated the options available to address the groundwater contamination.

To simplify the selection of remedial alternatives, the site was divided into three Operable Units, which are:

OU #1 - Site Soil
OU #2 - Groundwater
OU #3 - Off-site Soil East of Site

OU#1 was remediated through the IRM and no further remedial action is required. A remedial program for OU #2 is selected in this ROD. OU #3 will undergo further study and if necessary, a subsequent ROD will be prepared.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, BP America conducted 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 between May 1996 and January 1997 and the second phase between November 1997 and May 1998. A report entitled "Remedial Investigation of the Former Carborundum Company Electric Products Division, Hyde Park Facility" was completed on August 1997 and a follow-up report titled "Phase II Remedial Investigation of the Former Carborundum Company Electric Products Division, Hyde Park Facility" was completed in August 1998 to describe the field activities and findings of the RI and Phase II RI in detail.

The RI included the following activities:

- Installation of soil borings and monitoring wells to collect samples of soils and groundwater and to determine physical properties of soil and hydrogeologic conditions and depth to bedrock.
- Excavation of test pits to locate and sample sewer bedding to evaluate off-site migration pathways.
- Preparation of a Preliminary Risk Assessment to assess the impacts of site-related contaminants on workers at the facility and on the nearby residential population.

The Phase II RI included the following activities:

- Installation of additional monitoring wells to determine groundwater quality in bedrock down gradient of the site.
- Collection of an additional round of groundwater samples.
- Placement of soil borings along the eastern property line to assess soil contamination.
- Incorporation of additional soil data, including surface soil into a revised Risk Assessment.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Carborundum Globar site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of the NYS

Sanitary Code. For soils, NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, it was determined that certain areas and media of the site required remediation. These are summarized below. More complete information can be found in the RI Report.

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

4.1.1 Site Geology

General geology in the area consists of Glaciolacustrine sediments and glacial till 17-32 feet in thickness overlying Middle Silurian Dolostone bedrock of the Lockport Dolomite. Groundwater is present in both the glacial till (overburden) and underlying rock (bedrock) at the site. The water table in the vicinity of the site occurs at depths ranging from 3 to 7 feet below ground surface with perched conditions reported at the northeast edge of the site. Flow directions are southwesterly across the site for both overburden groundwater and the deeper bedrock groundwater.

4.1.2 Nature of Contamination:

As described in the RI Report, many soil and groundwater samples were collected at the Site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs are Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs). The VOCs are the primary contaminants found on this site. A class of chemicals called Polycyclic Aromatic Hydrocarbons (PAHs) are a subset of SVOCs. PAHs are a secondary issue associated with the contamination along the abandoned railroad that ran along the north property line. This PAH contamination was removed with the completion of the IRM project discussed in Section 4.2. Also, PAH contamination was not found in the groundwater at the site.

The Contaminants Of Concern (COCs) in soil are:

Volatile Organic Compounds:

trichloroethene	xylene
1,2 - dichloroethene	toluene
vinyl chloride	ethyl benzene
acetone	

Semi-Volatile Compounds:

naphthalene	acenaphthylene
fluorene	phenanthrene
anthracene	pyrene
benzo(a)anthracene	chrysene
benzo(b)fluoranthene	benzo(k)fluoranthene
benzo(a)pyrene	ideno(1,2,3cd)pyrene

The COCs in groundwater are:

Volatile Organic Compounds:
trichloroethene
1,2-dichloroethene
vinyl chloride
benzene

4.1.3 Extent of Contamination

Contamination has been identified above standards or guidance criteria in the soil and the ground water. Table 1 summarizes the extent of contamination for the contaminants of concern in the soil and groundwater and compares the data with the SCGs for the Site. The table shows the media that was sampled (soil or groundwater), the chemical, the concentration range at which the chemical was found and the frequency that the chemical exceeded SCGs.

Surface Soil

Surface (0-2 inches) soil samples collected during the Phase II RI program were collected from locations S001 through S004 (see Figure 3) along the east property line. COCs were not detected at significant levels in any of the surface soil samples. The low levels of COCs in surface soils along the eastern property boundary indicate that human health risk to the area residents from exposure to these soils is minimal. Refer to section 4.3 for further discussion on exposure and health risk

Subsurface Soil

COCs were found in five areas (see Figure 3) at concentrations that exceed the NYSDEC Soil Cleanup Objectives developed under TAGM #4046. These locations are:

Area 1- A small area in the vicinity of the north property line and former railroad spur contaminated with VOCs and PAHs to a depth of up to 10 feet;

Area 2 - A large area within the former storage area contaminated with VOCs to a depth of up to 24 feet;

Area 3 - A small area south of Area 1 and east of the main building wall contaminated with VOCs to a depth of 4 feet;

Area 4 - A small area in the southeastern corner of the site, at the parking lot exit, contaminated with VOCs to a depth of 4 feet; and

Area 5 - A small area in the southwestern portion of the site, in the parking lot along Rhode Island St. near Hyde Park Blvd, contaminated with xylene and lead to a depth of 2.5 feet.

All five of these areas were addressed during the implementation of the IRM program in 1999. Refer to Section 4.2 for discussion of the IRM.

Sediments

No natural streams or creeks exist on the Carborundum Globar site. Therefore, no samples of sediments were collected.

Site Utilities

Storm sewers that provide site drainage were investigated during the RI to assess the potential impact of site runoff to off-site areas. Test pits were excavated along the path of the storm sewers and soil and water samples were collected. Low levels of VOCs were detected in the soil and water and are not considered to have a significant impact on off-site areas. The storm sewers and adjacent soil and pipe bedding materials in the area of the IRM were excavated and disposed of off-site during the IRM program.

Groundwater

Groundwater samples have been collected from monitoring wells on the site on four separate occasions. Sampling was conducted during the Preliminary Site Assessment in 1992, during the RI and Phase II RI in 1996 and 1997 and finally in October 1999 after the completion of the IRM program. The sampling determined that the groundwater is contaminated with site related contaminants. The overburden groundwater (water found in the soil above the bedrock) and bedrock groundwater (water found in the fractures of the bedrock) are contaminated with COCs above the state groundwater standards.

Overburden Groundwater - Results of analysis of groundwater samples collected from the shallow, overburden wells indicate that COCs exist in groundwater at concentrations that exceed the NYSDEC Water Quality Standards. Contaminant concentrations are highest along the northern property line in MW-7A (see Figure 4). However, the highest vinyl chloride concentration was detected in MW-10A located along the south property line directly down gradient of MW-7A. COCs were not detected in the remaining overburden wells. It is important to note, for the evaluation of human exposure pathways discussed in Section 4.3, that MW-13A and MW-14A are down gradient of the site and on the residential side of Rhode Island Ave. COCs were not found in these wells.

The most commonly detected compounds in the groundwater in the overburden were 1,2-dichloroethene (1,2-DCE), trichloroethene (TCE) and vinyl chloride (VC). 1,2-DCE and VC are breakdown products from the natural decomposition of TCE.

The average total COCs concentration in the overburden groundwater during the investigation phases (1992-1997) was 1,122 ug/l with the maximum total COC detected at 10,110 ug/l (MW-7A).

After the completion of the IRM (October 1999) the average overburden groundwater concentration had decreased to 502 ug/l with the maximum total COC detected at 3848 ug/l (MW-7A).

Bedrock Groundwater - Results of analysis of groundwater samples collected from the deeper, bedrock wells indicate that COCs exist in groundwater at concentrations that exceed the NYSDEC Water Quality Standards. COCs in the bedrock wells are highest along the south property line (see Figure 5). Again, the most commonly detected compounds in the bedrock groundwater were 1,2-dichloroethene (1,2-DCE), trichloroethene (TCE) and vinyl chloride (VC).

The average total COCs concentration in the bedrock groundwater during the investigation phases (1992-1997) was 530 ug/l with the maximum total COC detected at 3,038 ug/l (MW-2B).

After the completion of the IRM (October 1999) the average bedrock groundwater concentration had decreased to 462 ug/l with the maximum total COC detected at 2,435 ug/l (MW-10B).

The groundwater quality has been improving during the investigation phases of this project. This can be at least partially attributed to improved operations at the facility since the early 1990's that reduced or eliminated new sources of contamination. The recently completed IRM removed 35,600 tons of contaminated soil which was the source of groundwater contamination. It is expected that the groundwater quality will continue to improve since the on-site contamination source was removed. Contaminants have been and will continue to break down through natural processes. This natural break down process is demonstrated by the presence of the various break down products of TCE.

Waste Materials

No waste was discovered during the investigations of the Carborundum Globar site. Soil and groundwater contamination are the result of plant activities that resulted in the spillage or runoff of TCE from the storage of equipment and drums on-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.

During the course of the investigations of the Carborundum Globar site it became apparent that on-site soil contamination was the source of the site groundwater contamination. BP America proposed an IRM to remove contaminated soil and dispose of it off-site. This IRM proposal was the subject of a Decision Document prepared by the NYSDEC and presented to the public at an Informational Meeting attended by area residents and local public officials on February 10, 1999. The IRM program was approved by the NYSDEC on February 16, 1999. The IRM was implemented from April 1999 through August 1999.

The purpose of the IRM was to eliminate this source of groundwater contamination and to remediate the areas of soil contamination found at the plant site. The IRM work consisted of excavation and off-site disposal of 35,600 tons of contaminated soil, the collection of samples from within the excavation and restoration of the site to the original grades.

The NYSDEC has established specific clean-up guidance for remediation of soils contaminated with hazardous wastes in Technical Administrative Guidance Memorandum (TAGM) #4046. This guidance was used to develop the site specific cleanup soil goals for this IRM.

The NYSDEC Division of Solid and Hazardous Materials, Bureau of Technical Support has developed guidance for managing regulated hazardous waste. This guidance is found in TAGM #3028, entitled "Contained-In Criteria for Environmental Media". In part, this guidance applies to soil that is contaminated by regulated hazardous waste and removed as part of a corrective action plan such as the IRM implemented at the Carborundum Globar site. The guidance states that soils containing hazardous

constituents from regulated hazardous waste can be managed as non-hazardous waste if the soil's hazardous constituent concentrations are at or below levels established in the guidance. Soils excavated as part of the IRM were disposed following this guidance.

After soils containing concentrations of COCs above NYSDEC Soil Cleanup Guidelines had been removed, verification samples of the bottom and sides of the excavation(s) were collected. A total of 224 verification samples were collected. Areas where sample results that did not indicate that cleanup goals were met, were re-excavated and the area re-sampled.

The IRM program successfully removed over 90% of the soil contamination on the Carborundum Globar site. Minor amounts of contaminated soil were left in Area 2 at a depth of 10 - 24 feet. For example, the maximum trichloroethene concentration remaining in Area 2, exclusive of the east wall which has been identified as OU #3, is 2,190 ug/kg compared to the original maximum concentration of 300,000 ug/kg identified during the RI. The clean-up goal for TCE is 880 ug/kg. Concerns for slope stability associated with the presence of the facilities infrastructure prevented excavation of the remaining contamination. The average total COC in the remaining soil is 1,465 ug/kg.

After the completion of the IRM, the remaining areas (1,3,4 & 5) met the soil cleanup objectives for VOCs. A portion of Area 1 exceeds SCGs for several PAHs, however the performance of the IRM was driven by the presence of VOCs in the soil. Any PAH contaminants remaining in Area 1 are below 25 ppm total PAHs and have been covered with a minimum of 2 feet of clean soil.

Considering the depth to the contamination and the volume remaining in OU #1, the contamination left behind is not significant and not considered a threat to human health or the environment.

In addition an area of soil contamination along the eastern property line was left because the contamination was found to extend beyond the site boundaries and the IRM program was not designed to remediate off-site areas. This off-site area to the east has been designated as OU #3 and will be addressed separately. Additional investigation will be conducted and remedial options, if necessary will be developed for OU #3.

The Department believes that the remediation in place as a result of the IRM program accomplished the remedial goals for site soils.

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 4 of the RI Report.

An exposure pathway is the manner by which an individual may come into contact with a contaminant. The five elements of an exposure pathway 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.

Potential exposure pathways which were evaluated at this site include:

- inhalation of and direct contact with contaminated soils on-site by plant workers and contractors;
- inhalation by plant workers and contractors of volatile organic compounds that have vaporized into the facilities indoor air from groundwater flowing below the plant site;
- inhalation of volatile organic compounds that could vaporize into residential indoor air from groundwater under the homes in the nearby residential neighborhood; and
- ingestion of contaminated groundwater by area residents.

The potential for plant workers to be exposed to contaminated surface soil is very low, since all remaining elevated levels of contaminants of concern are 10 feet below grade or deeper. Excavation to this depth during typical plant operation or construction activity is unlikely. It is important to note that this exposure evaluation does not apply to OU #3 - Off-site Soil East of Site, since this operable unit will be addressed in a future investigation.

The potential exposure of nearby residents to contaminated groundwater was evaluated. Should anyone use the contaminated bedrock groundwater in the area south west of the site, adverse health affects are possible. However, area groundwater is not used as potable water by industry or residents since a public water supply is readily available. The Town of Niagara (Town Code Chapter 135-95) requires all residents to use the public water supply. The City of Niagara Falls has a prohibition against the installation of drinking water wells within city limits. Therefore, the potential for ingestion of contaminated groundwater by nearby residents or facility workers is very low.

If contaminated overburden groundwater migrates into the basements of nearby homes, people may come into direct contact with contaminants or possibly inhale vapors entering basements from the contaminated groundwater. To evaluate this potential pathway, monitoring wells MW-13A and MW-14A were installed down gradient of the site and on the residential side of Rhode Island Ave. The depth to groundwater on 10/18/99 for MW-13A and MW-14A was measured at 9.98 feet and 8.00 feet respectively below ground surface. Since contaminants were not found in these wells (both were consistently non-detect) and the depth of these wells is similar to the depth of the nearby basements, it is evident that site contaminants are not reaching nearby residential properties in the overburden groundwater.

The Remedial Investigation (RI) and Phase II RI evaluated the risk that the inhalation of contaminants in the indoor air and possible contact with contaminated groundwater posed to nearby residents and plant workers. The results of the risk assessment indicate that human health impacts to plant workers and nearby residents from environmental conditions at the site are not significant.

4.4 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site. The Fish and Wildlife Impact Assessment (FWIA) included in Section 3.8 of the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. The FWIA concluded that the availability of natural resources which would support fish and wildlife in the subject area is severely

limited by historic industrial and residential development. The limited natural vegetation adjacent to the site has also been restricted by industrial development.

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 NYSDEC and The Carborundum Company (now BP America) entered into a Consent Order on 9/7/95. The Order obligated the responsible parties to implement the RI/FS program. Upon issuance of the Record of Decision the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

The following is the chronological enforcement history of this site.

Date	Index No.	Subject of Order
6/9/92	N/A	Preliminary Site Assessment
9/7/95	B9-0454-94-04	Remedial Investigation/Feasibility Study

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. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

This objective was accomplished through the remediation completed for OU #1, which is described in Section 4.2 Interim Remedial Measures, provided that it continues to be operated and maintained in a manner consistent with the current zoning for heavy industrial use.

Based on the results of the investigations and the IRM that has been performed at the site, the NYSDEC is proposing No Further Remedial Action as the preferred remedial alternative for OU #1. Alternatives for further remediation of contaminated site soils are therefore not discussed in Section 7.

The goals selected for OU #2 are:

- Reduce, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES FOR OU #2

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and use permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Carborundum Globar site were identified, screened and evaluated in the report entitled Feasibility Study for the Remediation of the Former Carborundum Company Electric Products Division Hyde Park Facility dated November 8, 1999.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Alternatives

The potential remedies are intended to address the contaminated groundwater remaining at the site.

No Further Action

This alternative recognizes remediation of the site conducted under a previously completed IRM. Only continued monitoring is necessary to evaluate the effectiveness of the remediation completed under the IRM.

GW-2b No Further Remedial Action with Groundwater Monitoring

Present Worth:	*$430,000*
Capital Cost:	*$ 75,000*
Annual O&M:	*$23,000*
Time to Implement	*3 months*

This alternative involves the installation of additional monitoring wells, development of a groundwater monitoring plan and periodic reporting of groundwater quality. This remedy relies on current Town zoning that restricts the use of the site to heavy industrial. Should the zoning be changed in the future while the site is still a listed hazardous waste disposal site, the remedy should be evaluated to determine the need for deed restrictions to control incompatible uses of the site. Starting with the 5th annual report, the NYSDEC will evaluate the progress of the natural attenuation process in achieving the remedial goals for the site groundwater.
Additional or a more aggressive groundwater remedial effort would be required if reviews do not show acceptable progress towards attaining the site SCGs.

GW-3a Groundwater removal with vertical pumping wells with treatment and disposal

Present Worth:	*$5,100,000*
Capital Cost:	*$ 4,000,000*
Annual O&M:	*$67,000*
Time to Implement	*9 months*

This alternative involves the removal of groundwater with a series of vertical pumping wells and treatment of groundwater prior to disposal, development of a groundwater monitoring plan and periodic reporting of groundwater quality. Treatment would be effectively performed by air stripping the contaminants from the groundwater or by treating the groundwater with granular activated carbon. Treated water would be disposed of in the local sewer system if a permit is granted

GW-5b Air Sparging/Vapor Extraction

Present Worth:	*$4,100,000*
Capital Cost:	*$ 3,000,000*
Annual O&M:	*$ 67,000*
Time to Implement	*12 months*

This alternative involves the injection of air into the subsurface groundwater with a set of injection wells and collection of the vapors with a set of vapor extraction wells to strip the contaminants from the groundwater, development of a groundwater monitoring plan and periodic reporting of groundwater quality. The vapor extracted from the ground would be treated prior to release into the atmosphere.

7.2 Evaluation of Remedial Alternatives for OU #2

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 included 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. Site specific SCGs were developed from TAGM #4046 to address the removal of the contaminated soil during the IRM program. The groundwater SCGs are the State groundwater standards.

Alternative GW-2b would eventually comply with site SCGs by utilizing the natural attenuation process to breakdown the site contaminants. The removal of the source of the groundwater contamination through the completed IRM project enhances the ability of this natural process to achieve the SCGs. Monitoring and evaluation of the progress of the remedy would ensure eventual compliance with the SCGs.

Alternatives GW-3a and GW-5b would eventually comply with the site SCGs. Installation of groundwater pumping wells or an air sparging/vapor extraction system would remove contaminants from the site and would eventually meet the site SCGs. However, these alternatives would not achieve SCGs significantly sooner than alternative GW-2b.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternative GW-2b, 3a and 5b would all be protective of human health and the environment. The Town of Niagara and the City of Niagara Falls both have local ordinances that prohibit the installation of drinking water wells. No existing drinking water wells have been identified in the area. Therefore, exposure of residents and site workers to groundwater is unlikely.

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/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternative GW-2b would have relatively minor short term impacts on the local community. This alternative would require the installation of additional monitoring wells to provide the necessary information to evaluate the progress of the remedy. Periodic sampling of site monitoring wells will be required. The time required to implement the remedy is estimated to be 3 months.

Alternatives GW-3a and GW-5b would have a greater impact on the local community as compared to alternative GW-2b. While these would not be a major impact, these alternatives would require the installation of numerous pumping wells or an air sparging/vapor extraction system along with the construction of a treatment system to treat groundwater and/or vapors extracted from the site. These alternatives would also require the installation of additional monitoring wells to provide the necessary information to evaluate the progress of the remedy. Periodic sampling of site monitoring wells will be required. The time required to implement these remedies is estimated to be from 9 to 12 months.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. 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.

Alternative GW-2b would be effective over the long term. With the completion of the IRM project, natural attenuation of the contaminants in the groundwater would continue and likely be enhanced due to the removal of the contamination source. A groundwater monitoring program would require periodic sampling of groundwater and preparation of annual reports for NYSDEC review to document the effectiveness of the remedy. Starting with the 5th annual report, the NYSDEC will evaluate the progress of the natural attenuation process in achieving the remedial goals for the site groundwater.
Additional or a more aggressive groundwater remedial effort would be required if reviews do not show acceptable progress towards attaining the site SCGs.

Alternatives GW-3a and GW-5b have a similar long term effectiveness as GW-2b. Though both alternatives include active remedial components, the lack of a significant contaminant source area and the site geology make the long term effectiveness of alternatives GW-3a and GW-5b questionable. Natural attenuation will still occur and the effect of these alternatives on the time required to reach SCGs will be minimal as compared to alternative GW-2b. Continuous operation and maintenance of the equipment for these alternatives would be required for the duration the remedy is in place.

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.

Alternative GW-2b would gradually reduce the toxicity, mobility and volume of the contaminated water through the natural attenuation process to breakdown the contaminants in the groundwater.

Alternatives GW-3a and GW-5b would reduce the toxicity, mobility and volume of contaminated groundwater but not significantly faster than what would occur in alternative GW-2b.

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

Alternatives GW-2b, GW-3a and GW-5b are implementable with current technology. Construction firms are readily available in the area to implement any of these alternatives. Alternative GW-2b is easily implementable. Alternatives GW-3a and GW-5b will require a more complex design and will be moderately difficult to implement. Permits to discharge treated groundwater or air from the site would be needed. Permits for these alternatives should be readily obtainable.

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. The costs for each alternative are presented in Table 2.

Alternative GW-2b is the most cost effective remedy as it takes advantage of natural attenuation processes that are already at work

Alternatives GW-3a and GW-5b would not significantly improve the remedial progress as compared to alternative GW-2b. The high cost of these alternatives is not warranted as they do not improve the performance of the remedy as compared to alternative GW-2b.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated 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 have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised. The Public Meeting to discuss the PRAP was held on June 27, 2000 at the Town of Niagara Town Hall. A

representative from the Town of Niagara Environmental Commission was the only person outside of the NYSDEC, NYS DOH and PRP personnel to attend the meeting. In general the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to items such as sampling frequency and duration, property ownership, off-site impacts to residences and disposal of excavated soil.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative GW-2b No Further Remedial Action with groundwater monitoring for OU #2 as the remedy for groundwater at this site.

This selection is based on the evaluation of the three alternatives developed for this site. All alternatives would eventually comply with the threshold criteria, compliance with SCGs and protection of human health and the environment. In addition, all the alternatives are similar with respect to the majority of the balancing criteria. The only major difference between these alternatives is estimated cost of the proposed alternatives.

The estimated present worth cost to implement the selected remedy is $430,000. The capitol cost to construct the remedy is estimated to be $75,000 and the estimated average annual operation and maintenance cost is $23,000.

The elements of the selected remedy for OU #2 are as follows:

1. A groundwater monitoring program will be developed that prescribes the location of additional groundwater monitoring wells, the monitoring of sanitary sewers near the site, the frequency of monitoring, the analytical requirements and the preparation of periodic and annual reports. The periodic and annual reports will be submitted to the NYSDEC;

2. Monitoring wells will be installed;

3. Ground water and sewer samples will be collected and analyzed periodically;

4. Reports will be reviewed by the NYSDEC to monitor the effectiveness of the remedy. With the 5th annual report, after a data base is established, the NYSDEC will evaluate the progress of the natural attenuation process in achieving the remedial goals for the site groundwater. If this evaluation indicates insufficient progress, then additional or a more aggressive action will be required; and

5. The need for deed restrictions will be evaluated if site zoning is changed.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A repository for documents pertaining to the site was established.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- Fact Sheet and Meeting Announcement November 1995
- Availability Session and Public Meeting December 5, 1995
- April 1996 - BP Community Letter
- Fact Sheet - September 1997
- February 1997 - BP Community Letter
- June 1998 - BP Community Letter
- January 1999 - Meeting Notice and Fact Sheet regarding IRM proposal
- February 1999 - Availability Session to present IRM proposal and get comments from community
- April 1999 - BP Community Letter
- June 2000 - Meeting Notice and Fact Sheet for PRAP meeting
- June 27, 2000 - PRAP Public Meeting
- July 2000 - Responsiveness Summary was prepared and made available to the public, to address the comments received during the public comment period for the PRAP.

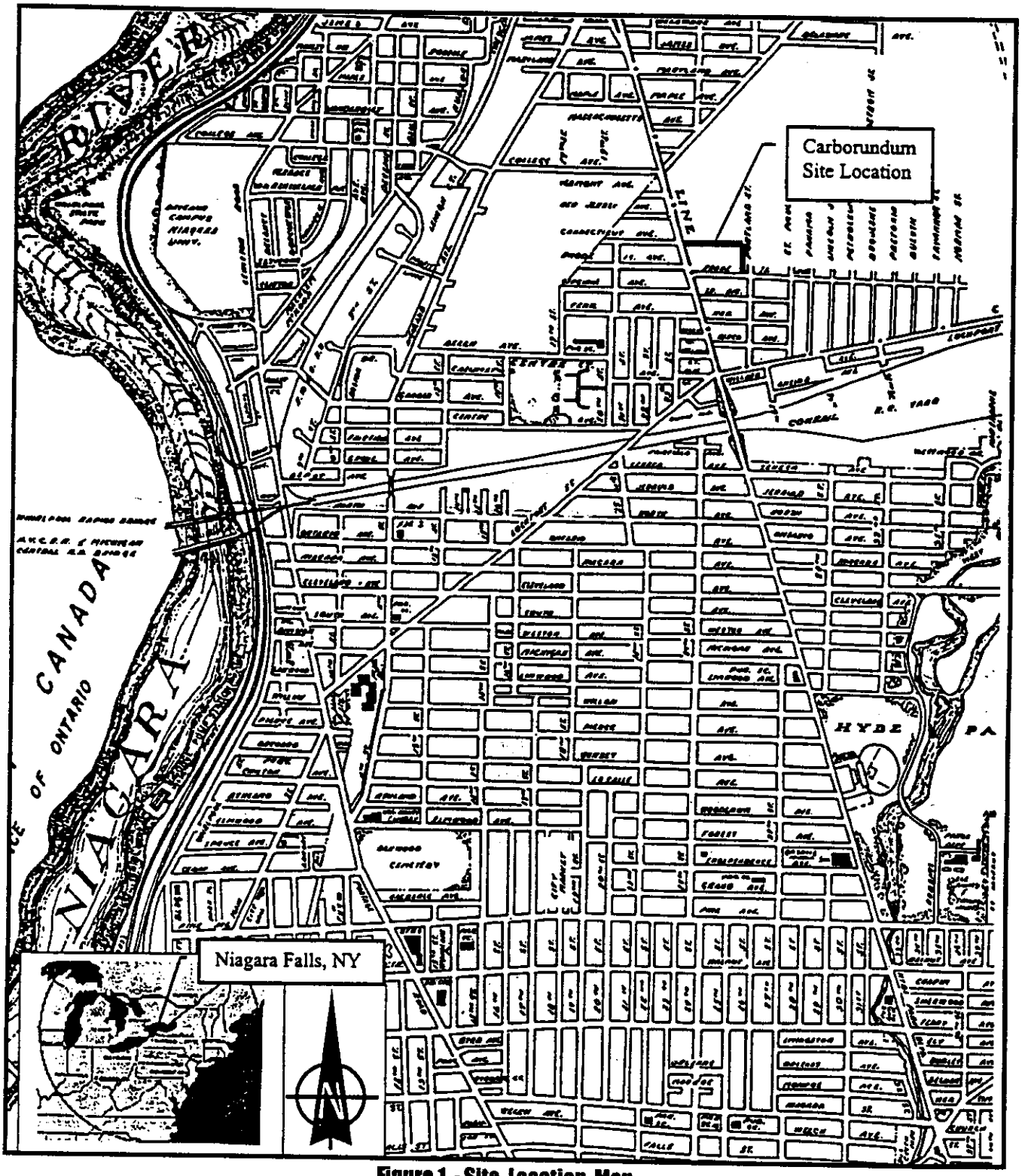

Figure 1 - Site Location Map

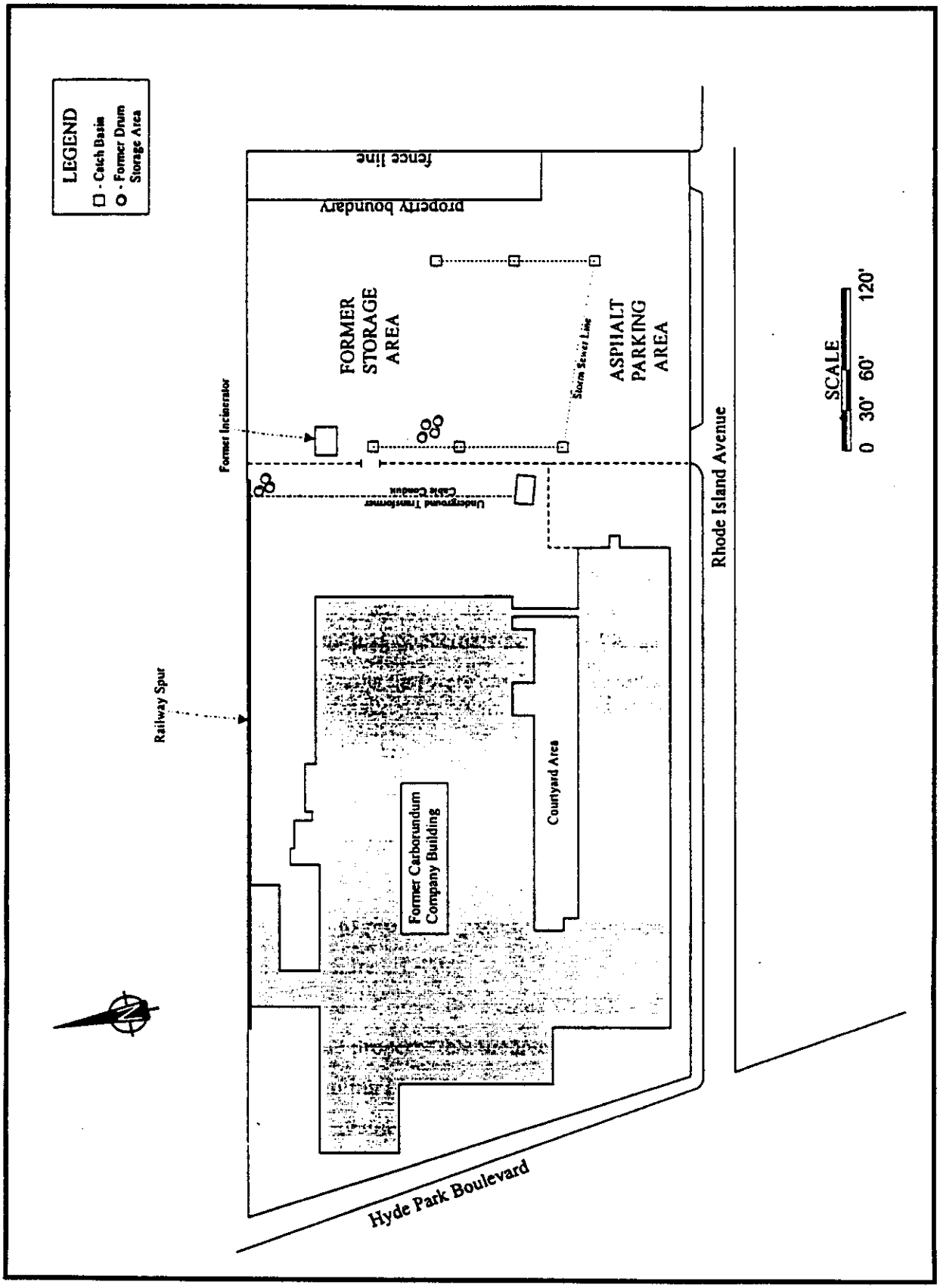

Figure 2 - Site Plan

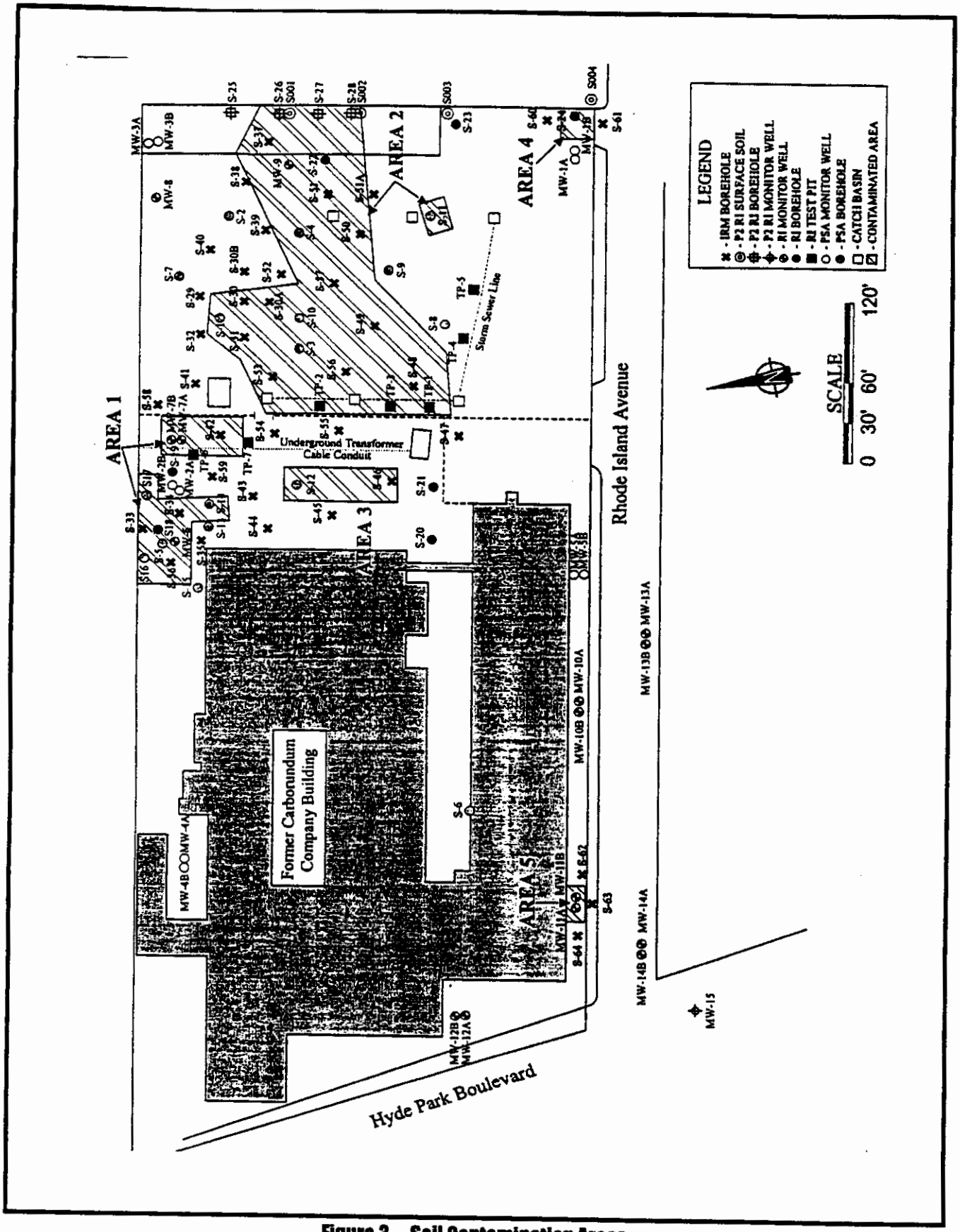

Figure 3 - Soil Contamination Areas

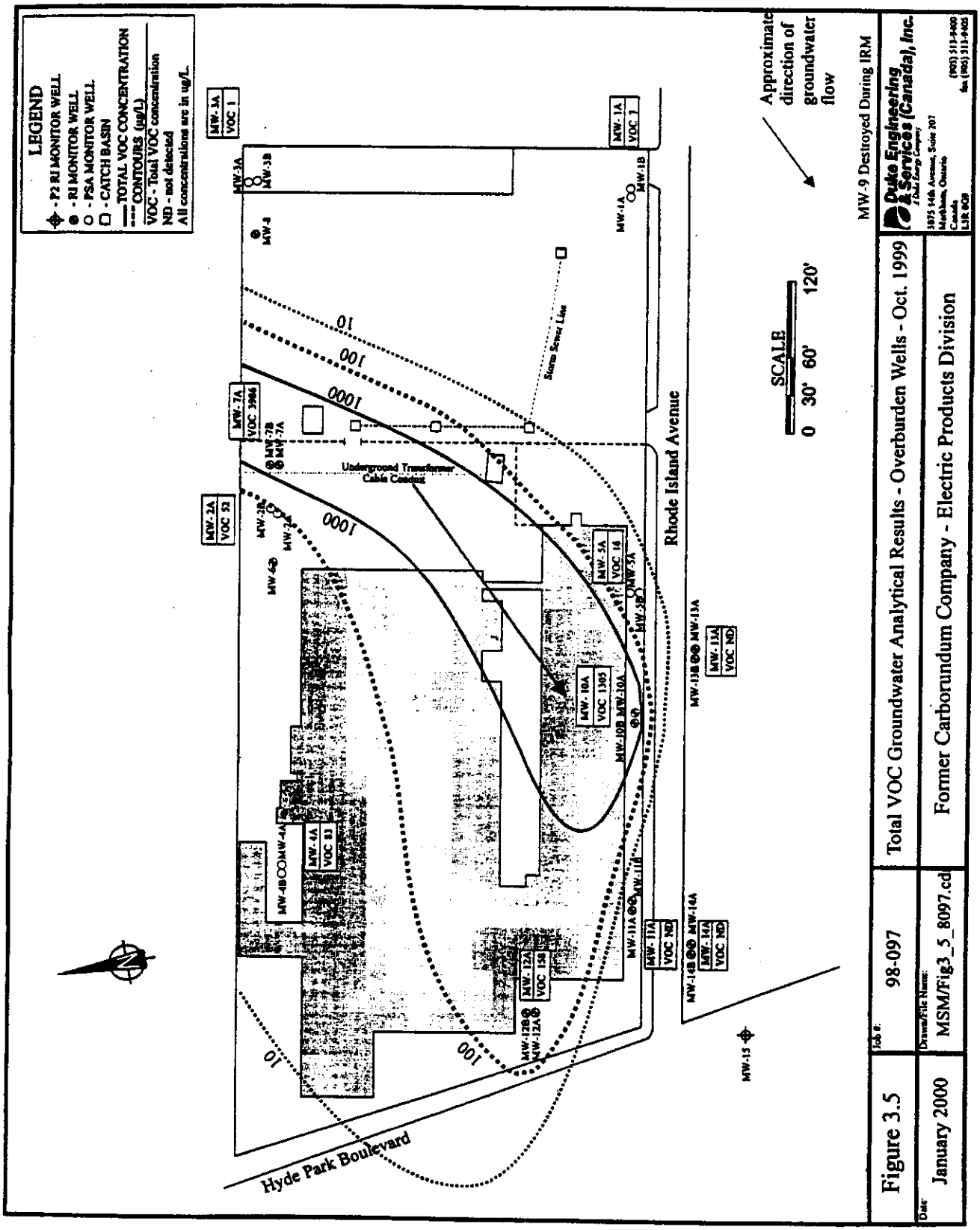

Figure 4 - Overburden Groundwater Contamination, 1999

Figure 5 - Bedrock Groundwater Contamination, 1999

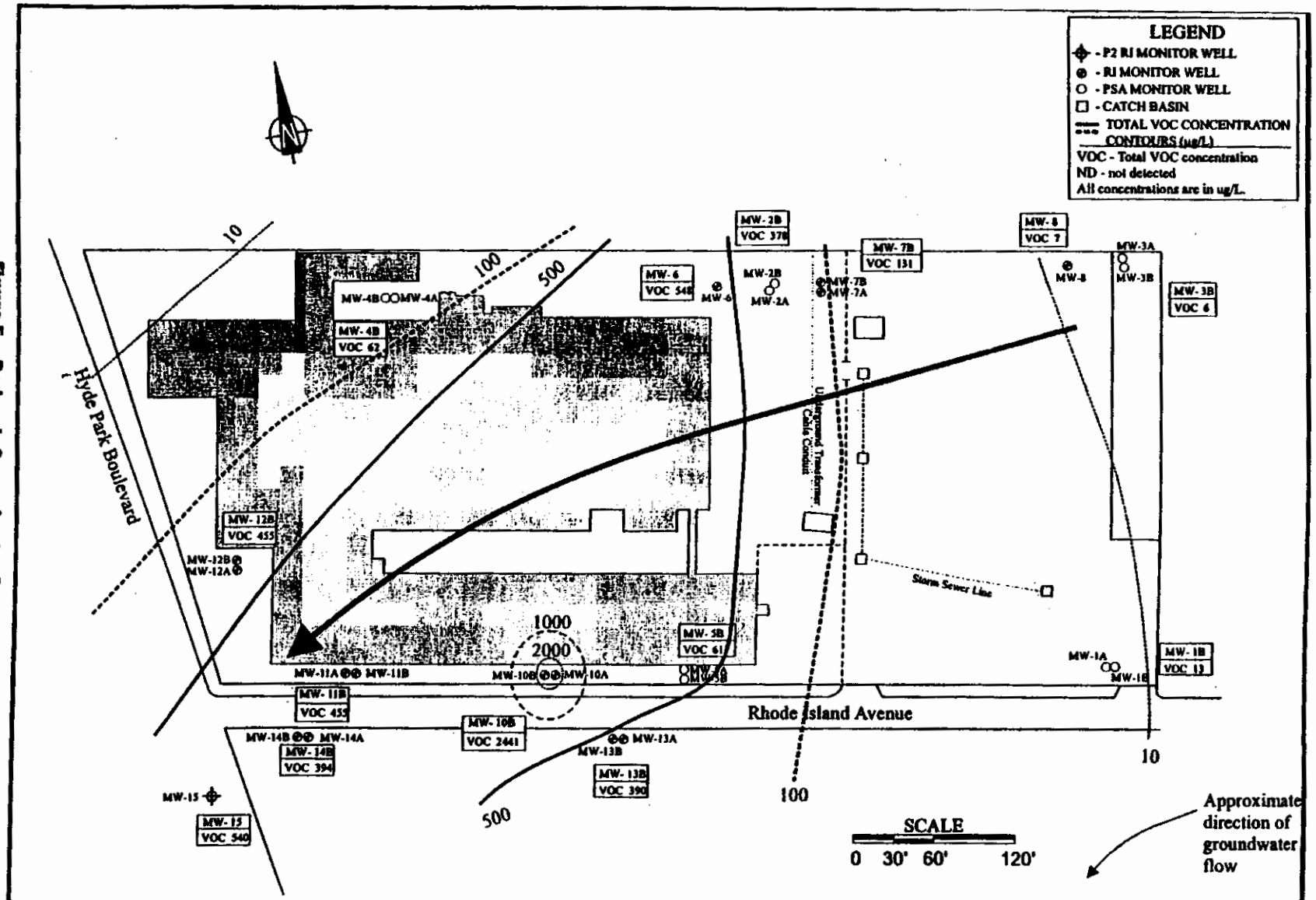

Figure 3.6	Job #: 98-097	Total VOC Groundwater Analytical Results - Bedrock Wells - Oct. 1999	Duke Engineering & Services (Canada), Inc. A Duke Energy Company 3075 14th Avenue, Suite 207 Markham, Ontario Canada L3R 0G9 (905) 513-9400 fax (905) 513-9405
Date: January 2000	Drawn/File Name: MSM/Fig3_6_8097.cdr	Former Carborundum Company - Electric Products Division	

Table 1
Nature and Extent of Contamination

MEDIA	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY EXCEEDING SCGs	SCG* (ppb)
Groundwater	trichloroethene	nd - 8700	10 of 51	5
	1,2-dichloroethene (total)	nd - 5206J	37 of 51	5
	vinyl chloride	nd - 1300	27 of 51	2
	benzene	nd - 4J	2 of 51	0.7
	1,1-dichloroethane	nd - 1500J	3 of 51	5
Soils**	trichloroethene	nd - 300,000J	8 of 75	880
	1,2-dichloroethene	nd - 37000	8 of 75	410
	vinyl chloride	nd - 400J	1 of 75	200
	toluene	nd - 84000J	2 of 75	2100
	acetone	nd - 6100	2 of 75	200
	ethylbenzene	nd - 90000J	1 of 75	7700
	xylene	nd - 400,000J	4 of 65	1680
	benzo(a)anthracene	nd - 35,000J	4 of 26	224
	benzo(b)flouranthene	nd - 64,500J	2 of 26	1500
	benzo(a)pyrene	nd - 24,000J	3 of 26	61
	phenanthrene	nd - 62,000J	1 of 26	50,000
	pyrene	nd - 54,000J	1 of 26	50,000
	chrysene	nd - 28,000J	4 of 26	560
	benzo(k)fluoranthene	nd - 66,000J	2 of 26	1500
	indeno(1,2,3cd)pyrene	nd -8200J	2 of 26	4480

nd - not detected
J - indicates an estimated value
* - adjusted for an inorganic carbon concentration of 1.4%
** - Pre-IRM Sampling, only two areas of the soil media exceeded SCGs at depth after IRM work

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
OU-1 No Further Action	$1,500,000*	$0	$1,500,000*
OU-2 GW-2b No Further Action	$75,000	$23,000	$430,000
OU-2 GW-3a Groundwater Removal and Treatment	$4,000,000	$67,000	$5,100,000
OU-2 GW-5b Air Sparging/Vapor Extraction	$3,000,000	$67,000	$4,100,000

* This reflects the cost already spent to complete the soil removal IRM. No additional cost are associated with OU #1 since long term monitoring will be addressed in OU #2.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Carborundum Globar
Proposed Remedial Action Plan
Town of Niagara, Niagara County
Site No.9-32-036
Operable Unit 1 and 2

The Proposed Remedial Action Plan (PRAP) for the Carborundum Globar site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on June 19, 2000. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil and sediment at the Carborundum Globar Site. The selected remedy was No Further Action for Operable Unit 1, Site Soils and No Further Action with groundwater monitoring for Operable Unit 2, Site groundwater.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on June 27, 2000 which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. No written comments were received.

The public comment period for the PRAP ended on July 21, 2000.

This Responsiveness Summary responds to all questions and comments raised at the June 27, 2000 public meeting.

COMMENT 1: The property to the east, do you know who owns it?

RESPONSE 1: The actual property ownership is unclear at this time. Niagara Vest owns a portion of the area east of the Carborundum site but also the Town of Niagara has a paper street in the area. The BP Company is researching the ownership issues to gain access to perform the investigative work on OU #3.

COMMENT 2: Will the site monitoring wells detect contamination from the east area?

RESPONSE 2: Yes. The groundwater flow at the site is in the south western direction. Ground water quality will be monitored by the site monitoring wells both up gradient and down gradient of the site.

COMMENT 3: How deep are the monitoring wells?

RESPONSE 3: The monitoring wells monitor two water bearing zones on the site. The overburden wells monitor the soil area above the bedrock. These wells range from 15 to 32 feet deep. The bedrock wells monitor the first water bearing fracture zone in the bedrock. These wells range from 25 to 45 feet deep.

COMMENT 4: How often will the wells be tested?

RESPONSE 4: This will be determined through the preparation and implementation of the groundwater monitoring plan. The monitoring plan will be placed in the Document Repository and available for review by the community.

COMMENT 5: Why does Union Carbide have to do semi-annual reports while the Carborundum Globar site will only have to do annual?

RESPONSE 5: The annual report that will be provided is a summary of the groundwater sampling that occurred during the previous year. The Carborundum Globar site will be sampled more than once per year as required in the yet to be approved Monitoring plan. The sampling results will be placed in the Document Repository for review by the community.

COMMENT 6: How long will this monitoring go on?

RESPONSE 6: There is no time limit on the monitoring requirement. Ground water monitoring will continue as long as ground water quality standards are exceeded.

COMMENT 7: Will there be a problem with gardens or digging holes in the residential properties near the site?

RESPONSE 7: The Remedial Investigation did not find any indication that contamination or overburden groundwater migrated into soil in any residential area. There is no reason for concern by the neighbors from gardening or digging into the soil at their homes.

COMMENT 8: Who monitored the IRM construction?

RESPONSE 8: The NYSDEC had a construction inspector on site during the performance of the IRM.

COMMENT 9: Where did the soils go?

RESPONSE 9: Most of the excavated contaminated soil went to Modern Disposal as a non-hazardous waste. The highly contaminated soil was disposed at CWM as a hazardous material.

COMMENT 10: Is there a surface water problem?

RESPONSE 10: No, surface water in the storm sewers was evaluated during the Remedial Investigation and found not to be impacted by the site.

COMMENT 11: When did the comment period start?

RESPONSE 11: The comment period started on June 19, 2000 and ran through July 21, 2000.

APPENDIX B

Administrative Record

ADMINISTRATIVE RECORD

The following documents constitute the Administrative Record for the Carborundum Globar Site Record of Decision:

Responsiveness Summary (Appendix A of ROD) for the Remedial Investigation/Feasibility Study and Proposed Remedial Action Plan, July 2000.

Proposed Remedial Action Plan, Carborundum Globar Site, NYSDEC, May 2000.

Feasibility Study, Carborundum Globar Site, Duke Engineering & Services, Inc., January 2000

Post IRM Groundwater Sampling, Carborundum Globar Site, Duke Engineering & Services, Inc., Inc., January 2000.

Execution of the Interim Remedial Measure Volumes I & II, Carborundum Globar Site, Duke Engineering & Services, Inc., December 1999.

Test Pit Sampling Results, Carborundum Globar Site, Duke Engineering & Services, Inc., May 1999.

Plans and Specifications IRM Project, Carborundum Globar Site, Duke Engineering & Services, Inc., February 1999

Interim Remedial Measure Decision Document, Carborundum Globar Site, NYSDEC, January 1999.

Interim Remedial Measure Work Plan, Carborundum Globar Site, Duke Engineering & Services, Inc., January 1999.

Phase II Remedial Investigation Final Report, Carborundum Globar Site, Duke Engineering & Services, Inc., August 1998.

Phase II Remedial Investigation Work Plan, Carborundum Globar Site, Intera Consultants Ltd., August 1997.

Remedial Investigation Final Report, Carborundum Globar Site, Intera Inc., August 1997.

Remedial Investigation Work Plan, Health and Safety Plan, Quality Assurance Project Plan, Carborundum Globar Site, Intera Inc., March 1996.

Citizen Participation Plan, BP Oil, February 1996

RI/FS Consent Order, September 1995.

Preliminary Site Assessment, Carborundum Globar Site, Intera Inc., May 1993.

Preliminary Site Assessment Consent Order, June 1992.

Preliminary Site Assessment Task 1, URS Consultants, December 1990.

Preliminary Assessment Carborundum, NUS Corporation Superfund Division, December 1987.