Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

100 Oser Avenue Site
Operable Unit 1
Town of Smithtown, Suffolk County
Site Number 1-52-162

March 2002

New York State Department of Environmental Conservation

GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

100 Oser Avenue Inactive Hazardous Waste Site
Operable Unit 1 On-site and Near Site Soil, Soil Gas, Indoor Air, and Groundwater
Town of Smithtown, Suffolk County, New York
Site No. 1-52-162

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for Operable Unit 1 (OU1) of the 100 Oser Avenue 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 100 Oser Avenue OU1 inactive hazardous waste disposal 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, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the 100 Oser Avenue OU1 site and the criteria identified for evaluation of alternatives, the NYSDEC has selected soil vapor extraction and in situ chemical oxidation. The components of the remedy are as follows:

1. Expansion of the soil vapor extraction system on the 100 Oser Avenue property to remediate the soil in the source area and contaminated soil gas to prevent further migration to indoor air.

2. In-situ treatment of groundwater using chemical oxidation.

3. A contingency for extraction and treatment of groundwater if in-situ chemical oxidation does not prove to be effective.

4. Proper closure of dry wells in the source area and re-routing of storm water away from contaminated areas.

5. Long term monitoring of soil gas and groundwater at the site.

6. Operation and maintenance of the expanded soil vapor extraction system.

7. Institutional controls to prevent exposure to contaminated soil and groundwater and deed restrictions to limit future use of the site to industrial and commercial use.

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.

3/28/2002
Date

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

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SECTION 1: SUMMARY AND PURPOSE OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), 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 100 Oser Avenue site, a Class 2 inactive hazardous waste disposal site. A Class 2 designation indicates that there is a significant threat or impact to human health and/or the environment. As more fully described in Sections 3 and 4 of this document, former textile manufacturing and dry cleaning activities have resulted in the disposal of a number of hazardous wastes, including tetrachloroethene, at the site, some of which were released or have migrated from the site to surrounding areas, including the indoor air, soil gas, and groundwater at adjacent businesses and residences. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- a significant threat to human health associated with contaminated indoor air and groundwater;

- a significant environmental threat associated with the impacts of contaminants to the groundwater, a sole source aquifer.

In order to eliminate or mitigate the significant threats to the public health and the environment that the hazardous wastes disposed at the 100 Oser Avenue site has caused, the following remedy was selected:

- in-situ groundwater treatment by chemical oxidation; and

- expansion of the existing soil vapor extraction (SVE) system in the source area and in and around the 110 Oser Avenue building.

The selected remedy, discussed in detail in Section 7 of this document, is 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 100 Oser Avenue site, Operable Unit (OU) 1 is located in the Heartland Industrial Park in the hamlet of Hauppauge, Town of Smithtown, Suffolk County. The site is located on Oser Avenue, west of Old Willet's Path, north of the Long Island Expressway, and south of Veteran's Memorial Highway.

The 100 Oser Avenue property comprises approximately two and one half acres, with an approximately 24,000 square foot building and a paved parking lot. A small wooded border has been placed between the site and a residential neighborhood. The site location is shown on Figure 1 and the site layout is shown on Figure 2.

Operable Unit 1, which is the subject of this ROD, consists of the 100 Oser Avenue property and two adjacent parcels, 90 Oser Avenue to the east and 110 Oser Avenue to the west. Figure 2 shows the boundaries of Operable Unit 1. An Operable Unit represents a portion of the site remedy which for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, a threat of release, or an exposure pathway resulting from the site contamination. These adjacent parcels were included in Operable Unit 1 because contamination at the 100 Oser Avenue site created similar environmental impacts at these properties. The configurations of the two adjacent properties are similar to the 100 Oser Avenue site. The remaining operable units for this site are described in Section 3.2 below.

New Mill Pond is located approximately 1.2 miles to the northeast. Other local surface water bodies include storm water recharge basins at various locations surrounding the site.

Other sites with potential sources of contamination in the area include:

- Glaro, Inc. (735 Old Willets Path, 1 mile southeast) - active remediation
- Computer Circuits (145 Marcus Blvd., 1,100 feet south-southwest) - active EPA investigation
- Standard Microsystems Corporation (300 Kennedy Drive, 2,500 feet south) - active EPA investigation
- American Tissue (50 Cabot Court, 4,200 feet west-southwest) - active SCDHS investigation
- Arkay Packaging (22 Arkay Drive, 3,300 feet southwest) - active SCDHS investigation

All of the above-mentioned sites are located in Hauppauge. The distances indicated are approximate.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

From 1975 to 1985, Sands Textiles Finishers, Inc. used and disposed tetrachloroethene (PCE or perc) at the site. PCE was used to dry clean finished textiles at the facility.

Disposal of PCE is likely to have occurred in the storm water drainage system via pipes from the building and the septic system via floor drains or slop sinks. Anecdotal evidence indicates that used PCE was also disposed in the roof drains and delivered to the sewer system and that there were open pits in the floor in which the used PCE was disposed.

Two aboveground PCE storage tanks and one underground fuel oil storage tank were formerly located on the site. These tanks may have leaked and caused soil and groundwater contamination. The tanks were removed when the property was purchased by a private owner in 1985.

3.2: Remedial History

In 1985, Anwar Chitayat purchased the 100 Oser Avenue property to expand his business from the 110 Oser Avenue property. In 1989, a soil and groundwater investigation on an adjacent property, Pall RAI, Inc., led to the discovery of elevated concentrations of PCE at the 100 Oser Avenue property. Based on the Pall RAI data and at the request of the Suffolk County Department of Health Services (SCDHS), Mr. Chitayat initiated his own investigation. He discovered additional soil and groundwater contamination during this investigation at the 100 Oser Avenue property.

In 1996, the NYSDEC became aware of contamination at the site. The NYSDEC began negotiations with the current site owner to include the site in the Voluntary Cleanup Program. However, the site owner was not able to implement a remedial investigation and feasibility study in a time frame satisfactory to the NYSDEC. A classification package was prepared to list the site as a Class 2 site.

The site was classified as a Class 2 site in 1998 and was referred to the State Superfund program. A consent order was signed by the current site owner to reimburse the NYSDEC for the cost of the investigation and remediation.

A second operable unit was defined in November 2000 when significant contamination was found off site of the 100 Oser Avenue property during Phase II of the OU1 Remedial Investigation. OU1 was defined as the 100 Oser Avenue property and two adjacent properties within the industrial park, 90 and 110 Oser Avenue. OU2 was defined as the impacted area outside of these three properties. The OU2 Remedial Investigation and Feasibility Study (RI/FS) consists of an off-site investigation of groundwater, surface water, and soil gas, and is currently in progress.

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, the NYSDEC recently 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 March 1999 and October 2000 and the second phase between October 2000 and May 2001. Two reports entitled "Remedial Investigation Report, October 2000" and "Phase II Remedial Investigation Report, May 2001" have been prepared which describe the field activities and findings of the RI in detail.

The RI included the following activities:

- Installation of 13 soil borings down to 50 feet below ground surface (bgs) for chemical analysis of soils as well as physical properties of soil and hydrogeologic conditions;

- Inspection of the drainage and septic systems and roof drains via a video camera;

- Installation of eight Hydropunch® vertical profile borings (down to a maximum of 242 feet bgs) for collection of soil samples and groundwater samples for chemical analysis;

- Installation of eight shallow (85 feet bgs) and six deep monitoring wells (178 to 231 feet bgs) to determine the chemical properties and flow of the groundwater on site and off site;

- Installation of 18 indoor and 76 outdoor soil gas points for sampling the soil gas and to determine potential indoor air impacts;

- Installation of six permanent indoor soil gas sampling ports;

- Collection of 72 indoor air samples at the on-site building and adjacent industrial and residential properties to determine impacts and possible exposures;

- Collection of 21 surface water and sediment samples from the storm water drainage system.

To determine which media (soil, groundwater, etc.) are contaminated 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 100 Oser Avenue site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, for soils, site specific background concentration levels can be considered for certain classes of contaminants. Guidance values for PCE in indoor air were obtained from the New York State Department of Health (NYSDOH).

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

Chemical concentrations are reported in parts per billion (ppb), parts per million (ppm), and micrograms per cubic meter ($\mu g/m^3$) for indoor air samples. For comparison purposes, where applicable, SCGs are provided for each medium and contaminant.

4.1.1: Site Geology and Hydrogeology

The Upper Pleistocene formation is composed of sand, gravel, and boulders with occasional silt and clay lenses. The bottom of this formation is approximately 200 feet bgs. Below the Upper Pleistocene is a deposit of gray and white silty sand and gravel with lenses of coarse sand and clay known as the Magothy Formation. Below the Magothy Formation are the Raritan Clay and the Lloyd Sand Members. Bedrock is located approximately 1,200 feet bgs.

Localized lenses of fine sand, silt, and/or clay were encountered at several locations at the site. A layer of clay was found between the Upper Pleistocene and the Magothy Formations. The thickness of the clay layer varied across the site from approximately six inches to five feet.

Two primary aquifers are located in the region: the Upper Pleistocene or Upper Glacial Aquifer and the Magothy Aquifer. The Ronkonkoma terminal moraine corresponds to a groundwater divide on Long Island. The site, located north of the groundwater divide, is in a recharge area which is characterized by recharge from precipitation and infiltrating into the ground. Groundwater generally flows in a northeast direction. The groundwater table at the site is located approximately 70 feet bgs.

4.1.2: Nature of Contamination

As described in the RI report, many soil, soil gas, groundwater, indoor air, and sediment samples were collected at the site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs are inorganics (metals) and volatile organic compounds (VOCs).

Isolated detections of inorganic contaminants in groundwater include arsenic, chromium, lead, antimony, and manganese at concentrations slightly above their groundwater standards. These inorganic contaminants are most likely due to naturally occurring metals in the soil or turbidity in the water and are not considered contaminants of concern.

The VOC contaminant of concern in soil is PCE. The VOCs of concern in groundwater are PCE, toluene 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethene (1,2-DCE), trichloroethene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA). In the indoor air, PCE, methylene chloride, 1,2,4-trimethylbenzene, methyl isobutyl ketone (MIBK), and toluene were found at concentrations exceeding typical background concentrations. Some of these compounds, such as MIBK, are used as part of the ongoing processes at the facility.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in the soil, groundwater, and indoor air and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

SOIL

Subsurface soil samples and dry well soil samples were collected from the 90, 100, and 110 Oser Avenue properties using soil borings and hand augers. A hot spot of soil contamination was found in the western alley on the 100 Oser Avenue property at concentrations up to 9,400 ppm PCE, which indicated a source area at the storm water drainage system and western dry wells. The soil cleanup objective for PCE is 1.4 ppm.

Dry Wells

Soil samples from the western dry wells of the 100 Oser property were collected with hand augers. Results revealed concentrations of PCE up to 1,900 ppm in the west storm drain (WSD). Other contaminants included 1,2-dichloroethene (1,2-DCE) up to 600 ppm. The cleanup objective for 1,2-DCE is 0.3 ppm.

Soil samples from the north dry well (NDW) and north storm drain (NSD) on the 100 Oser property revealed contamination from carbon disulfide at 22 ppm, 2-butanone at 60 ppm, and TCE at 10 ppm. The cleanup objectives for these contaminants are 2.7 ppm, 0.3 ppm, and 0.7 ppm, respectively. Benzene, toluene, ethylbenzene, and xylene (BTEX) compounds were detected at low concentrations but are most likely the result of water runoff from the parking lot.

Soil samples were also collected from the 110 Oser Avenue dry wells using hand augers. Sample results revealed concentrations of PCE at 0.2 ppm and acetone at 0.073 ppm in dry well, DW-7, which is located on the western side of the 110 building. These are below their respective cleanup guidelines.

Subsurface Soil

Five soil borings were drilled during the first phase of the investigation on the western side of the 100 Oser Avenue building. PCE concentrations ranged from non-detect (ITSB-01) to 2,900 ppm (ITSB-05). Borings were continued to a depth of 35 feet bgs and PCE was still present in the soil exceeding soil cleanup objectives at 150 ppm (ITSB-05). ITSB-05 is located adjacent to the western dry wells, south of the former AST locations. These soil boring and sample locations are shown on Figure 3.

Subsurface soil samples were collected from eight additional borings in the area of the western dry wells during the Phase II of the RI. Laboratory sample results revealed PCE concentrations as high as 9,400 ppm in ITWSB-04 at 35 feet bgs. Field screening of samples also indicated that contamination is present through the soil column down to the groundwater table. These soil boring and sample locations are shown on Figure 3.

Select samples from six on-site Hydropunch® borings across the site were also analyzed. The number of samples were chosen by random to give an indication of the background quality of the soil and the geology on the site. PCE was found in these soil samples, but the subsurface concentrations were below soil cleanup objectives.

GROUNDWATER

The groundwater was sampled using vertical profiling (using Hydropunch® sampling methods) through the soil column and by installing and sampling monitoring wells. The monitoring wells were sampled on multiple occasions as part of the RI and the Phase II RI.

Shallow Groundwater

The highest concentrations of PCE were generally found in the upper portions of the Upper Glacial aquifer and the concentrations decreased with depth. Groundwater across the 100 Oser Avenue site and most of OU1 is contaminated with PCE exceeding groundwater standards. In some locations, PCE concentrations exceed 80,000 ppb. The groundwater standard for PCE is 5 ppb. Shallow groundwater concentrations are illustrated on Figure 4.

Shallow groundwater samples were collected from 77 feet bgs to 100 feet bgs from six on-site Hydropunch® borings (ITHP-2, ITHP-3, ITHP-5, ITHP-6, ITHP-8, and ITHP-9). PCE was found to exceed its standard in at least one sample from every on-site Hydropunch® boring. The highest PCE concentration was found on the northeastern corner of the 100 building in ITHP-05. PCE concentrations on the site ranged from non-detect to 100,000 ppb. The Hydropunch® boring locations are shown on Figure 4.

Concentrations of PCE ranged from non-detect to 19,000 ppb (ITMW-03) in the eight newly-installed shallow monitoring wells, which were screened in the Upper Glacial Aquifer.

Two shallow wells were installed off site, but within the boundaries of OU1. One well is located on the 110 Oser property and the other well is located on the 90 Oser Avenue property. The downgradient 90 Oser Avenue well (ITMW-00-12S) had PCE concentrations up to 12,000 ppb.

Two previously installed wells were also sampled. MW-9 is located upgradient of the 110 property and MW-13 is located in the western alley of the 100 building. The PCE concentrations in MW-9 ranged from 660 ppb to 860 ppb. In MW-13, PCE concentrations ranged from 79,000 ppb to 87,000 ppb.

Deep Groundwater

The Hydropunch® borings were continued to depths reaching 242 feet bgs and deep groundwater samples were collected throughout the water column. Deep groundwater sample results showed PCE at concentrations up to 3,000 ppb. Additional contaminants exceeding standards found mostly in the deep groundwater were TCE (up to 130 ppb), toluene (up to 36 ppb), chloroform (up to 22 ppb), 1,1-DCE (up to 24 ppb), and 1,1,1 TCA (up to 51 ppb). The groundwater standards are 5 ppb for TCE, toluene, 1,1-DCE, and 1,1,1-TCA. The groundwater standard for chloroform is 7 ppb.

Six deep monitoring wells were installed on-site, some of which were converted from Hydropunch® borings. The depth of the groundwater well screens ranged from 160 feet bgs to 230 feet bgs. In the deep wells, PCE concentrations were found up to 8,200 ppb (ITMW-05D). Figure 5 shows the location of the deep groundwater plume relative to the site and OU1. Please see Table 1 for a summary of the sampling results.

Storm Water Drainage System

Standing water samples were collected from the storm water drainage system on-site and off-site. Because this water drains from the dry wells into groundwater, these sample results were compared to the groundwater standard for PCE (5 ppb).

Prior to the cleanup of the dry well in the western alley of the 100 building (see Section 4.2 below), standing water in the western dry wells had concentrations of PCE up to 7,100 ppb.

On the 110 Oser Avenue property, one surface water sample from dry well DW-7 had a PCE concentration of 46 ppb. Locations for the storm water drain system can be seen on Figure 6.

SOIL GAS

Soil gas samples were collected at a depth of ten feet bgs on site and off site to determine potential source areas and indoor air impacts to local buildings. Samples were collected at adjacent properties in all directions from the site, including the residential area. Figure 7 shows the soil gas sample locations, analytical results, and soil gas concentration contours. The highest concentration contour is centered on the 100 and 110 Oser Avenue properties.

Soil gas samples at the 100 Oser site were as high as 35,000,000 $\mu g/m^3$ (SG-00-59) of PCE at the western portion of the site. Soil gas samples from the 110 property had concentrations of PCE as high as 12,000,000 $\mu g/m^3$ (ITSG-17) adjacent to the source area. During the RI, a 1,000 $\mu g/m^3$ contour line was use as a goal to delineate the extent of the soil gas contamination.

Six permanent soil gas wells (FSG 1-6) were installed to 10 feet bgs through the foundation of the 100 Oser Avenue building. Samples from these wells revealed PCE concentrations in the soil gas under the building slab as high as 150,000,000 $\mu g/m^3$ (FSG-3).

Two vertical profiles of soil gas samples were also collected during the second phase of the investigation to determine the potential of PCE vapors to originate from the groundwater plume and migrate upward into the residential area. The vertical profiles were completed to a depth of 35 feet bgs. The results indicated PCE soil vapors increased as depth increased.

INDOOR AIR

Indoor air samples were collected using three different methods: passive sampling devices, summa canisters, and carbon tubes by NYSDOH, the NYSDEC's standby consultant, and the SCDHS, respectively. Passive sampling devices are small badges generally left in a location for 24 hours. Summa canisters are evacuated containers which actively draw air when a valve is opened. Carbon tubes are glass tubes containing absorbent material through which air is drawn by a hand-held vacuum pump. Figure 8 shows the indoor air sample locations and results. Results of the indoor air samples can be found in Table 3.

PCE was found in the 100 Oser Avenue building at levels up to 584 $\mu g/m^3$. At the 110 Oser Avenue building, PCE concentrations were found up to 3,160 $\mu g/m^3$. The indoor air samples collected at 90 Oser Avenue were below the NYSDOH PCE guidance value of 100 $\mu g/m^3$.

The indoor air of other adjacent businesses on Oser Avenue and Holiday Park Drive were sampled, but results were less than 100 $\mu g/m^3$, which is the NYSDOH recommended guideline for PCE in residential indoor air. PCE concentrations in residences adjacent to the site were found to be below 11 $\mu g/m^3$.

4.2: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. A number of IRMs have been conducted at the 100 Oser Avenue site and Operable Unit 1.

The first IRM was performed in 2000, consisting of an adjustment of the heating, ventilation, and air conditioning (HVAC) system in the 100 and 110 Oser Avenue buildings. This was done to create a positive pressure atmosphere inside the building to prevent contaminated soil gas from entering the slab and contributing to an indoor air exposure to PCE. This IRM was successful in reducing PCE concentrations at the 100 building, but does not appear to have been successful at the 110 building, as shown in Table 3.

The second IRM consisted of removal of contaminated soil and water from the septic system and the storm water drainage structures on the 100 Oser Avenue property. Contaminated soil was removed from the west storm drain and its associated overflow dry well. Approximately 11 cubic yards of contaminated sediments was removed from the western storm drainage structures in April 2000.

The third IRM consisted of the installation of a soil vapor extraction system to begin remediating the source area. A vapor extraction well (SVE-1) was placed at the source area between the western dry well and the western overflow dry well, as shown on Figure 3. The soil vapor is extracted with a vacuum and sent to a treatment system. The treatment system consists of catalytic oxidation, which completely destroys the PCE. The operation began in September 2000 and is being monitored monthly. Approximately 250 pounds of PCE have been destroyed by the IRM. The SVE is successful at extracting and destroying PCE, but the system is not capable of completely remediating the source area. Figure 9 shows the existing SVE system.

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 5.0 of both the RI report and the Phase II RI Report.

An exposure pathway is the manner by which an individual may come in 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.

Pathways which are known to or may exist at the site include:

- ingestion of contaminated groundwater: this pathway could potentially occur in the future if private or public drinking water supply wells existed at or near the site. A potable well search was performed and three downgradient public water supply well fields were found within one mile of the site. Residences and businesses in the area are served by public water from these Suffolk County Water Authority supply wells. The closest public supply well field located 2,000 feet downgradient of the site (Falcon Drive) is being treated for VOC contamination. Groundwater samples indicate that the 100 Oser Avenue site may be one source of the contamination at the Falcon Drive well field. Other sources in the area may also be contributing to the VOC contamination;

- dermal contact with contaminated soil: this pathway could occur during construction activities at the site;

- inhalation of VOC vapors from contaminated soil gas: this exposure pathway has occurred. Contaminated soil gas under the 100 and 110 Oser Avenue buildings has migrated from the source area and entered into the indoor air of both buildings. Soil gas samples in the residential area suggest that the indoor air is not likely to be impacted. Air samples collected from the residences verified that indoor air is not impacted from the site.

4.4: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The Fish and Wildlife Impact Assessment and Environmental Evaluation included in the RI presents a more detailed discussion of the potential impacts from the site to wildlife resources.

The site is located in a highly developed area. Most of the land is covered with pavement or buildings. Wildlife access to the contaminated soil or groundwater is unlikely because the site is paved and the depth of groundwater is 70 feet bgs.

Outdoor air samples at the small wooded area at the back of OU1 have not indicated any PCE in the breathing space within the OU1 boundaries.

There is no evidence of ecological impact due to the contamination. The nearest wetland area is located approximately ¾ mile downgradient of the site at the headwaters of the Nissequogue River. The potential impact of off-site groundwater contamination on this wetland will be investigated as part of the OU2 Remedial Investigation.

SECTION 5: ENFORCEMENT STATUS

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

The PRPs for the site that are documented to date include: Vanderbilt Associates, Sands Textiles Finishers Inc., the Anorad Corporation, and Anwar Chitayat.

The PRPs were not able to implement an RI/FS at the site in the time frame requested by the NYSDEC. However, in 1998 Anwar Chitayat entered into an Order on Consent to reimburse the NYSDEC for past and future costs regarding the investigation and remediation of the site contamination.

The following is the chronological enforcement history of this site.

Orders on Consent

Date	Index	Subject
9/25/98	D1-0023-98-09	Reimbursement for RI/FS and RD/RA

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 must 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.

The goals selected for this site are:

- Eliminate ingestion of groundwater affected by the site that does not attain NYSDOH Part 5 of the Sanitary Code standards.

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

- Eliminate, to the extent practicable, the migration of PCE to indoor air and exposures to PCE and other VOCs in indoor air.

- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of contaminants to the waters of the State.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the 100 Oser Avenue site were identified, screened and evaluated in the report entitled "Feasibility Study Report, October 10, 2001."

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to construct 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 Remedial Alternatives

Remedial alternatives to address site contamination are presented below by medium (soil gas and indoor air, soil, and groundwater) to simplify the comparison between them.

All remedial alternatives include:

(i) Institutional controls in the form of existing use and development restrictions limiting the use of groundwater as a potable or process water without necessary water quality treatment as determined by the Suffolk County Department of Health Services from the affected areas; and

(ii) Deed restrictions to be recorded in the chain of title of the 100 Oser Avenue site to restrict future site use to industrial and commercial purposes only and to require notification to the NYSDEC when any intrusive activities are planned.

(iii) Annual certification by the site owner to the NYSDEC that these institutional controls are in place, and in force.

SOIL GAS / INDOOR AIR ALTERNATIVES

Alternative SG-1 - No Further Action

This alternative recognizes remediation of the site conducted under previously completed IRMs. Only continued monitoring would be performed to evaluate the effectiveness of the existing IRM. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Present Worth:	$307,450
Capital Cost:	$ 0
Annual O&M:	$20,000

Alternative SG-2 - Soil Vapor Extraction (SVE)

Soil vapor extraction is an in-situ process where VOC contaminants absorbed to the soil are removed from the unsaturated zone by physically applying a vacuum to the subsurface. The vacuum creates an air movement and the contaminants are volatilized and drawn through a vapor treatment system. The vacuum is applied either through shallow trenches or vertical wells.

In this alternative, sixteen soil vapor wells would be installed adjacent to and inside two of the buildings of OU1. Soil gas would be extracted and transferred to a treatment system. The treatment system would consist of either vapor phase carbon or a catalytic oxidizer designed to comply with the appropriate air discharge criteria.

Because there is an existing public exposure route associated with soil gas, this element of the site remedy had been initiated as an IRM. Work plans for the design of the SVE expansion are currently being developed. Figure 10 shows a conceptual layout of the SVE expansion.

Present Worth:	$ 882,924
Capital Cost:	$ 639,714
Annual O&M:	$130,800
Time to Implement:	6 to 8 weeks

SOIL ALTERNATIVES

Alternative S-1 - No Further Action

This alternative recognizes remediation of the site conducted under previously completed IRMs. Only continued groundwater monitoring would be performed in this alternative. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Present Worth:	$316,059
Capital Cost:	$ 0
Annual O&M:	$20,560

Alternative S-2 - Soil Vapor Extraction (SVE)

Soil vapor extraction is an in-situ process where adsorbed VOC contaminants are removed from the unsaturated zone by physically applying a vacuum to the subsurface. The vacuum creates an air movement and the contaminants in the soil are volatilized and drawn through a vapor treatment system. The vacuum is applied either through shallow trenches or vertical wells.

Two vapor extraction wells within the dry well source area would be installed to remove the PCE. The soil vapor would be extracted using standard extraction wells and transferred to a treatment system. The treatment system would consist of an existing catalytic oxidizer and an acid gas scrubber. The treatment system would be located on the northern side of the 100 Oser Avenue building and the vapor extraction wells would be located on the western side of the building at the source area.

Present Worth:	$1,488,864
Capital Cost:	$ 595,800
Annual O&M:	Years 1 & 2 $ 289,973
	Year 3 $ 84,300
	Years 4-10 $ 36,400
Time to Implement:	6 to 8 weeks

Alternative S-3 - In-Situ Chemical Oxidation

In-situ chemical oxidation is an in-place treatment technology that breaks down contamination without a removal phase. Chemical additives are injected into the soil and, when they come into contact with the contamination, oxidize the organic contaminants into non-toxic compounds.

This alternative would consist of injection of a chemical oxidizer, such as sodium permanganate, into the area surrounding the dry wells located on the western side of the 100 building.

Groundwater and soil gas samples during system operations and maintenance (O&M) would indicate if the source area is being remediated effectively. If groundwater and soil gas concentrations do not decrease to an acceptable degree after the first injection, an additional injection event would be required. O&M would last for two years for this alternative.

Present Worth:	$ 2,774,598
Capital Cost:	$ 2,724,097
Annual O&M:	$ 27,160
Time to Implement	one month

Alternative S-4 - SVE and In-Situ Chemical Oxidation

This alternative is a combination of Alternatives S2 and S3. A chemical oxidant, such as sodium permanganate, would be injected into the area surrounding the dry wells located on the western side of the 100 building. Less oxidant would be required for this alternative than Alternative S-3 since SVE would be used to remediate a portion of the source area.

After sufficient time for adequate contact and chemical reaction of the contaminants and oxidant, a soil vapor extraction system would be activated to recover the remaining contaminants. The soil vapor would be extracted using standard extraction wells and transferred via subsurface pipe to an on-site treatment system.

Present Worth:	$ 2,507,960
Capital Cost:	$ 1,978,411
Annual O&M:	Year 1 $449,635
	Year 2 $78,000
	Year 3 $35,400
Time to Implement	8 to 10 weeks

GROUNDWATER ALTERNATIVES

Alternative G-1 - No Further Action

This alternative recognizes remediation of the site conducted under previously completed IRMs. Only continued groundwater monitoring would be performed. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Present Worth:	$316,059
Capital Cost:	$0
Annual O&M:	$20,560

Alternative G-2 - Groundwater Extraction and Treatment

In this alternative, groundwater would be extracted from the contaminated aquifer, pumped to a treatment system, and discharged to a local recharge basin. A representative groundwater treatment system would include an equalization tank and transfer pump, metals and solids pre-treatment, an air stripper, and granular activated carbon for polishing the liquid stream prior to discharge.

Five extraction wells would be installed within the plume and an extraction system would transfer the contaminated water to a treatment system. Wells would be installed at the downgradient boundary of OU1 to prevent further off-site migration of contamination. The system would be designed to comply with air and surface water discharge criteria.

Present Worth:	$ 7,149,727
Capital Cost:	$ 1,141,808
Annual O&M:	$ 315,821
Time to Implement	3 to 4 months

Alternative G-3 - In-Situ Chemical Oxidation

A solution of an in-situ chemical oxidant, such as potassium permanganate, would be injected into the groundwater via four new shallow wells and four existing deep monitoring wells.

The chemical oxidant solution would oxidize organic contaminants in the subsurface to non-toxic compounds. More than one injection may be necessary to treat the entire thickness of the plume and to ensure adequate contact time with the groundwater and contaminants.

Groundwater samples would indicate if the in-situ chemical oxidant had reacted and destroyed the organic contaminants both at the source area and in the groundwater plume. If groundwater contamination does not decrease to an acceptable degree after the first injection, an additional injection event would be required at the source area and in the groundwater.

Two groundwater wells would be installed at the downgradient border of the site for monitoring purposes. After sufficient time for the oxidation of the contaminants to occur, the groundwater wells may be converted to extraction wells as part of a contingency plan if the in-situ chemical oxidation is not successful. A treatment system would also be implemented as part of the contingency plan. O&M would last for two years.

Present Worth:	$ 1,918,509
Capital Cost:	$ 1,880,280
Annual O&M:	$ 20,560
Time to Implement	1 month

Alternative G-4 -
In-Situ Chemical Oxidation and
Groundwater Extraction and Treatment

This alternative would be a combination of the two previous groundwater alternatives. A chemical oxidant would be injected into the groundwater via wells located in the source area. Less oxidant would be used for this combination than Alternative G3 due to the secondary remediation system to extract and treat the remaining contaminants.

Five groundwater extraction wells would be installed downgradient from the chemical injection as a means of mass removal and containment to prevent further off-site contamination. The treatment system would include an air stripper and vapor phase activated carbon. The system would be designed to comply with air and surface water discharge criteria. The treated water would be pumped to a recharge basin located at an adjacent property.

Present Worth:	$ 5,475,435
Capital Cost:	$ 2,449,358
Annual O&M:	$ 291,538
Time to Implement	3 to 6 months

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is 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. The most significant SCGs for this site are ambient groundwater quality standards, public drinking water standards, the indoor air objectives for PCE in residential indoor air, and soil cleanup guidelines set by the NYSDEC's TAGM 4046. Each alternative is compared with the SCGs for the medium that pertains to that alternative (e.g. soil, groundwater, indoor air).

The No Further Action alternatives, Alternatives SG-1, S-1, and G-1, would not comply with SCGs for soil, groundwater, or indoor air.

Alternative SG-2 would reduce the soil gas and indoor air vapors in OU1 and would comply with the indoor air SCGs.

Alternative S-2 would comply with SCGs for soil by significantly reducing the source area contribution to groundwater and soil gas contamination.

Alternatives S-3 and S-4 would achieve SCGs for soil by significantly reducing the source area and preventing the migration of contaminants into groundwater.

Alternative G-2 would comply with SCGs in approximately 35 years by reducing the contaminants in groundwater and reducing the migration of contaminated groundwater. The SCGs would also be met relating to groundwater and air discharges after treatment.

Alternative G-3 and G-4 would achieve SCGs by significantly reducing and destroying the contaminants in groundwater. These alternatives would also prevent the migration of the contaminated groundwater off site.

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.

The No Further Action Alternatives, SG-1, S1 and G1, would not reduce the potential risks to human health or the environment because existing contamination and exposure routes would remain.

Alternative SG-2 would protect public health by preventing exposure to contaminated soil gas, but environmental protection of the groundwater resources would not be provided by this alternative alone. Similarly, Alternatives S-2, S-3, and S-4 would be protective of human health for direct exposure to soil contaminants by removing or destroying contamination in the source area, preventing further migration of PCE in the soil gas and groundwater. However, because soil gas contamination has migrated well beyond the source area, these alternatives alone would not be protective of public health until the soil gas dissipates over time.

Alternative G-2 would be protective of human health and the environment for groundwater exposures within the OU1 boundary since VOC impacted groundwater would be captured and treated and prevented from migrating further off-site. Similarly, Alternatives G-3 and G-4 would protect human health and the environment by destroying dissolved VOC contaminants, preventing contaminant exposure within OU1, and further migration of the groundwater plume.

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.

There would be no short term adverse impacts from the No Further Action alternatives, Alternatives SG-1, S-1, and G-1 since no construction activities are associated.

Potential short term risks to construction workers and the community may exist during activities involved with the installation of the remedial components of Alternatives S-2 and SG-2, S-3, and S-4. Alternatives S-3 and S-4 would also present potential risk of exposure to contaminated media and oxidizing agents. The use of personal protective equipment (PPE) would minimize such exposure.

Alternative S-4 would take the longest time to implement and provide a greater short term risk, followed in order by Alternative S-2, and Alternative S-3. However, the length of time to achieve the cleanup objectives would be longest for Alternative S-2, followed by Alternatives S-4 and S-3. Alternatives S-3 and S-4 would require a shorter period of time for operations and maintenance because the chemical reaction to oxidize the contaminants is an immediate reaction.

Potential risks to construction workers and the community would possibly exist during the installation of monitoring wells and mixing and injection of the chemical oxidant in Alternatives G-3 and G-4. Exposure to contaminated media and would be minimized through the use of personal protective equipment (PPE).

Alternative G-2 would take the longest time to implement and provide a greater short term risk, followed by Alternatives G-3 and G-4, respectively.

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.

Because contaminant levels in soil and groundwater are high, the No Further Action alternatives, SG-1, S-1, and G-1, are not expected to be effective in the long term.

Alternative SG-2 would provide a long-term remedy by removing the soil gas contamination permanently by extracting and treating the contaminants.

Alternative S-2 would provide an effective long-term remedy for VOCs present in the vadose zone. The vacuum extraction system would capture and remove the existing contamination from the source area and prevent further migration of PCE.

Alternative S-3 would provide an effective long-term remedy for VOCs present in the vadose zone. The remedy would permanently destroy some, if not all, of the existing adsorbed phase VOC concentrations found in the vicinity of the western dry wells. This would reduce this area as a future source of groundwater contamination.

Alternative S-4 would provide an effective long-term remedy for soil contamination by a mixture of destruction and removal.

Alternative G-2 would provide an effective long-term remedy by permanently removing, treating, and containing the contaminated groundwater.

Alternative G-3 would provide an effective long-term remedy for VOCs in groundwater. The dissolved VOCs would be permanently destroyed in the groundwater and would be prevented from migrating off-site.

Alternative G-4 would provide an effective long-term remedy at the site by reducing the source area VOCs with oxidants and by capturing VOCs in the groundwater plume recovery wells.

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.

The No Further Action alternatives, Alternatives S1 and G1, would not reduce the mobility, toxicity, or volume of the contaminants. Contaminants would continue to migrate through the environment and their toxicity would remain the same. Natural attenuation would have a minimal effect on reducing the concentration levels of individual contaminants.

Alternative SG-2 would significantly reduce the volume and mobility of contaminants in soil gas and indoor air by removing them from the subsurface and preventing further migration to other buildings or through the soil.

Alternative S-2 would reduce the overall volume and mobility of contaminants in the soil by removing them from the subsurface and preventing further migration.

Alternative S-3 would effectively reduce the volume and toxicity of vadose zone contaminants in the source area by destroying the contaminant molecules in place.

Alternative S-4 would effectively and significantly reduce the overall volume, toxicity, and mobility of contaminants in the soil by destroying contaminants in the source area by oxidation, and removing contaminants in other areas with soil vapor extraction.

Alternative G-2 would reduce the overall volume and mobility of contaminants by removing them from the aquifer and preventing further migration.

Alternative G-3 would reduce the volume and toxicity of contaminants in the saturated zone by permanently destroying them.

Alternative G-4 would reduce the overall volume, mobility, and toxicity of contaminants by permanently destroying contaminants in the source area by oxidation, and removing contaminants in other areas with groundwater extraction and treatment.

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 S-1, G-1, and SG-1 would be easily implemented since no action would be required.

Alternatives SG-2 and S-2 would be implementable at the site since soil vapor extraction is a common remedy for VOCs in the vadose soil and soil gas. Similarly, the soil vapor extraction component of S-4 would be readily implementable.

The in-situ chemical oxidant associated with Alternatives S-3 and S-4 is readily available and has been demonstrated to be effective in treating groundwater for chlorinated ethenes, such as PCE. Injection would be accomplished through injection wells constructed identically to typical groundwater monitoring wells. The dry well structures already existing on site would be appropriate for use with these alternatives.

Alternative G-2 would be easily implementable at the site. Groundwater extraction and treatment systems are commonly used for remediation of contaminated aquifers. Recovery wells could be installed at the required depths. Construction of the treatment system and renovation of the existing recharge basin would be a straightforward task.

The in-situ chemical oxidant associated with Alternatives G-3 and G-4 is effective in treating groundwater for chlorinated ethenes, such as PCE. Injection would be accomplished through injection wells constructed identically to common groundwater monitoring wells. Groundwater monitoring wells already existing on site would be appropriate for use with this alternative.

The groundwater extraction and treatment system component of Alternative G-4 is commonly used for remediation of contaminated aquifers. Recovery wells could be installed at the required depths. Construction of the treatment system and renovation of the recharge basin would be a straightforward task.

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.

No capital costs are associated with Alternatives SG-1, S-1, and G-1. The only costs would be associated with periodic groundwater or soil gas monitoring for each alternative. The present worth cost of Alternative SG-1 would be $307,450. The present worth cost of Alternatives S-1 and G-1 would be $316,059.

The capital costs associated with Alternative SG-2 include the installation of vapor extraction wells, connection to the existing on-site vapor extraction system and facility, and the implementation of an air monitoring program. The capital cost would be approximately $639,714 and the total net present worth would be approximately $882,924.

Capital costs associated with Alternative S-2 include the installation of two extraction wells at the source area, an on-site treatment system, and the implementation of a soil gas and groundwater monitoring program. The capital cost would be approximately $595,800 and the present worth would be $1,488,864.

Capital costs associated with Alternative S-3 include full-scale injection, baseline monitoring, preparation and injection of the chemical oxidant, and a post injection monitoring program. Capital costs would be approximately $2,724,097 and present worth costs would be $2,774,598.

Capital costs associated with Alternative S-4 include: application of chemical oxidant, installation of vapor extraction wells, and the on-site soil vapor extraction and treatment system. The capital costs would be approximately $1,978,411. The total net present worth cost would be approximately $2,507,960.

Capital costs associated Alternative G-2 would include the installation of on-site recovery wells, an on-site treatment system, discharge piping to an off-site recharge basin, and the implementation of a groundwater monitoring program. The capital cost is $1,141,808. The present worth is $7,149,727.

Capital costs associated with Alternative G-3 include full scale injection, baseline monitoring, preparation and injection of oxidant, and reporting. Six wells would be installed as part of the alternative, including two wells for monitoring. The capital costs would be $1,880,280. The present worth cost would be $1,918,509.

Capital costs for Alternative G-4 would be approximately $2,449,358. The present worth cost includes the following assumptions: operating and maintaining the extraction and treatment system for 15 years and quarterly sampling for 10 years followed by semi-annual sampling. The present worth cost is $5,475,435.

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 manner in which the Department will address the concerns raised.

In general the public comments received were supportive of the selected remedy. Most of the comments related to the Operable Unit 2 remedial investigation. Several comments were received, however, pertaining to the proposed remedy, funding of the remedy, the Suffolk County Water Authority, and other local sites. The comments regarding the remedy pertained mostly to general concerns, such as noise, length of remediation time, funding, excavation of contaminated materials, and other potential contaminants of concern. There were no changes made to the selected remedy based on the comments received.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternatives SG-2 (soil vapor extraction), S-2 (soil vapor extraction), and G-3 (in-situ chemical oxidation) as the combined remedy for this site.

This selection is based on the evaluation of the alternatives developed for this site. With the exception of the No Action alternatives, each of the alternatives comply with the threshold criteria for the associated medium.

Alternative SG-2 is the only remedy for soil gas and indoor air that meets the threshold and balancing criteria. Because there is an existing public exposure route associated with soil gas, this element of the site remedy has been initiated at the site as an IRM. Work plans for the design of the SVE expansion are currently being developed.

With respect to the balancing criteria, the soil alternatives are distinguished primarily by cost. Alternatives S-2 is the least costly of the soil remedial alternatives. The present worth cost of Alternative S-2 is estimated to be $1,488,864.

Alternative S-2 is also easily implementable since there is a SVE system already operating on site. The SVE system will require an expansion to handle the additional source area vapor extraction wells. The mobility, volume, and toxicity of the contaminants will be significantly reduced by implementing Alternative S-2. This will prevent the further migration of contamination into the groundwater.

The groundwater alternatives are similar to each other with respect to the threshold criteria. The major differences between the groundwater alternatives are cost, permanence, and implementability. Alternative G-3 (in-situ chemical oxidation) has the lowest cost, provides a permanent remedy, will be more easily implemented than the other alternatives, and will achieve SCGs more quickly by destroying the contamination in place. Six wells will be installed across the site. Two of the wells will be converted to extraction wells as part of a contingency if in-situ oxidation does not reduce the contamination sufficiently.

The estimated present worth cost to implement the combined remedy is $3,419,505. The total capital cost to construct the remedy is estimated to be $3,115,794 for the three alternatives and the estimated average annual operation and maintenance cost for 5 years is $157,960.

The elements of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved.

2. The existing soil vapor extraction system on the 100 Oser Avenue property will be expanded to remediate the soil at the source area and contaminated soil gas and prevent further migration to indoor air.

3. Contaminated groundwater will be treated in place by injection of a chemical oxidant into groundwater wells at the site.

4. If groundwater concentrations do not decrease after sufficient time to allow for contact with the chemical oxidants, two downgradient wells will be converted to extraction wells. Contaminated groundwater will be extracted from these wells and treated for proper disposal.

5. The dry wells at the source area will be properly closed and backfilled. The existing storm water system will be renovated to route storm water away from the source area.

6. A long term monitoring program will be instituted at the site. This program will allow the effectiveness of the groundwater chemical oxidant remedy and the soil vapor extraction system to be monitored.

7. The operation and maintenance of the existing and expanded soil vapor extraction system in the source area will be continued.

8. Institutional controls in the form of existing use and development restrictions will limit the use of groundwater as a potable or process water without necessary water quality treatment as determined by the Suffolk County Department of Health Services from the affected areas.

9. Deed restrictions will be recorded in the chain of title of the 100 Oser Avenue site to restrict future use for industrial and commercial use only and to require notification to the NYSDEC when an excavation is planned.

10. The property owner will certify annually to the NYSDEC that these institutional controls are in place and that long term monitoring is being conducted as required by the remedy.

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, local businesses, and other interested parties.

- A Fact Sheet was sent to the public contact list announcing the start of the Remedial Investigation (RI). A kickoff meeting was held in July 1999 to present the RI work plan to the public.

- In July 1999, a Responsiveness Summary was prepared and made available to the public, to address the comments received during the first public information meeting.

- A Fact Sheet was sent and a public information meeting was held in December 1999 to discuss the findings of the RI.

- A Fact Sheet was sent to describe the Phase II RI Work Plan in September 2000.

- A Fact Sheet was sent to announce the availability of the RI Report in October 2000.

- A Fact Sheet was sent and a public information meeting was held in November 2000 to present the findings of the Phase II RI Report.

- A Fact Sheet was sent in June 2001 to announce the results of the Phase II RI.

- In February 2002, the NYSDEC issued a press release and a mailing was sent to the public contact list announcing the release of the Proposed Remedial Action Plan (PRAP).

- A public meeting was held in March 2002 to present the PRAP and solicit comments regarding the PRAP. A comment period from February 18, 2002 to March 22, 2002 was provided for the public to send in their comments.

- In March 2002, a Responsiveness Summary was prepared and made available to the public, to address the comments received during the public comment period for the PRAP.

Table 1
Nature and Extent of Contamination
March 1999 - May 2001

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE	FREQUENCY of EXCEEDING SCGs/Background	SCG/ Bkgd.
Soils (ppm)	Volatile Organic Compounds (VOCs)	Tetrachloroethylene (PCE)	ND (0.1) to 9,400	24 of 201	1.4
		Trichloroethylene (TCE)	ND (0.1 to 3.1	1 of 201	0.7
		1,2-Dichloroethene (1,2-DCE)	ND (0.1) to 600	4 of 201	0.3
		2-Butanone	ND (0.1) to 830	4 of 201	0.3
		Benzene	ND (0.1) to 8	4 of 201	0.06
		Toluene	ND (0.1) to 55	3 of 201	1.5
		Ethylbenzene	ND (0.1) to 160	1 of 201	5.5
		Xylene	ND (0.1) to 680	2 of 201	1.2
		Carbon Disulfide	ND (0.1) to 28	2 of 201	2.7
	Semivolatile Organic Compounds (SVOCs)	Benzo(a)pyrene	ND (0.33) to 0.062	1 of 201	0.061
	Inorganics	Copper	ND (2.5) to 1,240	3 of 201	1
	(Metals)	Magnesium	ND to 6,620	1 of 201	100
		Cadmium	ND (0.5) to 5.5	2 of 201	1
		Arsenic	ND (1) to 15.7	1 of 201	12
		Nickel	ND (4) to 61	2 of 201	25
		Zinc	ND (2) to 815	3 of 201	50
		Chromium	ND (1) to 58.8	3 of 201	40
	Pesticides	Delta-BHC	ND (0.08) to 2.8	2 of 201	0.3

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE	FREQUENCY of EXCEEDING SCGs/ Background	SCG/ Bkgd.
Groundwater (ppb)	VOCs	PCE	ND (1) to 100,000	85 of 136	5
		TCE	ND (1) to 130	30 of 136	5
		1,1,1 Trichloroethane (1,1,1-TCA)	ND (1) to 51	14 of 136	5
		Toluene	ND (1) to 36	9 of 136	5
		1,2-DCE	ND (1) to 130	15 of 136	5
		1,1 Dichloroethene (1,1-DCE)	ND (1) to 24	7 of 136	5
		1,1 Dichloroethane (1,1-DCA)	ND (1) to 78	1 of 136	5
		Chloroform	ND (1) to 22	2 of 136	7
		Methylene Chloride	ND (2) to 120	1 of 136	5
		Acetone	ND (5) to 190	1 of 136	50
		Freon 113	ND (1) to 11	1 of 136	5
	SVOCs	Benzo(a)anthracene	ND (5) to 0.8	1 of 136	0.002
		Chrysene	ND (5) to 1	1 of 136	0.002
		Benzo(b)fluoranthene	ND (5) to 2	1 of 136	0.002
		Benzo(k)fluoranthene	ND (5) to 1	1 of 136	0.002
		Benzo(a)pyrene	ND (5) to 1	1 of 136	0.002
		Indeno(123cd)pyrene	ND (5) to 2	1 of 136	0.002
	Inorganics (Metals)	Arsenic	ND (0.5) to 28.1	1 of 136	25
		Chromium	ND (10) to 889	7 of 136	50
		Iron	ND (100) to 69,600	12 of 136	300
		Manganese	ND (10) to 10,600	10 of 136	300
		Nickel	ND (20) to 532	5 of 136	100
		Lead	ND (2) to 54	4 of 136	25

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE	FREQUENCY of EXCEEDING SCGs/ Background	SCG/ Bkgd.
Groundwater (ppb)		Sodium	ND (100) to 43,500	4 of 136	20,000
Indoor Air ($\mu g/m^3$)	VOCs	PCE	ND (5) to 3,160	33 of 72	100
		Methylene Chloride	ND to 10.4	8 of 14	3.8
		Methyl Isobutyl Ketone (MIBK)	ND to 271	4 of 14	73
		1,2,4-Trimethylbenzene	ND to 19.6	6 of 14	6.2

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
No Further Action - SG-1	$0	$20,000	$307,450
No Further Action - S-1, G-1	$0	$20,560	$316,059
Alternative SG-2 - SVE	**$639,714**	**$130,800**	**$882,924**
Alternative S-2 - SVE	**$595,800**	**Years 1 & 2 - $289,973 Year 3 - $84,300 Years 4-10 - $36,400**	**$1,488,864**
Alternative S-3 - In-situ Chemical Oxidation	$2,724,097	$27,160	$2,774,598
Alternative S-4 - SVE and In-situ Chemical Oxidation	$1,978,411	Year 1 - $449,635 Year 2 - $78,000 Year 3 - $35,400	$2,507,960
Alternative G-2 - Extraction and Treatment	$1,141,808	$315,821	$7,149,727
Alternative G-3 - In-situ Chemical Oxidation	**$1,880,280**	**$20,560**	**$1,918,509**
Alternative G-4 -In-situ Chemical Oxidation and Extraction and Treatment	$2,449,358	$291,538	$5,475,435
Selected Alternatives: SG-2, S-2, and G-3 - Soil Vapor Extraction and In-situ Chemical Oxidation	**$3,115,794**	**$157,960***	**$3,419,505**

* - Annual operations and maintenance costs only include the annual O&M costs for Alternative G-3 since the groundwater monitoring requirements for Alternative S-2 are similar.

Table 3
Summary of Air Sampling Results
for Tetrachloroethene (also known as perchloroethene, perc, or PCE)
100/110 Oser Avenue, Hauppauge, NY

Results are reported as micrograms of tetrachloroethene per cubic meter of air (µg/m^3)

Sampling Location	Tetrachloroethene Concentration (µg/m^3)						
	Sept. 1999	Dec. 1999	June 2000	Mar. 2001	May 2001	Jan. 2002	Feb/Mar 2002
100 Oser Avenue							
Southeast Corner (#100-6) (Training Room)	510	25	NS	NS	37	NS	NS
Southwest Corner (#100-5) (R&D Lab)	584	40	NS	NS	50	NS	NS
South of Firewall (#100-4)	544	26	NS	NS	NS	NS	NS
North of Firewall (#100-3)	550	49	NS	NS	NS	NS	NS
Assembly (near stairwell)	NS	NS	70	70	22	90	NS
Hall (near bulletin board)	NS	NS	70	80	NS	60	NS
Lab - Back Room	NS	NS	NS	80	NS	NS	NS
Outdoor	ND	NS	NS	NS	38	8	NS
110 Oser Avenue							
Lunch Room	NS	635	400	1180	500	610	130
Leo Room	NS	650	NS	NS	1460	770	1960
C. Meyer's Office	NS	480	NS	NS	130	NS	NS
T. Black's Office	NS	440	90	150	120	170	NS
Machine Shop	NS	490	NS	1100	120	255	NS
Standard Assembly	NS	760	900	1560	605	NS	NS
Standard Assembly North	NS	NS	NS	NS	690	NS	NS
CNC - South	NS	NS	NS	NS	960	NS	NS
CNC - North	NS	NS	NS	NS	1,000	240	NS
Maintenance	NS	NS	NS	NS	370	NS	NS
Conference Room A	NS	NS	NS	NS	170	NS	NS
Special Assembly	NS	NS	NS	NS	3160	870	1980
Clean Room North	NS	NS	NS	NS	1,000	NS	NS
Clean Room South	NS	NS	NS	NS	1200	930	300
"Fishbowl"	NS	NS	NS	NS	NS	600	1,800
Center Office	NS	NS	NS	NS	NS	275	NS
Outdoor (NE Corner)	NS	<5	3	80	5 [PL]	1 [PL]	5 [PL]
Center Roof Drain **	NS	NS	NS	NS	NS	7,000**	340**
Leo Room Floorboard **	NS	NS	NS	NS	NS	1,200**	570**
CNC Floor **	NS	NS	NS	NS	NS	600**	NS

Notes:

**Center Roof Drain, Leo Room Floorboard, and CNC Floor samples were collected close to the floor of the building. They are not representative of air quality in locations where people are likely to be exposed.

NS indicates that a location was not sampled.

ND indicates that tetrachloroethene was not detected in a sample

[PL] indicates that tetrachloroethene was detected in a sample but at less than the concentration specified.

The number following a "less than" sign (<) is the lowest level the laboratory test can reliably measure (the detection limit). A "<" before any number means the chemical was NOT detected in that sample.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

100 Oser Avenue OU1 Site
Operable Unit #1
Hauppauge, Suffolk County
Site No. 1-52-162

The Proposed Remedial Action Plan (PRAP) for the 100 Oser Avenue OU1 site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on February 18, 2002. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil, soil gas, and groundwater at the 100 Oser Avenue OU1 site. The preferred remedy is soil vapor extraction and in situ chemical oxidation.

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 March 6, 2002 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. The public comment period for the PRAP ended on March 22, 2002. No written comments were received.

This Responsiveness Summary responds to all questions and comments raised at the March 6, 2002 public meeting.

The following are the comments received at the public meeting, with the NYSDEC's responses:

<u>Questions and comments regarding the proposed remedy</u>

<u>COMMENT 1:</u>
I don't care what the remedy costs, I want the best cleanup for the site.

<u>RESPONSE 1</u>:
The selected remedy is the most cost effective remedy for the site in terms of long term effectiveness, ease of implementation and permanence. The remedy will permanently destroy the contamination, remove the source area, and reduce the potential for on-site exposures.

<u>COMMENT 2:</u>
What will be the noise impacts from the proposed SVE system?

<u>RESPONSE 2</u>:
The proposed SVE system will be housed in a storage shed to reduce noise. The current SVE system has been operating for a year (without housing for 24 hours a day) with little noise disturbance to either the residents or site employees.

COMMENT 3:
How does the remedy address other contaminants, such as benzene, toluene, xylene, chromium?

RESPONSE 3:
The remedy is primarily designed to address PCE and other chlorinated ethenes such as trichloroethene (TCE) and dichloroethene (DCE). The remedy will not reduce the chromium concentrations in the groundwater on site. The soil vapor extraction system will effectively remediate the chlorinated ethenes, as well as benzene, toluene, and xylene present in site soils and soil gas.

COMMENT 4:
Why not excavate the contaminated soil and truck it away?

RESPONSE 4:
An interim remedial measure (IRM) was conducted in 2000 to remove and dispose of contaminated soils from the source area dry wells. The rest of the contaminated soil on site is located beneath the western dry wells of the 100 Oser Avenue site. This contamination permeates through the soil to the groundwater table, located approximately 70 feet below the ground, which would require an extreme effort to remove safely. Soil excavation would be very difficult to perform without permanently damaging a retaining wall and the 100 Oser Avenue building. The selected remedy is a permanent remedy which removes and treats the contaminants from the soil and groundwater.

COMMENT 5:
Why are real estate concerns overriding remediation concerns?

RESPONSE 5:
Real estate concerns are not overriding remediation concerns. As discussed in response to Comment 4, the selected remedy offers a more effective alternative than demolishing the buildings and excavating the soil contamination.

COMMENT 6:
How long will it take to design and construct the recommended alternative? How long will the remediation process take?

RESPONSE 6:
The design and construction of the selected remedy will take less than a year. The remediation process is expected to require five years to effectively remove site contamination.

COMMENT 7:
Once the remediation is in place, is it considered safe when it's started?

RESPONSE 7:
Soil vapor extraction is a technology that removes the contaminants from the ground and transfers them to a treatment system which completely destroys the contaminants. A properly designed soil vapor extraction system will prevent indoor air contamination by removing the contaminated soil gas from beneath the buildings. The system will be monitored and is designed to automatically shut down if problems occur with the treatment system.

In situ chemical oxidation is a technology that injects a chemical oxidant into the groundwater which treats the contamination in place. A pilot study will be conducted during the design phase to ensure that the appropriate amount of oxidant is used to treat the contamination. Groundwater and soil gas will be monitored during the pilot study. A contingency plan to install groundwater extraction wells at the site boundary may be implemented during construction to ensure that the chemical oxidant doesn't travel further in the groundwater than is intended.

The selected remedies are safe for both residents and on-site workers.

COMMENT 8:
Does the DEC have experience with in-situ chemical oxidation (ISCO) at these levels and site conditions? The DEC has not investigated the ISCO process sufficiently to propose it as a remedy at the site.

RESPONSE 8:
The DEC and our consultants have experience using ISCO under similar contaminant and site conditions. The DEC performed a pilot test of ISCO at a similar site on Long Island, and performed a bench scale test during the feasibility study to determine the applicability of the technology at this site. The DEC believes that there is sufficient information to select ISCO for this site.

COMMENT 9:
What are the breakdown products of In-Situ Chemical Oxidation (ISCO)? I am concerned for the creation of intermediates during the oxidation process that may be as toxic or more toxic than PCE. I am also concerned that the permanganate is a non-specific oxidizer, and will oxidize all other organic matter.

RESPONSE 9:
The breakdown products of ISCO are inorganic ions (potassium, sodium, manganese and chloride), carbon dioxide, and hydrogen. Note that ISCO does not produce vinyl chloride or other chlorinated compounds as by-products of oxidation. The ISCO will also oxidize organic matter other than PCE. However, the native sandy soil has a very low organic carbon content, and is not expected to significantly interfere with ISCO at this site. During ISCO, the groundwater will be monitored for volatile organic compounds (VOCs) and for the ISCO breakdown products.

Questions and comments regarding the funding of the project

COMMENT 10:
Who is paying for the cleanup?

RESPONSE 10:
The cleanup for the OU1 site will eventually be paid by the current site owner, who is under an order on consent with the DEC to reimburse state remediation costs. The State Superfund is providing the initial outlay of funds for both investigation and remediation, and will be reimbursed by the site owner over time.

COMMENT 11:
What happened to the prior company that did the disposal?

RESPONSE 11:
Sands Textiles operated the 100 Oser Avenue site during the disposal period. The company is now defunct and is not considered to be a viable party for the recovery of investigation or remediation costs.

COMMENT 12:
I am concerned that the lack of State Superfund money will delay the cleanup of this site. If new data, collected privately, showed higher levels than the State found, would it speed up the process?

RESPONSE 12:
If the State Superfund is not refinanced, the cleanup of this site will be delayed. This site is a high priority for the DEC, and will be a candidate for immediate funding once Superfund money becomes available. Additional data would aid the design of the remediation, but would not raise the priority of the site for funding.

COMMENT 13:
Money recovered from Responsible Party should be spent on this project and not placed in the general Superfund account.

RESPONSE 13:
Money recovered from the Responsible Party reimburses the DEC for costs spent on this project with State Superfund monies. A separate account has been designated for this purpose.

COMMENT 14:
Statewide, how many sites are left to be cleaned up, and where is this project on that list?

RESPONSE 14:
Statewide, there are 788 sites that need funding to be investigated and/or remediated. This project is on the list of sites that need cleanup. The DEC views this site as a high priority due to ongoing indoor air exposures to the buildings' employees and the potential for contamination of public water supplies.

COMMENT 15:
What is the financial status of current owner and operator? Do they have insurance that would provide additional funds for this project?

RESPONSE 15:
The financial status of the current owner was evaluated when the Order on Consent was negotiated in 1998. The current site operator, who leases the site buildings, is a publicly traded company. The current tenant is not considered to be a responsible party because they lease the property and did not contribute to the site contamination. If the site owner had insurance to aid in the funding of cleanup, this would have been taken into consideration during negotiation of the consent order.

COMMENT 16:
Is the DEC monitoring the ongoing financial status of the site owner?

RESPONSE 16:
The ongoing financial status of the owner is not monitored by the DEC because a long term commitment has been secured to reimburse the State's response costs.

COMMENT 17:
Why wasn't the Suffolk County Industrial Development Agency pursued as a responsible party?

RESPONSE 17:
The settlement the Department entered into in this matter will fully reimburse the State for its expenditures to clean up this site. We also understand that the Suffolk County Industrial Development Agency acted in its capacity as a "conduit financier." Under the federal Superfund law, the agency would not be considered a responsible party for the site's remediation.

Questions and comments relating to the Suffolk County Water Authority

COMMENT 18:
Where are the wells located that provide public drinking water?

RESPONSE 18:
The closest public drinking water supply wells are located on Falcon Drive in Hauppauge about 1800 feet away from the site. There are other public supply wells in Hauppauge that also supply water to the site and the residential area. Water supply wells in the area are interconnected to the distribution system, and water delivered to homes and businesses are typically blended from multiple sources.

COMMENT 19:
I am concerned because the carbon bed that treats water from the Falcon Avenue wells is old. How often does the SCWA change the carbon bed in the Falcon Ave. wellhead treatment system? How effective is the treatment system?

RESPONSE 19:
The SCWA changes the carbon when weekly water sampling indicates a potential breakthrough of contamination. The treatment system is very effective at removing chlorinated ethenes from the water and achieving health-based drinking water standards. The SCWA regularly samples the water after treatment.

COMMENT 20:
Who is overseeing the Suffolk County Water Authority (SCWA)? Does the State or County take their own samples of the SCWA water? I would like to see these results.

RESPONSE 20:
Both the NYSDOH and Suffolk County Department of Health Services (SCDHS) monitor the groundwater quality from the SCWA water supply wells. The State and County have authority under 10 NYCRR Part 5 drinking water standards to ensure compliance by the public water supply companies. Suffolk County takes water samples annually as a quality check for the SCWA. The results are available to the public directly from the SCWA and have been placed in the document repositories for the Oser Avenue site.

COMMENT 21:
How often does the SCWA test for contamination in the drinking water? What contaminants do they test?

RESPONSE 21:
The SCWA samples the water on a weekly basis. The SCWA and SCDHS analyze samples for hundreds of possible contaminants in the groundwater, including the chlorinated ethenes found at 100 Oser Avenue.

COMMENT 22:
Can the DEC recommend to the SCWA to shut down contaminated wells?

RESPONSE 22:
The DEC doesn't have the authority over SCWA to recommend shutting down the wells. However, the NYSDOH and SCDHS enforce applicable state regulations relating to public health and safety. If the treatment system were to prove unreliable in achieving drinking water standards, the health departments could require the wells to be shut down.

COMMENT 23:
The attendance of the SCWA at future public meetings was requested, specifically Michael LoGrande, Melvin A Fritz, John Gee, Eric J Gruso, Esq. and James T.B. Trip Esq.

RESPONSE 23:
Several officials of the SCWA were invited to the public meeting but did not attend. The individuals listed above will be added to the contact list and invited to attend future public meetings.

Questions and comments relating to public health

COMMENT 24:
What are the specific potential health concerns associated with site-related contaminants?

RESPONSE 24:
In an investigation of the possibility of a link between health effects and environmental contamination, the nature and magnitude of exposure (if any) to the contaminants must be evaluated. There must be exposure to the substance in order for a substance to potentially affect a person's health. Without such an exposure, the contaminants cannot affect human health. One of the goals of the selected remedy for the 100 Oser Avenue site is to protect human health by minimizing or eliminating exposures to site-related contamination. A person may be exposed to a substance in one of three ways: by direct contact with the substance, by ingestion, or by inhalation.

Direct Contact

Inadvertent contact with site-related contamination is not likely to occur under current site conditions. The soil contamination is in an area ten feet or more below the ground surface beneath the pavement at 100 Oser Avenue. The depth to groundwater at the site is between sixty and seventy feet. Therefore, given the current conditions, the potential for direct contact with contaminated materials would be limited to site workers conducting excavations. Through a combination of active remediation and institutional controls, the selected remedy will ensure that direct contact exposures do not occur in the future.

Ingestion

Before 1990, people in the area may have been exposed to low levels (up to about 20 parts per billion (ppb)) of volatile organic compounds (VOCs), including tetrachloroethene, in drinking water from the Falcon Drive Wellfield. Some of the contamination in the raw water at that wellfield may be related to the 100 Oser Avenue site. The concentrations of contaminants did not exceed the NYSDOH guideline in effect at that time (50 ppb for each VOC not to exceed 100 ppb for total VOCs). Risks due to past exposures in drinking water are not definitively known. Conservative estimates suggest that the cancer risk would be low.

Since 1990, the water supplied from these wells has been treated to remove VOCs from the water. The treated water meets the more stringent NYSDOH drinking water standards currently in effect (5 ppb for each of the VOCs of concern at the wellfield). Routine monitoring of the treated water for VOCs will continue. This monitoring serves as a check on the effectiveness of the treatment systems.

Inhalation

People have been exposed to site-related contamination by breathing PCE vapors in the air in the industrial buildings at 100 and 110 Oser Avenue. The air sample results for 100 and 110 Oser Avenue are summarized in Table 3 of this document. When air samples were first collected, PCE concentrations in the air in both buildings exceeded the NYSDOH guideline for PCE in air. This guideline recommends that the average air concentration in a residential community not exceed 100 micrograms of PCE per cubic meter of air (100 $\mu g/m^3$). Samples from neighboring buildings in the industrial park and from nearby homes did not exceed the guideline.

It is important to note that the NYSDOH's 100 $\mu g/m^3$ guideline is not a line between concentrations that cause health effects and those that do not. It is much lower than concentrations that have been shown to cause either non-cancer or cancer effects. In addition, the guideline is based on the assumption that people are continuously exposed to PCE in air all day, every day for as long as a lifetime. This is not likely the case for employees at 100 and 110 Oser Avenue, who are more likely to be exposed for a part of the day and a part of their lifetime. The health effects of PCE depend on the level and length of exposure.

In studies involving people who were exposed to PCE, not all humans exposed showed effects at the same levels. This difference was due, in part, to the individual differences among humans. People, for example, differ in age, sex, diet, family traits, lifestyle, and state of health. These differences can affect how people will respond to a given exposure. One person may feel fine during and after an exposure while another person may become sick. This is known as sensitivity. Differences in sensitivity should be kept in mind when examining the following information on the human health effects of PCE.

Studies with volunteers show that short-term exposures of 8 hours or less to 70,000 $\mu g/m^3$ caused central nervous system symptoms such as dizziness, headache, sleepiness, lightheadedness, and poor balance. Exposures to 350,000 $\mu g/m^3$ for 4 hours affected the nerves of the visual system and reduced scores on certain behavioral tests (which, for example, measure the speed and accuracy of a person's response to something they see on a computer screen). These effects were mild and disappeared soon after exposure ended.

Studies of dry-cleaning workers indicate that long-term exposure (9 - 20 years, for example) to workplace air levels averaging about 50,000 $\mu g/m^3$ to 80,000 $\mu g/m^3$ reduces scores on behavioral tests and causes biochemical changes in blood and urine. The biochemical changes indicate liver and kidney damage. The effects were mild and hard to detect. How long the effects would last if exposure ended isn't known.

There is only one published study of long-term exposure to airborne PCE concentrations similar to (though somewhat higher than) those detected at 110 Oser Avenue. The study reported reduced scores on behavioral tests in healthy adults in apartments near dry-cleaning shops. The average length of time the people lived in the apartments was 10.6 years. The effects were small; the average test scores of the residents were slightly lower than that of unexposed people. The average PCE concentration in the air in all apartments in that study was 5,000 $\mu g/m^3$. The median was 1,400 $\mu g/m^3$ (that is, half the measured concentrations were above 1,400 $\mu g/m^3$ and half were below it).

Some studies show a slightly increased risk of cancer and reproductive effects among workers exposed to PCE, including dry-cleaning workers. The cancers associated with exposure included cancers of the esophagus and cervix and non-Hodgkin's lymphoma. The reproductive effects associated with exposure included increased risks of spontaneous abortion, menstrual and sperm disorders, and reduced fertility. The data suggest, but do not prove, that the effects were caused by PCE and not by some other factor or factors.

The expansion of the existing SVE system will minimize to a great extent the inhalation exposure of PCE.

People with questions about this information or who would like to know more about the potential health effects of PCE exposure should contact the NYSDOH at 1-800-458-1158.

COMMENT 25:
Does the cancer mapping initiative track incidences of cancer in people who grew up in neighborhoods and later moved away?

RESPONSE 25:
In 1998, Governor Pataki directed NYSDOH to develop easy-to-understand information that would help answer people's questions about the number of cancer cases in their communities. NYSDOH started the Cancer Surveillance Improvement Initiative (CSII) in response to the Governor's request. The CSII, also known as the cancer mapping project, is a comprehensive project which will enhance the State's ability to track the occurrence of cancer by improving the New York State Cancer Registry, and through the use of maps, charts and other graphic representations of the geographic pattern of cancer cases. The initiative will also increase public understanding of cancer, its known or suspected causes and risk factors, in order to promote prevention and early detection.

An advisory committee consisting of cancer activists, environmental advocates, and national experts in cancer issues, geographic information systems (GIS) and health risk communication is working closely with NYSDOH to develop the maps and informational materials. Based on the committee's advice, several maps of cancer incidence have been released. The maps, along with further information about the CSII, can be accessed on the NYSDOH website (http://www.health.state.ny.us) by following the

"Cancer Mapping" link. Information about the CSII and zip-code-level cancer maps for western Suffolk County will also be placed in the document repository for the 100 Oser Avenue site.

The NYSDOH is often involved in activities (like the CSII) that may identify areas with unusual patterns of disease, such as higher than expected rates of cancer. Follow-up studies may be necessary to evaluate whether environmental factors have contributed to the unusual disease pattern in these areas. The NYSDOH has developed a comprehensive, five-step approach to prioritize and carry out these investigations. Information about the unusual disease patterns investigation process is available on the NYSDOH website. This information will also be placed in the document repository for the 100 Oser Avenue site.

The NYS Cancer Registry collects information on where an individual lives at the time he or she is first diagnosed with cancer and the hospital or health care facility where the diagnosis take place. The Cancer Registry does not include information about people's residential histories. All of the maps produced as part of the Cancer Surveillance Improvement Initiative are based on residence at the time of diagnosis. If an unusual disease pattern is identified in an area and a follow-up study is undertaken, information regarding individuals' past places of residence may be collected as part of that study.

COMMENT 26:
What can I do to protect my family from exposure to contaminants in groundwater?
Would a carbon filter on my faucet help remove PCE?

RESPONSE 26:
The public water supply meets NYSDOH drinking water standards for PCE and other contaminants. People are not currently exposed to PCE or other site-related contaminants through the public water supply. The water is routinely tested and, if necessary, treated to remove contamination prior to distribution. Thus, it is not necessary to treat water from the public water supply at the tap to remove site-related contaminants.

If a person were to use a private water supply well that drew in groundwater from the contaminant plume, that person could be exposed to site-related contamination in that water. We do not know of any private wells in locations that could potentially be impacted by the contamination from 100 Oser Avenue. Anyone who has or knows of a private supply well in an area that could be impacted by site-related contamination is encouraged to contact the NYSDOH or the SCDHS about having the well tested.

COMMENT 27:
Is the relative toxicity of benzene and chromium greater than PCE at the site?

RESPONSE 27:
In general, health risks from a chemical are a function of two parameters: toxicity of a specific chemical, and exposure to the chemical. "Toxicity" is the degree to which a chemical is harmful and the health effects that result. Exposure is the way someone comes into contact with a chemical. The amount of exposure depends on four things: the route (the way in which a person comes into contact with a chemical), dose (how much of the chemical a person is in contact with), duration (how long the exposure lasts), and frequency (how often the exposure occurs). An assessment of the relative health risks from exposure to contamination at the 100 Oser Avenue site must consider all these factors.

Sufficient exposure to any of these chemicals (benzene, chromium, or PCE) can lead to health effects. However, the potential for exposure to benzene or chromium at the 100 Oser Avenue site is minimal. Unlike PCE, benzene and chromium are not considered to be contaminants of concern at the 100 Oser Avenue Site. During the remedial investigation, benzene slightly exceeded soil cleanup guidance values within storm water drainage structures at the site. The presence of low levels of benzene and other hydrocarbons in these structures may be related to parking lot runoff. Concentrations of chromium and other metals exceeded drinking water standards in a number of groundwater samples, but this is likely related to the presence of suspended sediment in the water samples. The results of the remedial investigation did not suggest that exposures to benzene or chromium are a concern at the 100 Oser Avenue site.

COMMENT 28:
What was the potential for exposure to site contaminants prior to 1990 when the carbon treatment was installed on the Falcon Avenue wells? Were there any PCE concentrations above 10 ppb in the drinking water? I am concerned for exposure of my children to PCE in drinking water before 1990 as they were growing up.

RESPONSE 28:
This comment is addressed in the response to Comment 23, under "Ingestion." One groundwater sample from the Falcon Drive well field in 1986 was recorded at 12 ppb of PCE.

Questions and comments relating to off-site migration and exposures

COMMENT 29:
Where does the off-site groundwater plume go?

RESPONSE 29:
The off-site groundwater plume generally flows northeast from the 100 Oser Avenue site. The extent of the off-site groundwater plume is still under investigation.

COMMENT 30:
I am concerned because I live in a house located over the groundwater plume. What is the potential for soil vapor to enter the basements of homes off-site?

RESPONSE 30:
Soil vapor samples have been taken as part of the OU1 remedial investigation. In conjunction with that, indoor air samples were taken at a number of residences, all of which showed that there no contamination above the NYSDOH guidance value. The groundwater is at a depth of sixty to seventy feet below the ground surface and it is highly unlikely for the soil vapors to enter the basements of homes.

COMMENT 31:
Was the indoor air in homes sampled during the winter when concentrations are expected to be highest?

RESPONSE 31:
The residential indoor air samples were conducted in November, which showed no contamination above the NYSDOH guidance values.

COMMENT 32:
Can residents request for the indoor air of their properties to be tested?

RESPONSE 32:
If there is concern for the indoor air as part of the investigation or a complaint from residents, then the indoor air of the homes can be tested.

COMMENT 33:
How far into the adjacent neighborhood has the soil gas been tested?

RESPONSE 33:
Recent soil gas samples were taken from the eastern side of Falcon Drive. Results are still pending.

COMMENT 34:
What is depth to the water table at Cardinal Lane, where the land surface is lower? Does the relatively higher water table at this location pose an increased threat for exposure through soil gas?

RESPONSE 34:
The water table depth on Cardinal Lane is approximately 45-50 feet bgs. The relatively higher water table does not pose an increased threat for exposure to soil gas because the highest concentrations of contaminants are deeper in the aquifer in that area. Off-gassing of contaminants is only a concern where high concentrations are present at the top of the water table, which is not the case in the Cardinal Lane area.

COMMENT 35:
I am concerned that I won't be able to complete the certification necessary to sell my house. I request a letter stating that contamination beneath off-site homes does not represent a threat to the health of people living in them.

RESPONSE 35:
New York State's Property Condition Disclosure Act requires the seller of residential real property to complete a Property Condition Disclosure Statement prior to the sale. One of the questions to be answered in this statement reads as follows:

> "Has the property been tested for the presence of motor fuel, motor oil, home heating fuel, lubricating oil, or any other petroleum product, methane gas, or any hazardous or toxic substance?"

The investigation of Operable Unit 2 of the 100 Oser Avenue site involves the testing of indoor air, soil gas, and groundwater at a number of residential properties. Anyone whose property has been tested for contamination as part of this investigation should answer "Yes" to this question. Test results that have been provided to the homeowner, such as indoor air sampling reports, should be included with the statement. Potential buyers and others with questions regarding these tests are welcome to contact the NYSDOH for further information regarding indoor air testing and the NYSDEC for further information regarding groundwater and soil gas testing.

The offsite investigation for the 100 Oser Avenue site is ongoing. The results of the investigation to date do not suggest that residents living above groundwater contamination related to the 100 Oser Avenue site are being exposed to that contamination. Anyone with questions regarding potential exposures to or health effects from site-related contamination should contact the NYSDOH at 1-800-458-1158, extension 27880.

Questions and comments concerning citizen participation

COMMENT 36:
The fact sheet mailing was inconsistent. What was done to publicize this meeting?

RESPONSE 36:
The Fact Sheet mailing included local residents, interested parties, elected officials and local media, including television and newspapers. Approximately 735 Fact Sheets were mailed to publicize the PRAP meeting. A news agency and the NYSDEC posted the public meeting and site information on their web pages. In addition to the Fact Sheet mailing, a press release was issued by NYSDEC's Stony Brook Office to publicize the PRAP meeting.

COMMENT 37:
How will comments on the proposed cleanup plan be addressed?

RESPONSE 37:
The comments on the proposed cleanup plan are addressed in this responsiveness summary as part of the Record of Decision (ROD). Any comments regarding the proposed cleanup were taken into consideration prior to the selection of the remedy which is presented in the ROD.

COMMENT 38:
Why is this public meeting being held? What is preventing us from doing something about the site? Are there supervisors at the NYSDEC that are saying we can't remediate the site? Is this the first time the NYSDEC has made the PRAP presentation?

RESPONSE 38:
The PRAP public meeting was held in conformance with 6NYCRR Part 375 to inform the community about the site and to solicit comments regarding the proposed remedy. The only thing preventing the design and construction of the selected remedy is the refinancing of the NYS Superfund Program. The supervisors at the NYSDEC are in full support of the selected remedy. Yes, the March 6, 2002 meeting was the first PRAP meeting for the 100 Oser Avenue site.

COMMENT 39:
I couldn't access the plume map on the web.

RESPONSE 39:
If the plume map is not able to be accessed on the web, the map can be viewed at any of the document repositories. The documents are not generally posted on the web due to their size and complexity.

Questions and comments about other sites

COMMENT 40:
I am concerned for contamination coming from other industrial facilities in the industrial park. Who is monitoring what is going on in these facilities? What is being done to investigate other sites in the Industrial Park?

RESPONSE 40:
The SCDHS conducts periodic inspections of the industrial facilities. In addition, facilities that are subject to the Resource Conservation and Recovery Act (RCRA) are regularly inspected by the NYSDEC to ensure proper management of their hazardous wastes. Other sites in the industrial park with known chemical releases are being investigated by the EPA, SCDHS, or the NYSDEC.

COMMENT 41:
Are contaminants from these other sites being detected at the 100 Oser Ave site?

RESPONSE 41:
Some groundwater contamination is coming onto the 100 Oser Avenue site, but the source(s) have not yet been identified.

COMMENT 42:
I believe there is an SVE system operating at the Glaro Inc. site. How is it performing?

RESPONSE 42:
The remediation at Glaro is ongoing. An air sparge/soil vapor extraction system has been in operation since 1998 to remove chlorinated ethenes from the soil and groundwater. The system is very effective at removing and destroying the contaminants.

Other questions and comments

COMMENT 43:
Why isn't the property condemned?

RESPONSE 43:
The 100 and 110 Oser Avenue properties are not condemned because the buildings are structurally sound. The indoor air exposures at the 100 Oser Avenue building have been reduced below NYSDOH guidance values. The indoor air exposures at the 110 Oser Avenue building are still above guidance values, but an IRM expansion is planned to be installed in the near future to reduce exposures there.

COMMENT 44:
How did you discover the contamination at this site?

RESPONSE 44:
The contaminants were discovered during an investigation of soil and groundwater contamination across the street from the site. Groundwater wells were installed and high concentrations of PCE were found which indicated a source area on the 100 Oser Avenue site.

COMMENT 45:
Is the source area contained on site? Why are there no "dams" or protective barriers to contain the source area?

RESPONSE 45:
The source area (soil contamination) is located on the site. Soil contamination has not been found off site. However, groundwater and soil gas contaminated from the source area have migrated off site. Installing protective barriers at the source area was determined not to be feasible due to the depth of the soil contamination and the inability to position barriers under the source area where the soil contamination is contacting and affecting the groundwater.

COMMENT 46:
Why wasn't contamination at the site cleaned up right away?

RESPONSE 46:
The majority of the contamination at the site wasn't cleaned up right away because the full extent of the contamination was not known. A complete remedial investigation was necessary to determine the nature and extent of contamination so that appropriate remedial alternatives can be evaluated. More contamination was found than anticipated, which prolonged the investigation phase.

COMMENT 47:
How does the current drought and associated drop in the water table affect contaminant migration?

RESPONSE 47:
The current drought and drop in the water table may be very beneficial. Generally, the speed of the groundwater flow slows when water levels drop, and the infiltration of contamination from the source area will be lessened with a decrease in storm water. If the water table is lowered, more soil vapors can be removed from the source area and destroyed.

COMMENT 48:
Is Anorad moving due to problems in the 110 Oser Avenue building?

RESPONSE 48:
Anorad has had plans in place for a number of years to consolidate their buildings and possibly move to another area. These plans were discussed prior to the discovery of the indoor air problems in the 110 building.

COMMENT 49:
Could this problem get worse for the site? Could the contamination add to higher concentrations in the groundwater off site?

RESPONSE 49:
The problem could get worse if the site is left alone (the No Action Alternative) and remediation is not performed. Over time, higher levels of contamination could move off site, and existing off-site contamination could migrate further downgradient.

COMMENT 50:

Please place the SCWA drinking water monitoring results and any State or County drinking water results in the document repositories.

RESPONSE 50:

The SCWA and County drinking water monitoring results have been placed in the document repositories.

COMMENT 51:

Please place the cancer mapping initiative in the document repository.

RESPONSE 51:

Information about the cancer mapping initiative has been forwarded to the document repositories.

APPENDIX B

Administrative Record

Administrative Record Index File
100 Oser Avenue OU1
Site #1-52-162
Site Investigation

1. Index: 100 Oser Avenue OU1, Site #1-52-162
2. Phase I Investigation of Potential Sources of Contamination, FP&M, July 1990
3. Follow-Up Soil Investigation, FP&M, November 1990
4. Investigation of Potentially Responsible Parties, FP&M, January 1992
5. Proposed Remedial Investigation, FP&M, July 1991
6. Remedial Investigation Report, FP&M, October 1992
7. Order on Consent, NYSDEC and Anwar Chitayat, September 1998
8. Fact Sheet for Remedial Investigation Work Plan, NYSDEC, July 1999
9. Responsiveness Summary, NYSDEC and NYSDOH, July 1999
10. Remedial Investigation Feasibility Study Work Plan, IT Corporation, August 1999
11. Fact Sheet Remedial Investigation Results, NYSDEC, December 1999
12. Fact Sheet Remedial Investigation Phase II Work Plan, September 2000
13. Design Submittal, IT Corporation, September 2000
14. Remedial Investigation Report, IT Corporation, October 2000
15. Fact Sheet Remedial Investigation Report, NYSDEC, October 2000
16. Construction Certification Report, IT Corporation, February 2001
17. Remedial Investigation Phase II Work Scope, IT Corporation, April 2001
18. Phase II Remedial Investigation Report, IT Corporation, May 2001
19. Aerial Photograph Review, IT Corporation, May 2001
20. Indoor Air Assessment Proposal, IT Corporation, May 2001
21. Fact Sheet Phase II Remedial Investigation Results, NYSDEC, June 2001

22. Below Slab Soil Gas Assessment, IT Corporation, July 2001

23. Feasibility Study Report, IT Corporation, October 2001

24. Oser Avenue OU1 Summary Report, IT Corporation, January 2002

25. Fact Sheet Proposed Remedial Action Plan, NYSDEC, February 2002

26. Oser Avenue Proposed Remedial Action Plan, NYSDEC, February 2002

27. Oser Avenue Record of Decision, March 2002

28. QA/QC Data 1999-2002

LEGEND

- State Route
- Geo Feature
- Population Center
- Street, Road
- Major Street/Road
- Interstate Highway
- State Route
- Open Water

Scale 1:15,625 (at center)

1000 Feet

500 Meters

Mag 15.00
Wed Mar 31 12:29:14 1999

New York State Department of
Environmental Conservation

100 Oser Avenue
Operable Unit 1
Hauppauge, New York
Site No. 1-52-162

Figure 1: Site Map

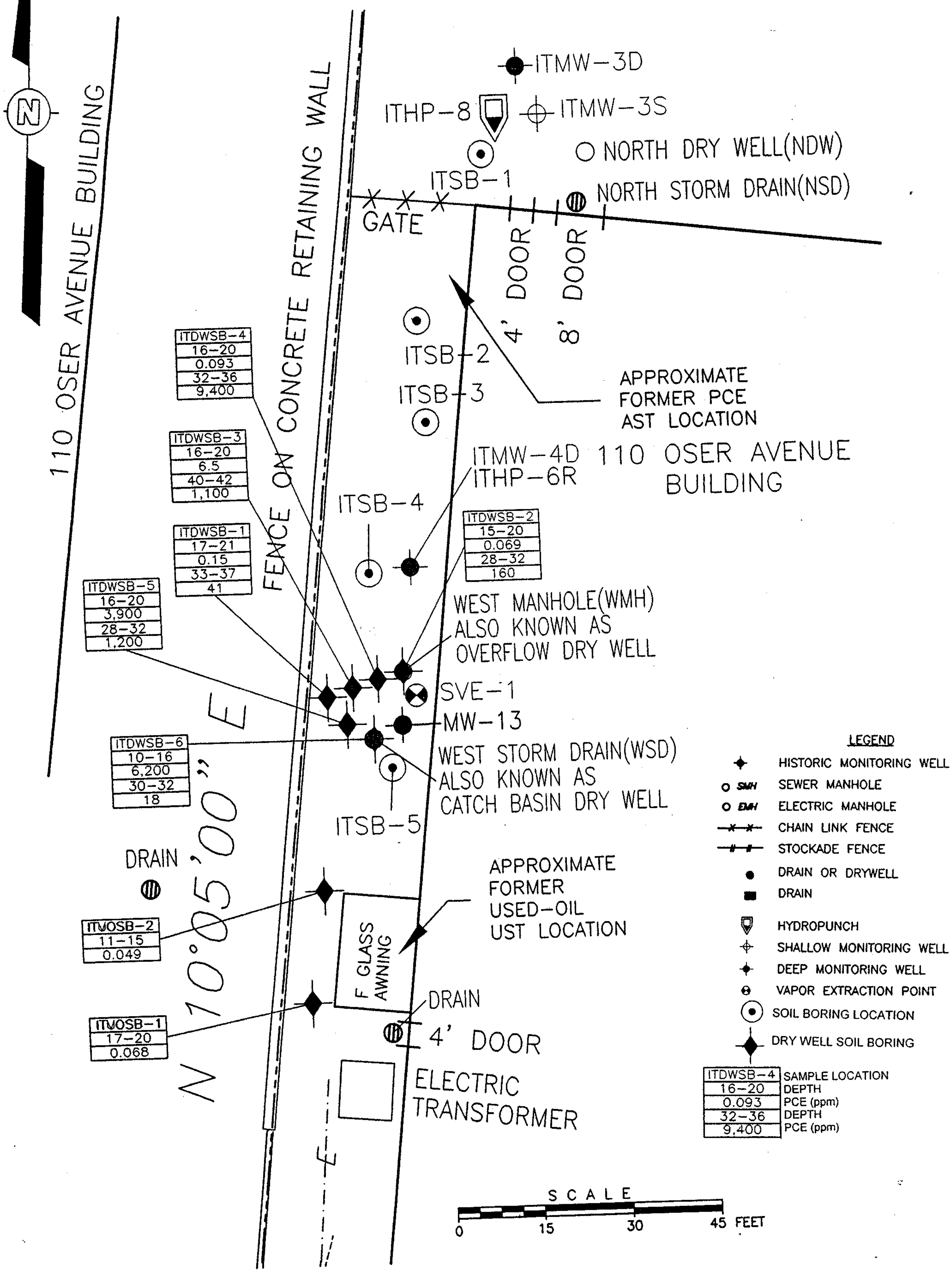
Figure 2: Potential Source Areas

New York State Department of Environmental Conservation

100 Oser Avenue - Operable Unit 1
Hauppauge, New York
Site No. 1-52-162

Figure 3 : Source Area Soil Sample Locations

PLAN VIEW



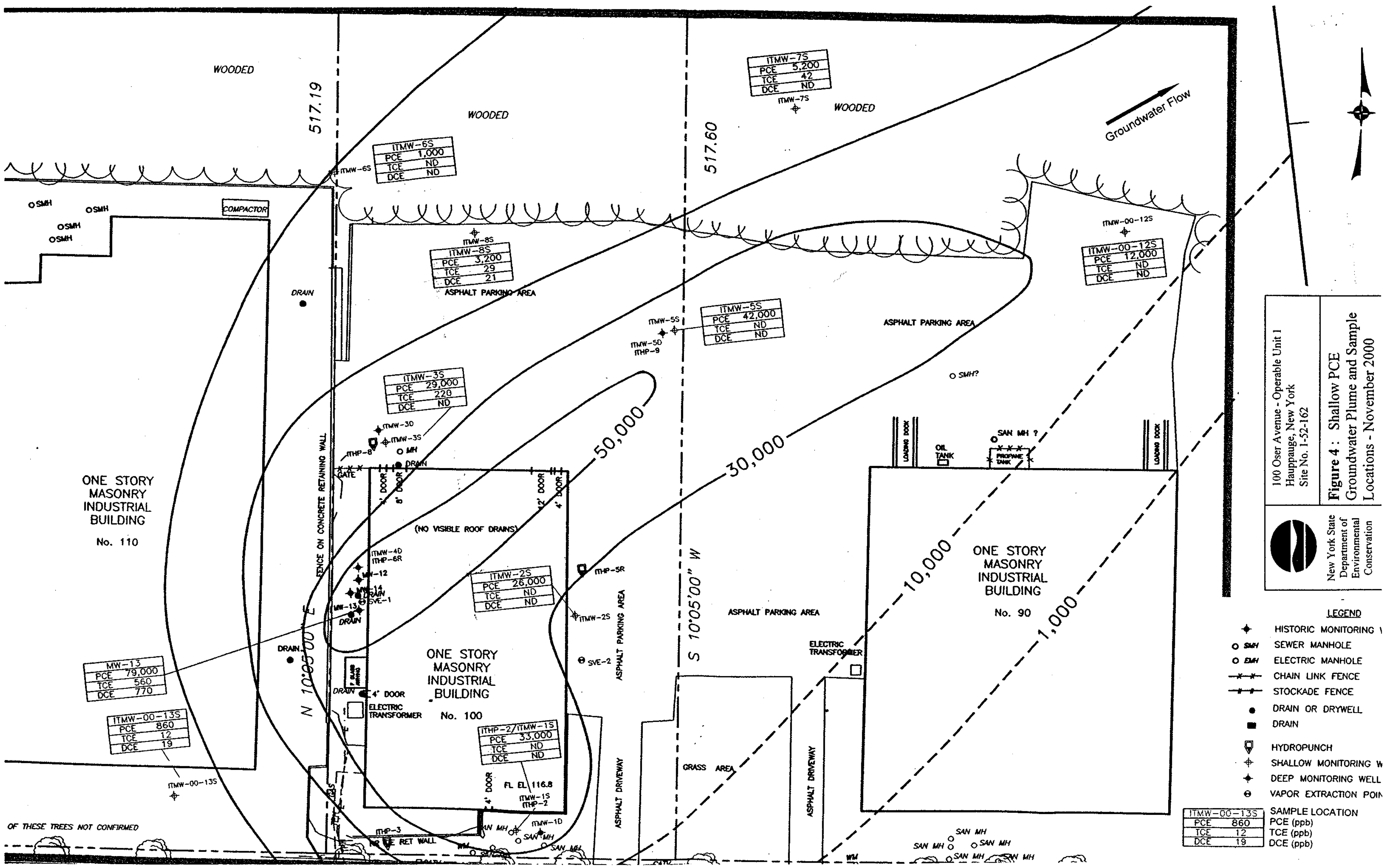
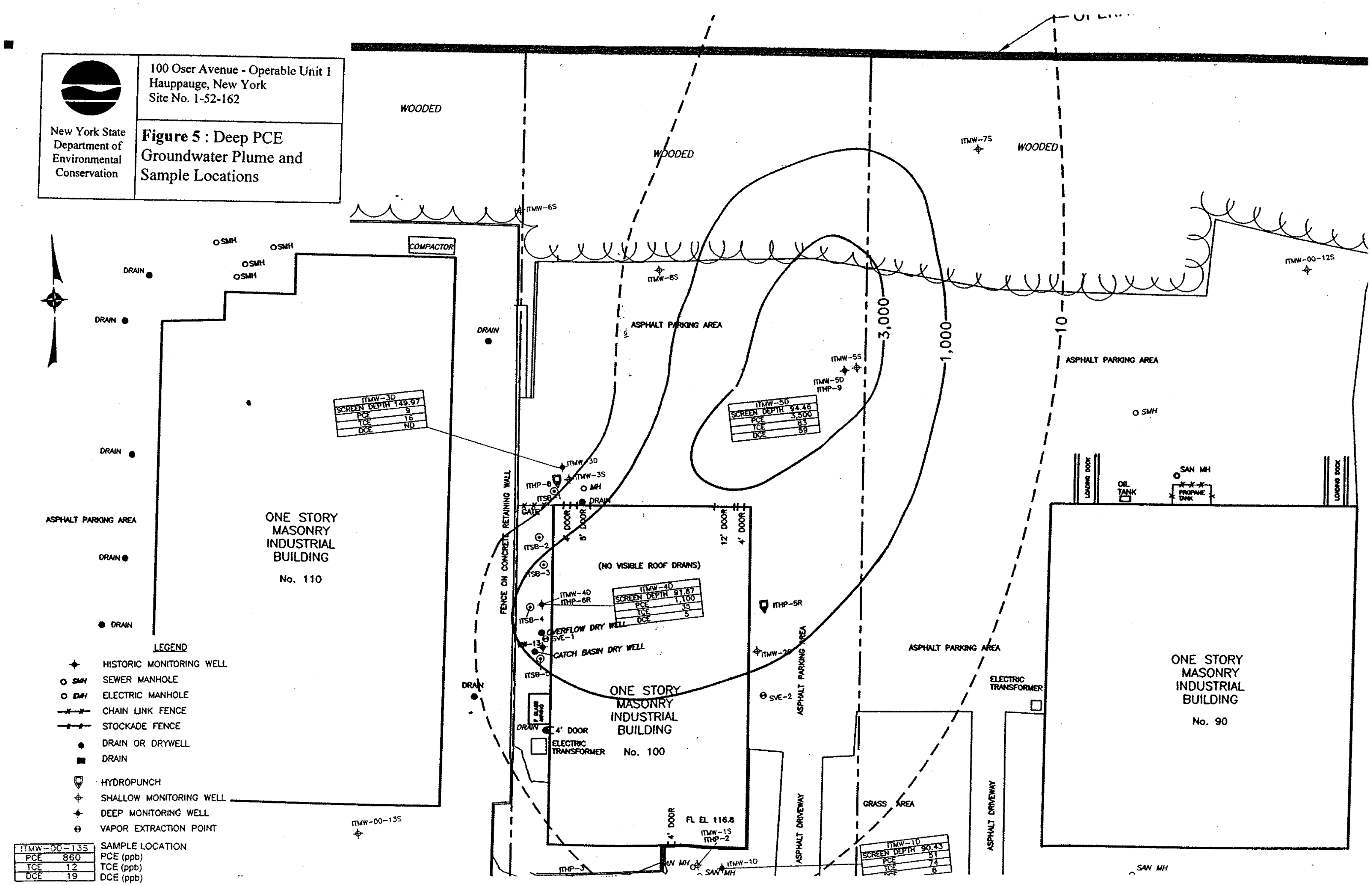


Figure 4: Shallow PCE Groundwater Plume and Sample Locations - November 2000

100 Oser Avenue - Operable Unit 1
Hauppauge, New York
Site No. 1-52-162

New York State Department of Environmental Conservation

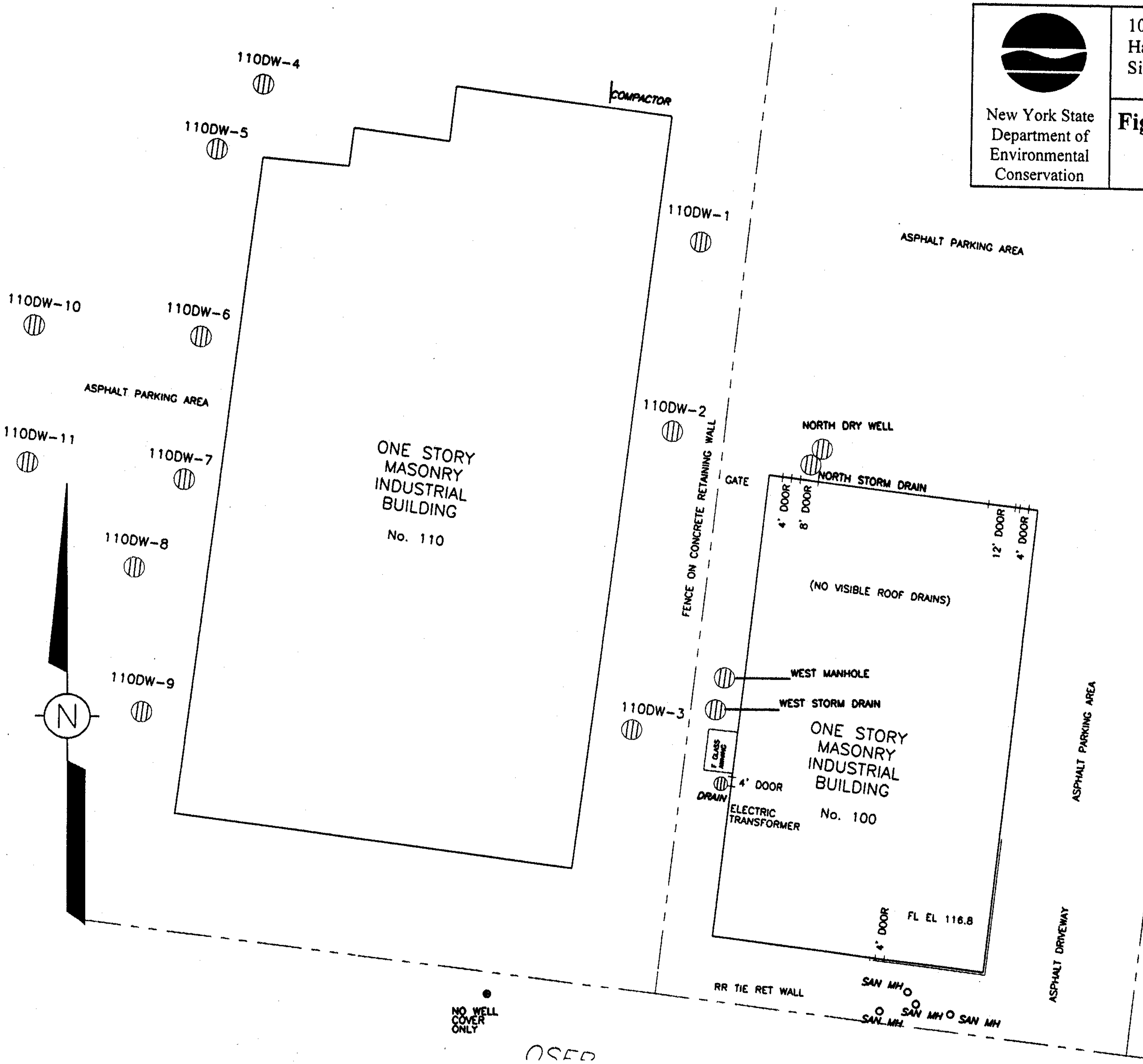
Figure 5 : Deep PCE Groundwater Plume and Sample Locations

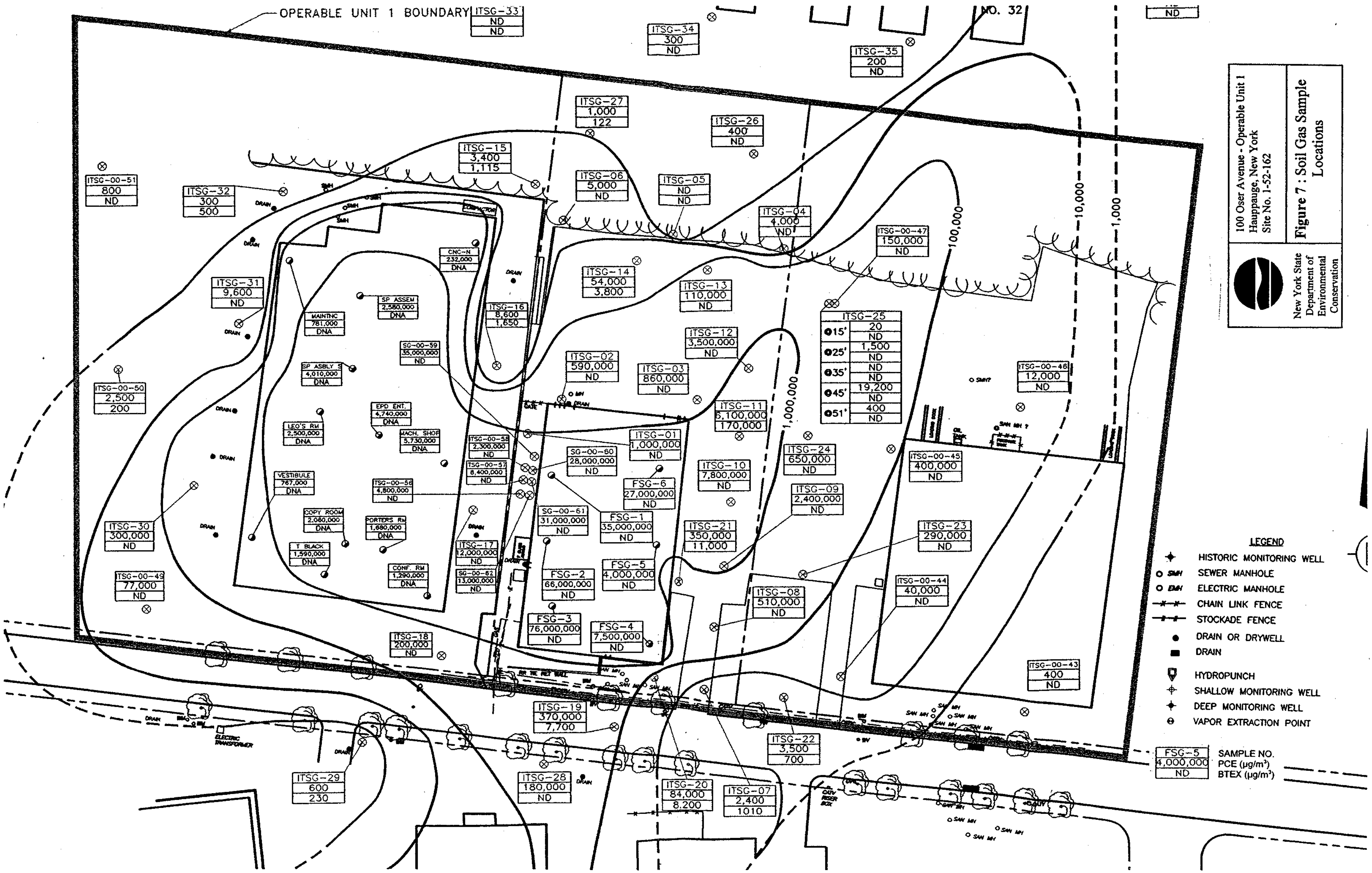


New York State
Department of
Environmental
Conservation

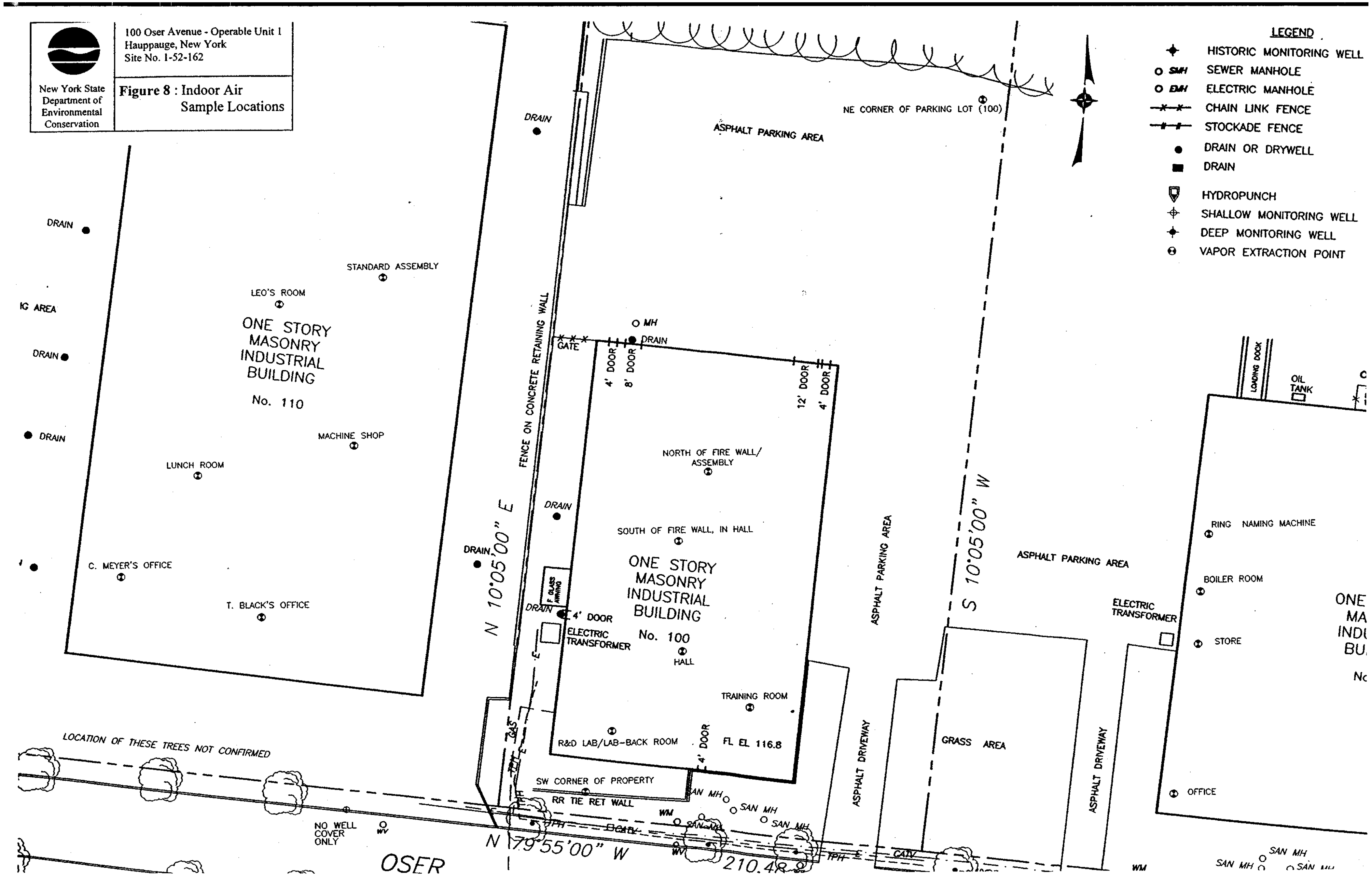
100 Oser Avenue - Operable Unit 1
Hauppauge, New York
Site No. 1-52-162

Figure 6 : Storm Water Drainage System





OPERABLE UNIT 1 BOUNDARY
100 Oser Avenue - Operable Unit 1
Hauppauge, New York
Site No. 1-52-162
Figure 7 : Soil Gas Sample Locations
New York State Department of Environmental Conservation
ITSG-33 ND ND
ITSG-34 300 ND
ITSG-35 200 ND
ITSG-27 1,000 122
ITSG-26 400 ND
ITSG-15 3,400 1,115
ITSG-06 5,000 ND
ITSG-05 ND ND
ITSG-04 4,000 ND
ITSG-00-51 800 ND
ITSG-32 300 500
ITSG-00-47 150,000 ND
ITSG-14 54,000 3,800
ITSG-13 110,000 ND
ITSG-31 9,600 ND
ITSG-16 8,600 1,650
ITSG-25
15' 20 ND
25' 1,500 ND
35' ND ND
45' 19,200 ND
51' 400 ND
ITSG-12 3,500,000 ND
ITSG-02 590,000 ND
ITSG-03 860,000 ND
ITSG-00-50 2,500 200
ITSG-00-46 12,000 ND
ITSG-11 6,100,000 170,000
ITSG-01 1,000,000 ND
ITSG-24 650,000 ND
SG-00-60 28,000,000 ND
ITSG-00-45 400,000 ND
FSG-6 27,000,000 ND
ITSG-10 7,800,000 ND
ITSG-09 2,400,000 ND
SG-00-61 31,000,000 ND
FSG-1 35,000,000 ND
ITSG-30 300,000 ND
ITSG-21 350,000 11,000
ITSG-23 290,000 ND
ITSG-17 12,000,000 ND
FSG-5 4,000,000 ND
ITSG-00-49 77,000 ND
FSG-2 66,000,000 ND
ITSG-00-44 40,000 ND
ITSG-08 510,000 ND
FSG-3 76,000,000 ND
FSG-4 7,500,000 ND
ITSG-18 200,000 ND
ITSG-00-43 400 ND
ITSG-19 370,000 7,700
ITSG-22 3,500 700
ITSG-29 600 230
ITSG-28 180,000 ND
ITSG-20 84,000 8,200
ITSG-07 2,400 1010
SP ASSEM 2,580,000 DNA
MAINTNC 781,000 DNA
CNC-N 232,000 DNA
SG-00-59 35,000,000 ND
SP ASBLY S 4,010,000 DNA
EPD ENT. 4,740,000 DNA
LEO'S RM 2,500,000 DNA
MACH. SHOP 5,730,000 DNA
ITSG-00-58 2,300,000 ND
ITSG-00-57 8,400,000 ND
VESTIBULE 767,000 DNA
ITSG-00-56 4,800,000 ND
COPY ROOM 2,060,000 DNA
PORTERS RM 1,680,000 DNA
T BLACK 1,590,000 DNA
CONF. RM 1,290,000 DNA
SG-00-62 13,000,000 ND
1,000,000
100,000
10,000
1,000
NO. 32
DRAIN
SMH
ELECTRIC TRANSFORMER
CATV RISER BOX
SAN MH
LEGEND
HISTORIC MONITORING WELL
SEWER MANHOLE
ELECTRIC MANHOLE
CHAIN LINK FENCE
STOCKADE FENCE
DRAIN OR DRYWELL
DRAIN
HYDROPUNCH
SHALLOW MONITORING WELL
DEEP MONITORING WELL
VAPOR EXTRACTION POINT
FSG-5 4,000,000 ND
SAMPLE NO.
PCE (µg/m³)
BTEX (µg/m³)



New York State Department of Environmental Conservation

100 Oser Avenue - Operable Unit 1
Hauppauge, New York
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Figure 8 : Indoor Air Sample Locations

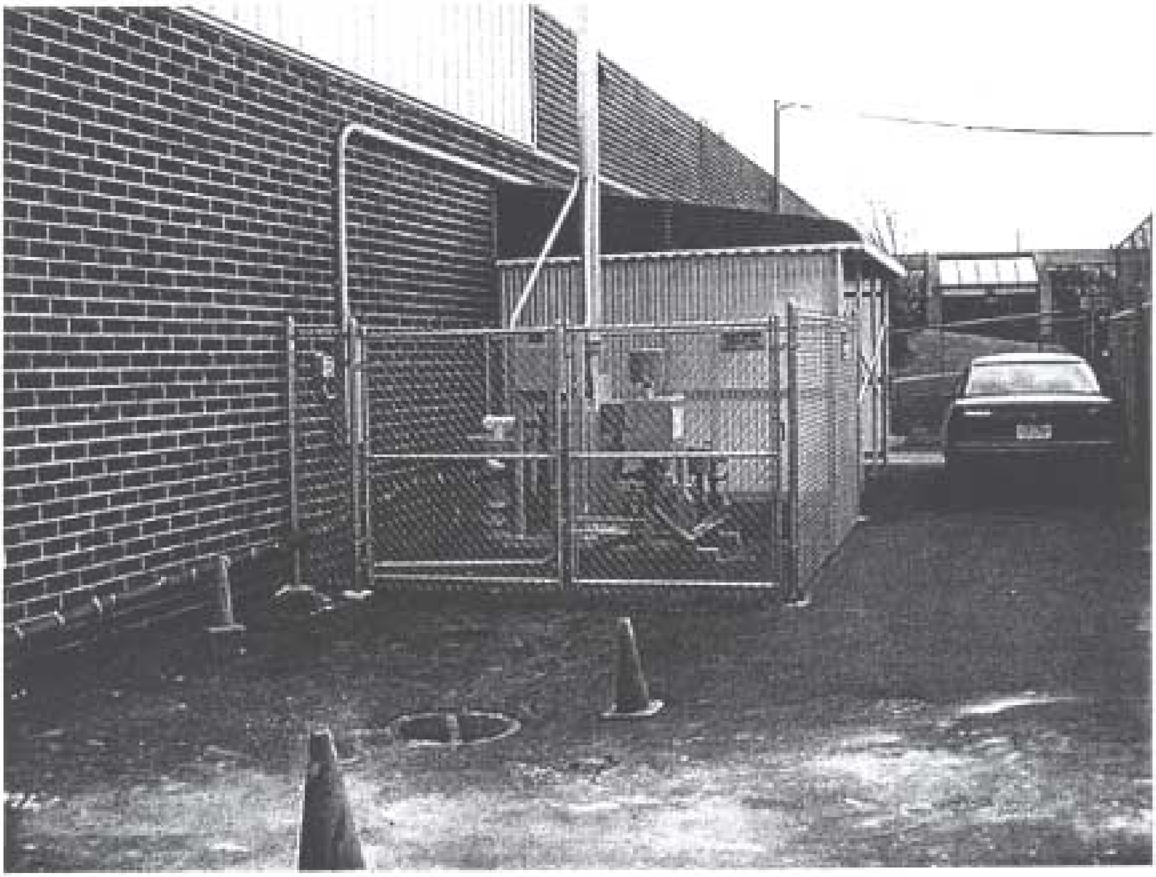

Figure 9 - Soil Vapor Extraction with Catalytic Oxidation Treatment (IRM #3)

Figure 10: Proposed Remedial Alternatives SG-2, S-2, G-3