REMEDIAL INVESTIGATION REPORT

Scobell Chemical Site

Town of Brighton, New York
Monroe County
Site No. 8-28-076

May 1999

Prepared by
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION

Table of Contents

Section 1 - INTRODUCTION

1.1 Site Location

The Scobell Chemical site is located at One Rockwood Place, immediately adjacent to the northwest corner of the I-490/I-590 interchange, in the Town of Brighton (on the boundary with the City of Rochester), Monroe County, New York (see Figure 1). The site is bordered to the south and east by the highway interchange, to the west by a commercial building, and to the north by railroad tracks and a Rochester Gas and Electric (RG&E) substation.

1.2 Site Description

The site is the location of a former chemical operation that conducted chemical storage, warehousing, transferring and sales of hazardous materials. Originally, the site was approximately 2.6 acres in size. In 1988, as a part of the New York State Department of Transportation's (NYSDOT) "can of worms" reconstruction project, an Interim Remedial Measure (IRM) was conducted by NYSDOT. The IRM included demolition of all of the on-site buildings as well as excavation and off-site disposal of contaminated soil and bedrock from over half of the site. The present site is about one (1) acre in size, is capped with approximately twelve (12) inches of clay, and is fenced. The site is located in a highly urbanized area in the Town of Brighton, at the eastern boundary of the City of Rochester. Industrial and commercial properties are located directly to the west of the site. A major Conrail railroad line is directly north, and to the east and south is the I-490 and I-590 highway interchange. The site is presently owned by the New York State Department of Transportation (NYSDOT).

1.3 Site History

The Scobell Chemical Site is the location of a former chemical repackaging company. The former site was operated from the 1920s until 1986. Assorted chemicals were purchased by the company in bulk and repackaged into smaller containers for resale. The site had one main building, two smaller structures and four above ground storage tanks. The amount of and type of the materials handled is unclear but significant subsurface soil contamination has been identified.

In 1986, the NYSDOT condemned the property to construct the "Can of Worms" highway intersection (the intersection of I-590 and I-490). In early 1988, the NYSDOT discovered extensive contamination at the Scobell site including abandoned drums, contaminated structures, and soil and bedrock contamination. Drums and containers containing halogenated volatile organic compounds (VOCs), pesticides/herbicides (including 2,4,5-T) and toluene were found in the warehouse. The site was reported to contain deteriorated containers, discolored soils, and stained asphalt.

In 1988, the NYSDOT conducted an IRM removal action. The IRM included decontamination and demolition of the structures, removal of containers, drums and above ground storage tanks, and excavation and disposal of contaminated soil and bedrock. Over half of the former footprint of the site was remediated by the IRM and is now a part of the highway interchange. For the remaining portion of the site, only the structures and above ground tanks were removed; no soil remediation was reported other than capping the area with 9-12 inches of clay. A fence was placed around the site. Significant subsurface soil contamination remains under the cap including toluene, trichloroethene, tetrachloroethene, 1,2-dichloroethene, chromium and pesticides (see Section 2).

A seep prevention system was installed by NYSDOT in November 1988, near the end of the IRM. The seep prevention system was installed at the base of the slope, adjacent to the highway ramp, to prevent water from running onto the highway. The seep prevention system consisted of approximately 300 feet of six inch diameter underdrain pipe that ran from the southwest to the northeast at the base of the slope between the site and the highway. When the system was in operation water drained to a 16 cubic foot collection sump (a manhole), located at the base of the slope below the northeast corner of the Scobell site. From the collection sump the water was pumped to a 2000 gallon holding tank, located at the top of the slope in the northeast corner of the site. When the seep prevention system was temporarily shut down in 1994, no water was seeping from the bedrock face. Since the purpose of the seep prevention system (prevent water from running onto the highway) was being accomplished on its own, the system was no longer needed to accomplish its intended goal and its use was discontinued in 1995.

During the demolition of the on-site structures 62 drums of soil/dust, containing site related contamination including low levels of 2,4,5-T (silvex), were generated. At the time the waste was generated it was difficult to find a facility to accept the waste for disposal. As a result, the drums were stored in an on-site storage trailer until they were disposed of at an off-site facility in 1996.

Section 2 - RESULTS FROM PREVIOUS SAMPLING AT/ NEAR THE SITE

Previous sampling events at and near the site are discussed below. A summary of the analytical results from these sampling events can be found in Table 2.1.

2.1 1988 NYSDOT Soil Sampling

Contractors for NYSDOT conducted soil/dust sampling in March, May, and June-August of 1988. Samples were collected from the entire footprint of the site at that time; since that time, over half of the site was removed as a part of the IRM summarized in Section 1.3, above. The results discussed in this section only include results from the current site area (what remained after the 1988 IRM).

Samples were analyzed for one or more of the following: volatile organics, total metals, EP Toxicity metals, dioxin scan, pesticides, and herbicides. Soil samples were collected at various depths ranging from the surface down to bedrock (generally less than ten feet below the surface).

Volatile organics were detected at nearly every sample location at varying concentrations. The volatile organics which were most prevalent include: trichlororethene (TCE), tetrachloroethene (PCE), 1,2-dichlororethene (1,2-DCE), and toluene. The following is a brief summary (also see Figure 2.1/Table 2.1 for a summary of the 1988 NYSDOT sampling) of the contaminants found in the portion of the site that remained after NYSDOT's IRM (the current footprint of the site):

Trichloroethene

The results indicated concentrations of TCE in the soil ranging from non-detect to 116 parts per million (ppm). The highest concentration was detected at the south-central portion of the site (sample # 88-61) at a depth of 84"-107". The area near the west-central portion of the site also indicated the presence of relatively high TCE concentrations (22.4 ppm at sample #88-85 at a depth of 0-18").

Tetrachloroethene

The results indicated concentrations of PCE in the soil ranging from non-detect to 73.6 ppm. The area where the highest concentrations of PCE were observed was the west-central portion of the site at and near sample # 88-89.

1,2-Dichloroethene

The results indicated concentrations of 1,2-DCE in the soil ranging from non-detect to 76.1 ppm. The highest concentrations were detected at the south-central portion of the site (sample # 88-60, -61, -62, and -29).

Toluene

Elevated concentrations of toluene in the soil were detected in many of the samples across the current footprint of the site. The highest contamination was detected in an area running from the west-central portion of the site to the east-central portion of the site, as well as in the north central portion of the site (near the former above ground storage tanks). The highest concentration was detected at sample # 88-98 (989 ppm at a depth of 36"-72") with elevated concentrations also found at sample # 88-89, -85, -97, -60, -61, -29, -91, -92, -93, -95, and -96.

EP Toxicity Metals - Chromium

There was an occasional "hit" for EP Tox chromium at levels above the regulated level (the level which classifies the soil as hazardous waste; 5 mg/L for chromium). Five samples, located along the western portion of the site (sample # 88-71, -72, -73, -75, and -76) indicated concentrations above the regulated level; four of these samples had levels between 8.3 and 15.3 mg/L with one of the sample results indicating a concentration of 758 mg/L.

EP Toxicity Metals - Lead

There were two samples that indicated EP Tox lead at levels above the regulated level (5 mg/L for lead). These samples were located along the western portion of the site (sample # 88-71 and -73) and the EP Tox lead concentrations were 12.2 and 5.6 mg/L, respectively.

Pesticides/Herbicides

There were some low level detections of certain pesticides/herbicides at the site. However, the only concentration that exceeded any of the cleanup objectives, presented in the Division of Environmental Remediation's Technical and Guidance Memorandum 4046, was the 12.6 ppm of MCPP (2-(22-methyl-4-chlorophenoxy)-propionic acid) detected in sample 88-30, located near the northeast corner of the site.

2.2 Leachate Collection System

As indicated in Section 1.3, a seep prevention system was installed, by NYSDOT in November 1988, near the end of their IRM. The seep prevention system was installed at the base of the slope, adjacent to the highway ramp, to prevent water from running onto the highway. The seep prevention system consisted of approximately 300 feet of six inch diameter underdrain pipe that ran from the southwest to the northeast at the base of the slope between the site and the highway. When the system was in operation water drained to a 16 cubic foot collection sump (a manhole); water that collected in the sump was then pumped to a 2000 gallon holding tank, located at the top of the slope in the northeast corner of the site.

Two sets of data are available for water samples taken from the 2000 gallon leachate holding tank. These samples were collected on April 10, 1989 and July 6, 1992 and the results are summarized below:

April 10, 1989

Analysis of this sample indicated the presence of 1,2-DCE (1360 parts per billion or ppb), PCE (302 ppb), TCE (224 ppb), toluene (150 ppb), 1,2-dichloroethane (122 ppb), and 1,1,1-trichloroethane (31 ppb).

July 6, 1992

The results of this sampling event indicated elevated concentrations of TCE (435 ppb), PCE (114 ppb), 1,1,1-trichloroethane (93 ppb), 1,2-dichloroethane (21 ppb), and 1,2-DCE (9 ppb).

2.3 Sediment and Surface Water Samples - Grass Creek Drainage System

On May 5, 1992 representatives of the Monroe County Health Department and the New York State Department of Health collected surface water/sediment samples from four locations in the Grass Creek drainage system. The samples were collected from (with the upstream samples listed first): north of site on RG&E property (sample location #3); just northwest of the I-590/I-490 interchange from the south end of the detention pond adjacent to the highway (sample location #4); northeast corner of Route 590 North on-ramp at Blossom Road (sample location #2); and north side of Edgevale Road at Clover Street (sample location #1).

The two sample locations located furthest from the site (#1 & #2) did not indicate the presence of elevated concentrations of site related contaminants. The two sample locations closest to the site indicated elevated concentrations of the following VOCs in the surface water samples: cis-1,2-DCE (up to 310 ppb), TCE (up to 140 ppb), and vinyl chloride (up to 6 ppb).

2.4 Blossom Village Apartments Foundation Excavation

The Blossom Village Apartments are located approximately one half mile north-northeast of the site, on the south side of Blossom Road just west of I-590. During the construction of the building the excavation for the foundation was advanced to approximately 7 feet below the surface, in one area, in order to remove concrete foundations and scrap metal (reportedly the remains of a small structure that had previously existed at the site). The elevation of the groundwater surface was reported to be just above the bottom of the excavation. A water sample was taken on May 3, 1995 and analyzed for metals and VOCs. A summary of the results from this sampling event indicated that only five parameters (three metals and two VOCs) were found in concentrations above the method detection limits. The two VOCs that were found were TCE (62 ppb) and 1,2-DCE (17 ppb).

Section 3 - SITE INVESTIGATION ACTIVITIES

A Work Assignment (WA), to perform the Site Investigation at the Scobell Chemical site, was issued to Parsons Engineering Science, Inc. on February 10, 1998. The Scope of Work included in the WA included the preparation of work plans to accomplish the following objectives:

- ❍ Evaluate localized groundwater flow patterns (with the use of exploratory groundwater monitoring points) to determine groundwater flow direction from the contaminant source area.
- ❍ As a part of past work at the site by NYSDOT most of the subsurface soils have been adequately characterized, with the exception of the northeast corner of the site. As a result, one of the objectives was to characterize the contaminant concentrations present in subsurface soils located in the northeast corner of the site.
- ❍ Field screen subsurface soils in an attempt to determine if LNAPL and/or DNAPL was present..
- ❍ Conduct a site survey and prepare a basemap.
- ❍ Based on the information collected as a part of the initial phase of this WA, install overburden and shallow bedrock groundwater monitoring wells to evaluate groundwater quality and determine the extent of any contaminant plume from this site.
- ❍ Determine if surface water/sediments have been impacted.
- ❍ Conduct a vapor extraction system pilot study.

Parsons Engineering Science, Inc. prepared the November 1998 Site Investigation Summary Data Report to document the work which they performed; this document is included as Attachment 1.

3.1 Determination of Groundwater Use in the Area

A review of groundwater usage in the vicinity of the site was conducted to determine whether water supply wells are currently in service near the site.

. 3.2 Evaluation of the Seep Prevention System

As discussed in Section 1.3, as a part of the work performed by NYSDOT a seep prevention system was installed to make sure that contaminated groundwater did not seep onto the highway at the exposed bedrock located along the southeastern edge of the site. This seep prevention system was inspected in order to determine: 1) its current condition; 2) if it is continuing to collect contaminated groundwater from the site, and if so, where that water is going; and 3) if the seep collection system has any potential for future use for the containment/collection of contaminated groundwater. A water sample was also collected from the sump basin and sent to an approved laboratory for VOC, pesticide, and metals analysis.

3.3 Small Diameter Groundwater Monitoring Point Installation

This initial part of this phase of the Site Investigation included the installation of 21 on-site and 4 off-site exploratory subsurface soil/groundwater monitoring points, GP-1 through GP-25, to bedrock (approximately 7-10 feet below ground surface) using a small diameter groundwater probe (e.g., Geoprobe^{tm} or equivalent method). This work was conducted between May 13, 1998 and May 15, 1998. The approximate locations of these points (on-site) were established on a 50 foot grid (see Attachment 1, figure 2.1).

At all 25 of the points continuous soil samples were collected for geological characterization, PID field screening, and field screening for the presence of NAPL using a hydrophobic dye (Sudan IV). At 10 of the locations (6 on-site/4 off-site) soil samples were collected from two different depths and sent for laboratory analysis; the depths were chosen based upon the results of the PID field screening. These samples were sent for laboratory analysis in order to fill in data gaps from NYSDOT's 1988 sampling, as well as to characterize the soils from the off-site geoprobe locations. Piezometers were installed at 19 of the 21 on-site locations and at the 4 off-site locations. Groundwater samples were collected for laboratory analysis at 3 on-site locations and 3 off-site locations (the fourth piezometer was dry).

On June 28, 1998 seven additional piezometers, GP-26 through GP-32, were installed to the north of the site, on Rochester Gas and Electric's property. Groundwater samples were collected from 5 of the piezometers; the other two piezometers were dry.

3.4 Monitoring Well Installation

The placement of the monitoring wells was based upon the information on groundwater flow direction gathered from the small diameter groundwater monitoring points, discussed in the previous section. Five monitoring well pairs, consisting of an overburden well and a shallow bedrock well, were originally planned. However, at three of the locations groundwater was not encountered in the overburden. Overburden monitoring wells were not installed at these locations, resulting in the installation of two overburden wells and five shallow bedrock wells (see Attachment 1, figure 2.1).

3.4.1 Shallow Bedrock Well Installation Method

Five shallow bedrock wells were installed (MW-1D, -2D, -3D, -4D, and -5D). At each well pair location the bedrock well was installed first in order to evaluate the integrity of the top-of-rock, in order to determine how to install the overburden well (see Section 3.4.2).

For the installation of the shallow bedrock monitoring wells, soils were drilled to bedrock using 6-1/4 inch inside diameter (I.D.) hollow-stem augers, with continuous split spoon sampling to the top of bedrock. A six inch spin casing was inserted into the hole and seated into the top-of-rock to allow for the containment of the drill water. The bedrock was then cored using HX coring methods, inside the six inch spin casing, to a depth of five feet into bedrock. A 5-7/8 inch roller bit was then used to ream out the hole and a four inch steel casing was set (with cement/bentonite grout) into the rock socket and was extended approximately two feet above the ground surface. Excess grout inside the steel casing was flushed out using potable water. After the grout had been allowed to set for at least 24 hours, HX coring methods were used to advance the hole up to 30 feet into the bedrock (Pennfield dolostone). Drilling logs are included in Appendix A of Attachment 1.

Monitoring wells were constructed of two inch ID threaded schedule 40 PVC flush-joint casing with a ten foot machine slotted 0.010-inch well screen. The annulus around the well screen was backfilled with No. 1 Morie sand. The sand pack extended one to two feet above the well screen. A bentonite seal was placed above the sand pack to form a two-three foot seal. Cement/bentonite grout was placed to the surface. Grout was lost in a high permeability zone below the steel casing at MW-1D, MW-2D, and MW-3D, so the remaining annular space was filled with hydrated bentonite chips. Each well had a vented cap placed on the monitoring well casing and a locking cover was placed on the 4-inch steel casing. A cement pad was installed around each steel well casing to channel surface water away from the well.

3.4.2 Overburden Well Installation Method

Only two overburden wells were installed (MW-4S and MW-5S); at the other three locations where overburden wells were to be installed, no water was encountered in the overburden when the bedrock wells were being installed. As a result, there was no point installing overburden wells at these locations. Prior to beginning the installation of the overburden well at the other two locations, the rock cores from the bedrock well were examined to determine the integrity of the top-of-rock (thickness of the "weathered bedrock"). Overburden monitoring wells were advanced with 4-1/4-inch inside diameter (ID) hollow-stem augers to the top of the bedrock. The well borings were continued through the augers 2.3-2.5 feet into the top of rock using a 5-7/8-inch outside diameter (OD) roller bit and water rotary drilling methods.

Monitoring wells were constructed of two inch ID threaded schedule 40 PVC flush-joint casing and ten feet of machine slotted 0.010-inch well screen. The overburden wells were screened across the water table so that any LNAPL that may be present, could be detected. The annulus around the well screen was backfilled with No. 1 Morie sand. The sand pack extended to one-two feet above the well screen. A bentonite seal was placed above the sand pack to form a two-three foot seal. Cement/bentonite grout was placed to within three feet of the surface, if there was enough space. Each monitoring well casing had a vented cap placed on it and a locking four inch diameter steel protective casing, with a hinged locking cover, was cemented into place over each overburden well. A cement pad was installed around each protective casing to channel surface water away from the well.

3.4.3 Vapor Extraction Well Installation

A vapor extraction well was installed near the western-central portion of the site. Soils were drilled with using 6-1/4 inch inside diameter (I.D.) hollow-stem augers, and continuous split spoon sampling, to the top of bedrock. The extraction well was constructed of 4 inch PVC schedule 40 pipe with a 0.040 inch slotted PVC screen. The screen will extend from the bottom of the hole to within 2.5 feet of the ground surface. A sand pack, with a grain size appropriate for 0.040 inch slotted screen, was installed surrounding the screened interval with a bentonite seal installed to within six inches of the surface. The extraction well was completed with a protective casing and a lockable cover.

3.5 Well Development and Slug Testing

Well development was conducted from June 29, 1998 through July 2, 1998. Monitoring wells were developed using pumping and surging, or by bailing, until temperature, conductivity, and pH stabilized and turbidity of less than 50 NTUs was achieved. Well evacuation was accomplished using a disposable polyethylene bailer or a pump and polyethylene tubing. MW-3D did not sustain satisfactory quantities of water during development so it was surged and agitated with a bailer in an effort to clean the sand pack while being bailed to dryness.

All monitoring wells were slug tested to estimate aquifer properties. Rising head (slug out) and falling head (slug in) slug tests were conducted using a combination of electronic water level monitoring and electronic data logger equipment. The slug tests were conducted between August 10, 1998 and August 12, 1998.

3.6 Vapor Extraction System Pilot Study Procedures

With the nature of many of the contaminants of concern at this site (volatile organics), and the type of unconsolidated material present below the site, vapor extraction may be a viable remedial technology. As such, a vapor extraction system (VES) pilot study was conducted from August 26, 1998 through September 3, 1998 with the use of the vapor extraction well (SVE-1) and five vapor monitoring points (GP-6, -16, -17, -20, and -22). A blower was connected to the vapor extraction well, air was extracted from the vapor extraction well and the surrounding soil (the air was passed through a carbon cannister), and the induced vacuum was monitored at the five monitoring points. Vapor extraction continued for a period of five days until breakthrough was observed at the carbon cannister.

At regular intervals during the first four hours of the pilot study vacuum response (at the piezometers being monitored) and VOC concentration at the extraction well (with a PID) were measured; after the first four hours measurements were taken at the end of the first and fifth days. PID readings were also taken from in the piezometers during the pilot study, as well as three days after the blower was turned off.

During the pilot study four air samples were taken and analyzed for VOCs in a laboratory. Three of the samples were collected from the extraction well (1 hour, 22 hours, and 120 hours after initiation of the pilot test) and one sample was taken from the effluent of the carbon treatment cannister (22 hours after test initiation).

3.7 Handling of Investigation Derived Waste

Excess drill cuttings, generated from the installation of the monitoring wells, were drummed and staged on-site until off-site disposal could be arranged. One composite sample was taken from the drill cuttings generated from the installation of the soil vapor extraction well and one composite sample was collected from the drums containing the rest of the drill cutting being staged at the site. The two samples were analyzed by the toxicity characteristic leaching procedure (TCLP) for VOCs, pesticides/herbicides, and metals.

All decontamination and drill water from the on-site wells and piezometers was allowed to infiltrate back into the site, making sure that runoff/surface flow was not allowed (a small area of the 9"-12" clay cover, installed as a part of the 1988 NYSDOT IRM, was temporarily removed to facilitate the infiltration). Drilling water, development water, and purge water from the upgradient and downgradient monitoring wells was containerized pending the results of the groundwater samples taken from those wells. The water generated from the upgradient well was later disposed of at the site; the water generated from the downgradient wells was not allowed to infiltrate into the ground at the site.

At the time of the writing of this report arrangements were being made for the off-site disposal of the drill cuttings and water being staged at the site.

3.8 Collection of Samples

As a part of the Site Investigation field work samples of the following environmental media were collected: surface soil, subsurface soil, sediment, surface water, groundwater, dense non-aqueous phase liquid (DNAPL), and soil vapor. The number of samples for each media, the phase of the field work when the samples were collected, and the method of analysis for the samples is summarized in Table 3.1.

3.8.1 Small Diameter Groundwater Monitoring Points

During the small diameter groundwater monitoring point (geoprobe^{TM}) installation, subsurface soil samples were collected continuously from ground surface to the top of bedrock at each of the initial 25 soil boring locations. The soils were visually examined for geological characteristics and evidence of contamination. A portion of each sample was placed in a zip-lock bag and the headspace was screened for the presence of organic vapors using a photoionization detector (PID). Two soil samples from each of the borings, one near the top of the water table and one near the top of bedrock, were also screened for the presence of LNAPL and DNAPL with Sudan IV, a hydrophobic dye. Soil samples were not collected in the additional seven borings installed north of the site.

A total of ten of the geoprobe locations were designated for the collection of subsurface soil samples; six on-site, to fill in data gaps, and at all of the four off-site locations, since no soil data previously been collected downgradient of the site. Two subsurface soil samples were collected, from each of the ten locations, based on the field screening results. The 20 samples were submitted for laboratory analysis, as summarized in Table 3.1.

Groundwater samples were collected from six piezometers (GP-1, GP-2, GP-4, GP-5, GP-9, and GP-24) on May 26 and 27, 1998 and analyzed for VOCs, pesticides, and metals. Prior to sampling, each of the piezometers were purged a minimum of three well volumes of water, or to dryness and then allowed to recover. Four of the seven piezometers originally planned for sampling were dry (GP-3, GP-19, GP-23, and GP-25), therefore three new sample locations were substituted (GP-5, G-9, and GP-24). Purging and sampling were conducted using a combination of a peristaltic pump with dedicated tubing(purging) and small bailers (sampling). Groundwater sampling logs are presented in Appendix B of Attachment 1.

3.8.2 Miscellaneous Site Investigation Samples

Surface water and sediment samples were collected from the site on May 28, 1998 (Attachment 1, Figure 2.1). Two surface water samples (SW01 and SW02) and two sediment samples (SED01 and SED02) were collected from the highway stormwater retention pond, located approximately 0.25 miles northeast of the site. Samples SW01 and SED01 were collected at the southwestern (influent) end of the stormwater retention pond approximately 25 feet northeast of the box culvert. Samples SW02 and SED02 were collected near the base of a hill adjacent to a groundwater seep located on the western side of the marshy area at the southwestern end of the retention pond (i.e. northwest of

SW-1). Sediment sample (SED03) was collected from the drainage ditch north of the railroad tracks and east of the Rochester Gas and Electric substation. There was no standing water in the ditch during the site investigation so surface water was not sampled.

A **water sample (SUMP1)** was collected from the seep prevention sump (vault) located adjacent to the southeastern edge of the site along the I-590 off ramp. The sump sample was collected by lowering a disposable bailer and other sampling apparatus into the sump from the top.

Four **surface soil samples** (SS01 to SS04) were collected along the western and northern boundaries of the site on May 27, 1998. Samples SS01 and SS02 were located in the area between the building and the fence along the west side of the site. Samples SS03 and SS04 were located near the base of the railroad embankment along the north side of the site. At each location, the surface debris and sod was removed. The surface soil samples were then collected from a depth of approximately 0 to 2 inches.

3.8.3 Monitoring Wells/Vapor Extraction Well

Continuous split spoon samples were collected through the overburden to the top of bedrock at each well location (if a well pair was to be installed at a certain location, split spooning occurred during the drilling of the deeper well). The soils were visually examined for geological characteristics and evidence of contamination. A portion of each sample was placed in a zip-lock bag and the headspace was screened for the presence of organic vapors using a PID. Two soil samples from each well pair location, one near the top of the water table and one near the top of bedrock, were also screened for the presence of NAPL with Sudan IV, a hydrophobic dye.

Two subsurface soil samples were collected from the overburden section in the two onsite monitoring wells for laboratory analyses. In addition, samples from the two on-site and two downgradient well locations (one at each of the on-site locations and two at each of the off-site locations) were analyzed for "physical parameters" including moisture content, total organic carbon, and particle size distribution.

Two soil samples were collected from the split spoons taken during the installation of the vapor extraction well. These samples were submitted for analysis of "physical parameters" including moisture content, total organic carbon, and particle size distribution.

During the purging of the monitoring wells, prior to the collection of groundwater samples, the presence of dense nonaqueous phase liquid (DNAPL)was encountered in MW-3D and MW-4D. Samples of the DNAPL were collected for VOC analysis.

Four air (soil gas) samples were collected during the SVE pilot test for laboratory VOC analysis. Air samples were collected from the vapor extraction well (SVE-1) approximately 1 hour, 22 hours, and

120 hours after test initiation. In addition, an air sample was collected from the effluent of the carbon canister 22 hours after test initiation. The air samples were collected in tedlar bags and

shipped overnight to the analytical laboratory for VOC analysis.

3.9 Site Survey/Preparation of Basemap

It was necessary to perform the site survey in two phases. The placement of the monitoring wells was based upon the interpretation of the groundwater levels from the piezometers installed as a part of the initial site investigation field work. As a result, the piezometers had to be surveyed for vertical control in order to properly evaluate the groundwater levels. Once the monitoring wells were installed a second phase of surveying was conducted to include all of the sampling points on the basemap.

The first phase of the site survey was conducted on May 28, 1998 and consisted of surveying the piezometers, conducting a topographical survey, establishing a site benchmark, and preparing a preliminary site basemap. The second phase of the site survey was conducted on July 2, 1998 and July 9, 1998 and included surveying the monitoring wells/ additional piezometers, as well as any sampling point not previously surveyed. All wells/piezometers/ sampling points were surveyed for vertical and horizontal control. In addition, at each piezometer the top-of-casing elevation was recorded and at each monitoring well the elevation of the inner and outer casing was collected. A site basemap, which included all sampling locations and a one foot topographical interval, was completed and included with the Site Investigation Report.

Section 4 - RESULTS OF THE SITE INVESTIGATION

Except as noted, the following synopsis is largely based upon the report "Site Investigation Summary Data Report for the Scobell Chemical Site", Parsons Engineering Science, Inc., November 1998 (Attachment 1).

4.1 Physiography and Climate

Relative to regional features, the Scobell Chemical site is: approximately 6.0 miles south of Lake Ontario, 2.2 miles west of Irondequoit Creek, 1.4 miles east of the Genessee River and 7 miles north of the New York State Thruway. The site is located in the Town of Brighton, on the municipal boundary with the City of Rochester, in the Irondequoit Creek drainage basin. Rochester lies in the Lake Erie - Lake Ontario Lowland and extends from the Lake Plain southward up to the Lockport Escarpment. The climate is temperate, with average daily maximum temperatures of 38 degrees (F) in the winter and 76 degrees (F) in the summer. Annual precipitation is about 32 inches, including the meltwater from an average 80 inches of snowfall. The land is characterized by gently rolling terrain underlain by dolomitic sandstone and dolomite bedrock which is veneered with glacial sediments. The site is located on the eastern margin of the Pinnacle Hills moraine-kame complex.

4.2 Geology

4.2.1 Regional Geology

SURFICIAL GEOLOGY

Surficial geology deals with the unconsolidated deposits that are found from the surface downward to the solid bedrock. The surficial geology in the immediate vicinity of the site is dominated by Pleistocene and post-Pleistocene aged glacial materials deposited toward the close of the last (Wisconsin) ice age. According to various age dating methods these deposits were formed between 20,000 and 10,000 years before present. During the retreat of the Wisconsin ice sheet a minor re-advance occurred. The geological processes associated with these events imparted fabric and structure to the sediments which created the engineering properties that we observe today. The surficial deposits rest on an eroded bedrock surface created by the glacial events. The resulting erosion produced a surface of low relief and a relatively highly fractured zone, up to about 15 feet thick.

The site lies at the eastern margin of the Pinnacle Hills moraine, which was formed by a minor glacial re-advance dated at about 13,000 years before present. As a recessional moraine it is characterized by kame deposits which were formed in cave-like channels in the ice. They tend to be poorly sorted mixtures of boulders, cobbles, sand and clay. The kame moraine is veneered with a thin ablation till, which is a mixture of large rocks, sand and clay. From a soils engineering perspective most glacial tills are "over-consolidated", that is, they are compressed to a greater density than would normally be considered "maximum". Ablation tills such as the one that caps the Pinnacle Hills Moraine, on the other hand, tend to be under-consolidated. They are also "well graded", which means that many different particle sizes, from coarse to fine, are present in the material.

BEDROCK GEOLOGY

The bedrock in the Rochester area consists of several thousand feet of Paleozoic aged (geologically ancient) strata overlying the Precambrian basement rocks at depth. The rocks that occur most immediately beneath the surficial deposits range in age from Ordovician to Silurian era, and consist principally of the rock types sandstone, shale, and limestone/dolostone[1]. These sedimentary rocks are nearly horizontally bedded; they dip to the southwest at 50 feet per mile (about one half of one degree). As noted below, during the ice age the weight of advancing glaciers stressed the bedrock and caused the upper 10 to 30 feet to become relatively highly fractured. In addition the glaciers acted as erosional agents, producing the undulating but relatively smooth bedrock surface upon which the surficial materials were deposited.

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[1] "Dolostone" refers to a rock type; "dolomite" refers to a mineral species. Dolostone is composed of 50% or more of the mineral dolomite. The mineral is the chemical "calcium-magnesium carbonate".

4.2.2 Site Geology

SURFICIAL GEOLOGY

Surficial deposits at the Scobell site range in thickness from 7 - 10.5 feet. These deposits consist of (from the top down) a silty clay cover placed during the 1988 IRM (0.4 to 3 feet), fill of sand, silt, and gravel with coal, cinders, brick and glass (0 to 4.5 feet), native silt and clay with some sand, probably ablation till (0 to 7.5 feet), and an oxidized basal sand unit with some gravel, probably outwash, which directly overlies the bedrock (up to 3.5 feet thick) (Parsons Site Investigation Summary Report, November 1998).

BEDROCK GEOLOGY

The depth to bedrock at the site ranged from 7 - 10.5 feet below ground surface. The bedrock formations that immediately underlie the site are members of the Clinton and Lockport groups. They are listed here in reverse geological order; that is, from youngest to oldest. This means that the uppermost rock formation is discussed first.

Where not removed by construction activities, the Oak Orchard formation directly underlies the surficial deposits at the site. Grasso and Leibe (1994) mention that the Oak Orchard is exposed in the roadcut at the junction of I-490 and I-590, adjacent to the site. The Oak Orchard is a dolostone that contains numerous vugs (hollows) lined with mineral crystals such as gypsum, calcite, dolomite and sphalerite. It also contains fossil remains of corals and other invertebrate sea animals. These features provide the rock with a certain degree of porosity, which tends to enhance ground water flow. (See section on Hydrology, below.)

The 65 foot thick Penfield formation underlies the Oak Orchard. To the naked eye this rock appears to be a dolostone, but laboratory inspection reveals that it contains a high percentage of sand. Near its base the formation is actually a sandstone whose grains are cemented with dolomite. The Penfield is described by site investigators as “a gray crystalline dolostone with lenses of cemented fossiliferous sand containing crinoid fragments [with] occasional stylolite development [and vugs]...” (Parsons, November 1998).

Beneath the Lockport group lies the Clinton group. The uppermost formations in the Clinton group are the 10 foot thick DeCew dolostone and the 100 foot thick Rochester shale. The DeCew formation is fine grained dolostone. It exhibits contorted bedding, but is a relatively coherent rock. The Rochester formation is a limey shale, with varying ratios of lime to clay minerals. As with most shale units, it is thin bedded and has occasional vertical fractures. The hydrology section discusses implications that these physical characteristics have on contaminant migration.

4.3 Hydrology

4.3.1 Regional Hydrology

The Scobell site is in the Irondequoit Creek drainage basin, which empties into Lake Ontario via Irondequoit Bay. It is located between the Irondequoit valley and the gorge of the Genesee River.

Regional ground water flow in the vicinity of the site is northward, toward Irondequoit Bay.

4.3.2 Site Hydrology

SURFICIAL HYDROLOGY

Surface water hydrology at the site is controlled by built features, especially the railroad that borders the site to the north and the drainage facilities associated with arterial highways I-490 and I-590 to the south and east. The stormwater drainage system consists of catch basins, drainage culverts, a retention pond and surface intermittent stream. Surficial flow direction at the site has been altered by the highway construction. Because of the road cuts, the flow direction is predominately toward the south-southeast, where it most likely emerges into surface drainage diversions. The drainage is generally from the bluff along the highway southeastern edge of the site, northward to the retention pond, and from the pond via Grass Creek to Irondequoit Creek.

The ground water flow regime is separate from surface flow. In the overburden, direction and velocity vary according to the geologic material described under surficial geology above. For practical purposes infiltration to the natural surficial deposits, in the immediate vicinity of the site, is limited by the silty clay cover material that was artificially placed in 1988. Horizontal recharge to the surficial deposits is limited by removal of overburden to the south and east in conjunction with highway construction. Recharge from the west is limited by built features of the area (paved parking lots and buildings). The shallow groundwater table appears to be perched in a thin zone above the overburden/bedrock interface. During on-site subsurface exploration work groundwater was encountered at depths of 4.2 to 9.4 feet below the ground surface. Water level measurements indicate that shallow groundwater on-site flows to the south, towards the I-590 ramp; shallow groundwater off-site to the north of the railroad tracks appears to flow to the northeast.

BEDROCK HYDROLOGY

Ground water flow in the bedrock, on the other hand, is an important consideration at the Scobell site. In this case flow is controlled by the bulk characteristics of the rock formation and the hydraulic head driving the water from its source toward the point where it exits the ground. The uppermost bedrock formations (Oak Orchard and Penfield) are dolostone and dolomitic sandstone.

Because of the magnesium present in dolomite it is far less soluble in natural waters than is calcite, the principle constituent in limestone. Both limestone and dolomite found at the site tend to break into blocks, bounded by bedding planes on the top and bottom, and vertical fractures called joints on the sides. The more soluble character of limestone frequently results in enlargement of vertical joints and bedding planes due to dissolution of the rock matrix. This crack network provides potential pathways for migration of contaminants, in both the pure non-aqueous phase and in the dissolved phase.

The rocks of the Oak Orchard and Penfield formations are brittle, and exhibit interlocking grain structure. This means that there is relatively little opportunity for contaminant migration through the rock matrix itself. Voids in the rock such as vugs and hollows between bone fragments in fossiliferous zones increase the porosity and can provide enhanced migration pathways where they are interconnected. However, as noted above, migration can readily take place through fractures and most migration takes place in this way. Where exposed to the over-riding ice during glaciation, the uppermost several feet of either formation has fractured in response to the stress of the ice mass. This results in a very permeable zone immediately beneath the overburden-bedrock interface.

Sandstone also develops bedding and joint fracture sets. However, because it is composed of rounded sand grains cemented with another - usually softer - mineral, it fractures more like concrete. Some sandstones are massively bedded, and solution enlargement of bedding planes is much less prevalent. In the sandy horizons, the cement may be dissolved over time, resulting in increased permeability and increased ground water flow. These considerations pertain to the bedrock at depths of 75 to 100 feet below the ground surface.

Ground water was encountered in the shallow bedrock at depths ranging from 10.5 to 20.7 feet below ground surface. While the differences in depth to water suggest that the water in the surficial deposits may be "perched", visual staining of the basal sand (as well as its presence in two of the bedrock wells) suggests that DNAPL has penetrated any confining layer that may be present. Flow direction in the shallow bedrock appears to be to the northeast (Parsons, 1998).

4.4 Groundwater Use

Groundwater in the vicinity of the Scobell site is not used as a source of drinking water. The City of Rochester obtains municipal water from Canadice and Hemlock Lakes located in Livingston and Ontario Counties. The Monroe County Water Authority (from which the Towns and Villages of East Rochester, Brighton, and Pittsford obtain water) obtains drinking water from Lake Ontario. The Village of Webster obtains drinking water from 6 municipal wells located on Dewitt Road and 5 wells located on the sandbar between Irondquoit Bay and Lake Ontario. The wells are approximately 350 to 400 feet deep and are located over 7 miles north of the site.

The Monroe County Health Department reviewed their records for all streets within ½ mile of the site and did not identify any private water wells.

4.5 Summary of Analytical Results

4.5.1 Groundwater

ON-SITE - OVERBURDEN

Groundwater samples were collected from three of the on-site geoprobe points, one from each corner of the triangular shaped site. The results indicated that, in general, the highest contaminant concentrations were present in the northwest corner of the site. The analytical results indicated the presence of chloroform (non-detect (ND) - 180 ppb), ethylbenzene (ND - 74 ppb), xylene (1 ppb - 49 ppb), trichloroethene ((TCE) 3 ppb - 38 ppb), tetrachloroethene ((PCE) ND - 27 ppb), toluene (ND - 25 ppb), 1,2-DCE (ND - 6 ppb), and benzene (ND - 6 ppb).

Elevated metals concentrations were found in the groundwater samples taken from the three on-site geoprobe points. The metals that indicated elevated concentrations (above SCGs) in at least two of these three samples included: arsenic (40 and 26 ppb compared to a standard of 25 ppb); chromium (397, 65, and 61 ppb compared to a standard of 50 ppb); lead (136, 165, and 1140 ppb compared to a standard of 25 ppb); zinc (2170, 2370, and 4770 ppb compared to a standard of 2000 ppb). The highest metals concentrations were found in the sample taken from GP-05, near the northwest corner of the site. Although some metals were found on-site at elevated concentrations, none of the metals listed above were detected off-site at concentrations above groundwater standards. This is an indication that these metals are not migrating from the site.

In addition, a groundwater sample was collected from the vapor extraction well (SVE-1). The following VOCs were detected: toluene (300,000 ppb), 1,2-DCE (12,000 ppb), TCE (7400 ppb), vinyl chloride (140 ppb), xylene (140 ppb), and ethylbenzene (54 ppb).

ON-SITE - SHALLOW BEDROCK

Groundwater samples were collected from the two on-site shallow bedrock monitoring wells (MW-2D and MW-3D). Very high concentrations of TCE (480,000 ppb - 1,000,000 ppb) and 1,2-DCE (3200 ppb - 19,000 ppb) were detected. In addition, elevated levels of PCE (930 ppb - 1100 ppb), vinyl chloride (ND - 480 ppb), toluene (ND - 380 ppb), and 1,1-DCE (ND - 130 ppb) were detected. When MW-3D, located in the northwest corner of the site, was sampled a dense non-aqueous phase liquid (DNAPL) was encountered. A sample of the **DNAPL** from MW-3D was collected; the results indicated that the DNAPL is made up predominantly TCE (790,000,000 ppb) and PCE (6,900,000 ppb).

OFF-SITE - OVERBURDEN

During the initial phase of field work four geoprobe points were installed off-site, north of the railroad tracks. Groundwater samples were taken from three of these geoprobe points (GP-03 was dry) and the results indicated the presence of TCE as high as 1200 parts per billion (ppb) and the presence of 1,2-dichloroethene (1,2-DCE) as high as 3400 ppb. Vinyl chloride was detected in two of the off-site geoprobe points at concentrations as high as 9 ppb.

During the installation of groundwater monitoring wells two well pairs (overburden/shallow bedrock well in each pair) were installed off-site, to the north on Rochester Gas & Electric's (RG&E) property. Seven additional piezometers were also installed, to the top of bedrock, on RG&E's property. Five overburden groundwater samples were taken from the piezometers (GP-28 and -32 were dry) and two overburden groundwater samples were taken from monitoring wells. The results indicated elevated concentrations of 1,2-DCE (47 ppb - 3000 ppb), TCE (46 ppb - 730 ppb), and vinyl chloride (ND - 29 ppb).

The off-site shallow groundwater samples were collected in a "corridor" to the north-northeast of the site. The sample collected closest to the site (GP-1) was relatively clean; the only VOC detected above groundwater standards was TCE at 11 ppb (standard = 5ppb). All of the groundwater samples collected along the western edge of the corridor (GP-27, -29, -30, and -31) indicated that all VOC concentrations were below standards. Three of the five monitoring points along the eastern edge of the corridor were dry (GP-3, -28, and -32); the other two (GP-4 and -26) did contain elevated VOC concentrations. The two monitoring points that are the most downgradient are located approximately 900 feet north-northeast of the site. The groundwater sample from the westernmost sampling point (GP-31) was “clean”; the groundwater sample from the easternmost sampling point (GP-32) was the dry.

OFF-SITE - SHALLOW BEDROCK

There are two shallow bedrock wells located downgradient of the site; MW-4D is located approximately 300 feet to the north-northeast of the site and MW-5D is located approximately 475 feet to the north-northeast of the site. The groundwater sample from MW-4D indicated very high concentrations of TCE (770,000 ppb), PCE (7500 ppb), chloroform (7300 ppb), and 1,2-DCE (1900 ppb); the groundwater sample from MW-5D indicated very high concentrations of TCE (150,000 ppb), PCE (21,000 ppb), and 1,2-DCE (27,000 ppb). When MW-4D was sampled DNAPL was encountered. A sample from MW-4D indicated that the **DNAPL** is made up of predominantly TCE (640,000,000 ppb) and PCE (43,000,000 ppb).

4.5.2 Surface soil

Four surface soil samples were collected, two from along the western edge of the site and two from along the northern edge of the site. The results indicated that VOC concentrations in all four samples were far below potential levels of concern (i.e., the highest concentratin of TCE detected was 0.014 ppm compared to the cleanup objective of 0.7 ppm presented in the Division of Environmental Remediation’s Technical and Guidance Memorandum 4046, or TAGM 4046). Two pesticides were detected slightly above concentrations presented in TAGM 4046. Specifically, endrin was detected in SS02 at a concentration of 0.13 ppm (compared to 0.1 ppm presented in the TAGM); heptachlor epoxide was detected at a concentration of 0.023 ppm (compared to 0.020 ppm presented in the TAGM). In addition, some of the metals concentrations were elevated including cadmium (up to 33.3 ppm), chromium (up to 164 ppm), lead (up to 668 ppm), mercury (up to 0.94 ppm), and zinc (up to 2320 ppm).

4.5.3 Subsurface Soil

Subsurface soil samples were taken from north of the site as well as on the site itself to fill in some data gaps. The results from the **off-site samples** did not indicate elevated concentrations of VOCs or pesticides. Certain semi-volatile organic compounds (SVOCs) were present at somewhat elevated concentrations. However, after reviewing the sample results from samples taken on-site, these SVOCs do not appear to be related to what has been found at the site.

A total of 16 **on-site subsurface soil samples** were taken at eight locations (GP-5, -11, -12, -13, -14, and -24; MW-2D and MW-3D). The analytical results indicated that elevated VOC concentrations were were present at GP-11 and GP-12 including toluene (up to 1,100 ppm from GP-11 @ 6'-8'), TCE (up to 200 ppm from GP-11 @ 6'-8'), PCE (up to 46 ppm from GP-11 @ 6'-8'), xylene (up to 16 ppm from GP-11 @ 6'-8'), 1,1,1-trichloroethane (up to 13 ppm from GP-11 @ 6'-8'), and 1,2-DCE (up to 0.46 ppm from GP-11 @ 1'-3').

Subsurface soil contamination appears to be limited to on-site areas and is predominantly made up of volatile organic constituents (see also Section 2.1, above, for a summary of 1988 NYSDOT sample results).

4.5.4 Surface Water/Sediment

Three surface water/sediment sample locations were established. These samples were located: at the southern end of the stormwater retention pond, near the influent of the pond (SW-01/SED-01); along the southwestern perimeter of the stormwater retention pond, approximately 175 feet northwest of SW-01/SED-01 (SW-02/SED-02); and in the drainage ditch located on RG&E property north of the site and east of RG&E's substation (SED-03). The drainage ditch at location 3 was dry so a total of three sediment samples and two surface water samples were collected.

The results from SW-01 indicated elevated concentrations of 1,2-DCE (28 ppb) and TCE (23 ppb); the results from SW-02 did not indicate elevated concentrations of VOCs.

Volatile organics were detected in the sediment samples; the compounds that had the highest levels detected included 1,2-DCE (0.29 ppm @ SED-03 and 0.21 ppm @ SED-01), TCE (0.081 ppm @ SED-03 and 0.065 ppm @ SED-01), and vinyl chloride (0.3 ppm @ SED-02).

4.5.5 Seep Prevention Sump (water)

A water sample was collected from the seep prevention sump, located at the bottom of the slope below the northeast corner of the site. The results indicated elevated VOC concentrations including 1,2-DCE (20,000 ppb), 1,1,1-TCA (1300 ppb), vinyl chloride (1200 ppb), toluene (970 ppb), xylene (320 ppb), and 1,1-DCA (170 ppb); 1,1-DCE, benzene, ethylbenzene, TCE, 1,2-DCA, and PCE were also detected at concentrations ranging from 18 ppb - 94 ppb.

4.5.6 Data Validation

Analytical samples were collected from various media at the Scobell Chemical site during the site investigation (see Table 3.1). All analytical data were evaluated according to NYSDEC Department of Environmental Remediation (DER) Data Usability Summary Report (DUSR) guidelines. Laboratory and field data were reviewed to determine the limitations, if any, of the data and to assure that the procedures were effective and that the data generated provides sufficient information to achieve the project objectives. All data qualifications were documented following the NYSDEC ASP 1995 Revision guidelines. The data usability summary report and complete validated laboratory analytical results are presented in Appendix D of Attachment 1.

The data usability summary report, presented in Attachment 1, was reviewed by a chemist in DER's Quality Assurance Unit. The chemist concluded that the data evaluation was thorough and accurately followed the data validation guidelines (10/14/98 memorandum from C. McGrath to J. Moras); the data is valid and usable as qualified.

4.6 Vapor Extraction Pilot Study

During the pilot test, air was extracted from the vapor extraction well (SVE-1) at a rate of approximately 39 cubic feet per minute and an average vacuum of 3 inches of mercury. The vacuum response at each piezometer was measured at regular intervals during the test. Table 5.1 of Attachment 1 summarizes the vacuum measurements at each piezometer during the pilot test. The vacuum response measured at the piezometers showed variability throughout the duration of the test. However, the maximum vacuum response in each piezometer was recorded during the first day of vapor extraction. Based on the vacuum response data, an air permeability for the site soils has been estimated to be approximately 9.5 darcy units (or cm^2). This value is typical of soils with moderate permeability.

The maximum vacuum response at each piezometer versus distance from the vapor extraction well is presented on Figure 5.1 of Attachment 1. As shown, the relationship between maximum vacuum response and distance is linear. Based on this data, the radius of influence for the vapor extraction well has been estimated at approximately 40 feet. The radius of influence was obtained by assuming a conservative minimum vacuum response of 0.3 inches of water and interpolating the corresponding radius of influence from the regression line. Over time, the radius of influence may exceed 40 feet as soil moisture decreases and preferential flow pathways are established. However, due to the vertical heterogeneity of the soil, a conservative radius of influence of 40 feet should be used for design purposes.

4.6.1 Volatile Organic Compound Removal

Effluent VOC concentrations from the vapor extraction well were measured with a PID during the pilot test. The data is presented in Attachment 1: VOC concentrations are summarized in Table 5.2 and plotted on Figure 5.2. Results indicate that VOC concentrations in the extracted air stream were reduced by approximately 66 percent during the test. The highest PID reading of 3,062 ppm was measured following 30 minutes of vapor extraction. PID readings were near or below 1,000 ppm after the fifth day of vapor extraction.

Four air samples were collected during the pilot test for laboratory analyses of VOCs. Three samples were collected prior to carbon treatment and one sample was collected after carbon treatment. Laboratory analytical results are summarized in Attachment 1, Table 5.3. A total of 12 VOCs were detected in the air samples. The highest VOC concentrations were detected in samples collected before carbon treatment after one and 22 hours of vapor extraction. Total VOC concentrations before carbon treatment ranged from 1,654 ppb to 2,326 ppb, with the maximum concentration detected in the sample collected following 22 hours of extraction.

VOCs detected in the air samples consisted primarily of toluene, trichloroethene and *cis*-1,2-dichloroethene. Toluene concentrations ranged from 1,600 ppb to 2,000 ppb and accounted for approximately 86% to 96% of the total VOC concentration. Trichloroethene concentrations ranged from 39 ppb to 220 ppb and accounted for approximately 2% to 10% of the total VOC concentration. *Cis*-1,2-dichloroethene concentrations ranged from 12 ppb to 75 ppb and accounted for approximately 0.7% to 3% of the total VOC concentration. Vinyl chloride was detected at a maximum concentration of 11 ppb after one hour of extraction. The concentration decreased to 0.3 ppb after 120 hours of extraction.

Based on the air sampling data, an estimated 37 pounds of VOCs, or an average of 7.4 pounds per day of VOCs were removed from the soil during the pilot test.

4.6.2 Air Emissions Control

The extracted air stream during the pilot test was treated with air-phase carbon prior to discharging to the atmosphere. An air sample was collected from the discharge side of the carbon canister during the second day of the pilot test. Three VOCs (acetone, methylene chloride, and toluene) were detected in the sample at estimated concentrations below the detection limit of 1 ppb.

Air emissions from the carbon canister were monitored for VOCs with a PID to estimate whether breakthrough of the carbon canister had occurred. Following the fifth day of the pilot test, elevated PID readings were detected on the discharge side of the carbon canister. Since breakthrough had apparently occurred, the SVE system was turned off and the pilot test was ended.

4.6.3 Conclusions

Based on the results of the pilot test, SVE appears to be an effective remedial approach for removing the key VOCs detected in site soils. The following additional conclusions and recommendations can be made from the results of the vapor extraction pilot test:

- Estimated air permeability of the site soils is approximately 9.5 darcys, which is typical of soil with moderate permeability.

- The vacuum radius of influence is approximately 40 feet.

- VOCs in the extracted air stream consisted primarily of toluene, trichloroethene, and *cis*-1,2,-dichloroethylene, with toluene accounting for between 86 percent and 96 percent of the total VOC concentration. These were the primary VOCs detected in site soils and groundwater.

- An average of approximately 7.4 pounds per day of VOCs were removed from the vapor extraction well during the test.

Section 5 -NATURE AND EXTENT OF CONTAMINATION (On-site)

5.1 Applicable Standards, Criteria, and Guidance (SCGs)

In order to identify potential exposure pathways, applicable SCGs must be identified. 6 NYCRR Part 375-1.10(c)(1)(I) requires that remedial actions comply with SCGs “unless good cause exists why conformity should be dispensed with." Standards and Criteria are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance. Guidance includes non-promulgated criteria and guidelines that are not legal requirements; however, the site's remedial program should be designed with consideration given to guidance that, based on professional judgement, is determined to be applicable to the site.

SCGs are categorized as chemical specific, location specific, or action specific. These categories are defined as the following:

Chemical Specific: These are health or risk based numerical values or methodologies which, when applied to site specific conditions, result in the establishment of numerical values for the chemicals of interest. These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the environment.

Location Specific: These are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a specific location.

Action Specific: These are usually technology or activity based requirements or limitations on actions taken with respect to hazardous waste management and site cleanup.

The following lists the principal SCGs that have been identified for the Scobell Chemical site:

General - 6 NYCRR Part 375, Inactive Hazardous Waste Disposal Site Remedial Program

Soil - NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) 4046, Determination of Soil Cleanup Objectives and Cleanup Levels

- 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes

– 6 NYCRR Part 376 - Land Disposal Restrictions

- NYSDEC Division of Hazardous Substance Regulation TAGM 3028, "Contained in Criteria for Environmental Media" (11/92)

Groundwater - 6NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater
- NYSDEC Division of Water TOGS 1.1.1

Air - Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants

A comprehensive list of all of the potential SCGs for this site is included in Table 5.1.

5.2 Summary of Nature and Extent of Contaminated Media (On-Site)

Based on the information developed during previous studies and this RI, chemical compounds of potential concern by environmental medium have been identified. Compounds of potential concern were selected based on frequency of detection, range of concentrations, and potential for migration. As discussed above in Section 4.3, analytical results confirm the presence of contamination in on-site soil and groundwater.

The main source of contamination at this site is most likely the result of spills that occurred, due to past storage and handling practices, over a long period of time. Volatile organic contamination is present at the site as dissolved constituents in the ground water and apparently as free product which is more dense than water and has/is moving down into the aquifer (dense non-aqueous phase liquid or DNAPL). Some solvents remain in the on-site soil above the water table in the vicinity of the source area. This contamination exists as a residual that did not migrate to the base of the aquifer, but rather bound to individual soil particles as it passed through the unsaturated soil.

Four surface soil samples were taken from the perimeter of the site, two each from along the western and northern borders of the site. Two pesticides (endrin and heptachlor epoxide) and five metals (cadmium, chromium, lead, mercury, and zinc) were detected at elevated concentrations.

Subsurface soil contamination appears to be limited to on-site areas and is predominantly made up of volatile organic constituents (see also Section 2.1, above, for a summary of 1988 NYSDOT sample results). A total of 16 on-site subsurface soil samples were taken at eight locations during the RI. These samples were taken to supplement the subsurface soil samples collected in 1988 by NYSDOT (see Section 2.1). Elevated concentrations of the following contaminants have been found in on-site subsurface soil: TCE, PCE, 1,2-DCE, toluene, xylene, 1,1,1-TCA, lead, chromium, zinc, and MCPP.

The results of the groundwater samples taken from on-site monitoring points indicated the presence of chloroform, ethylbenzene, xylene, TCE ,PCE, toluene, 1,2-DCE, 1,1-DCE, vinyl chloride, and benzene. In addition the following metals were detected at elevated concentrations in the on-site overburden groundwater: cadmium, chromium, lead, and zinc.

5.2.1 Contaminants of Concern

The following contaminants have been found (historically and/or during Site Investigation) at elevated concentrations at the Scobell Chemical site:

SURFACE SOIL	endrin

heptachlor epoxide
cadmium
chromium
lead
mercury
zinc

SUBSURFACE SOIL
1,2-dichloroethene (1,2-DCE)
MCPP (herbicide) [seen in one sample during 1988 NYSDOT sampling]
tetrachloroethene (PCE)
toluene
1,1,1-trichloroethane (1,1,1-TCA)
trichloroethene (TCE)
xylene
chromium
lead
zinc

GROUNDWATER
benzene
chloroform
1,1-dichloroethene
1,2-dichloroethene
ethylbenzene
tetrachloroethene
toluene
trichloroethene
vinyl chloride
xylene
cadmium
chromium
lead
zinc

The attached analytical data summary tables (see Tables 5.2- 5.7) present SCGs for the contaminants analyzed for in each media (i.e., soil, sediments, water, etc.).

Section 6 – EXPOSURE PATHWAY ANALYSIS

An exposure pathway describes the course that a contaminant takes from the source of the contamination to the exposed individual. An exposure pathway links the source(s) with the receptor and consists of: (1) a source of contamination; (2) a transport media (i.e., soil, water, air); (3) a point of potential contact by the receptor with the contaminated media; and (4) an exposure route (e.g., ingestion) at the contact point. This information has been used to generate a qualitative risk assessment, as documented below.

6.1 Human Exposure Pathway Analysis

This Human Exposure Pathway Analysis has been performed to qualitatively evaluate the potential for current or future adverse human health effects which might result from exposure to contaminants at or migrating from the Scobell Chemical site. This analysis was performed assuming current site conditions, in the absence of any further action to control or remove the identified contamination. The analysis provides a discussion of potential exposure to site contaminants, identification of media of concern, and identification of potential receptors based on available data from this RI and previous studies. It has been prepared to assist in determining the need for remediation.

6.1.1 Identification of Media of Concern (On-Site)

Compounds of potential concern were selected based on frequency of detection, range of concentrations, and potential for migration. As discussed above, in Sections 4.3/5.2, analytical results confirm the presence of contamination in on-site soil and groundwater.

The main source of contamination at this site is most likely the result of spills that occurred, due to past storage and handling practices, over a long period of time. Volatile organic contamination is present at the site as dissolved constituents in the ground water and apparently as free product which is more dense than water and has/is moving down into the aquifer (dense non-aqueous phase liquid or DNAPL). Some solvents remain in the on-site soil above the water table in the vicinity of the source area. This contamination exists as a residual that did not migrate to the base of the aquifer, but rather bound to individual soil particles as it passed through the unsaturated soil.

Four surface soil samples were taken from the perimeter of the site; two pesticides (endrin and heptachlor epoxide) and three metals (chromium, lead, and zinc) were detected at elevated concentrations.

Subsurface soil contamination appears to be limited to on-site areas and is predominantly made up of volatile organic constituents (see also Section 2.1, above, for a summary of 1988 NYSDOT sample results). Elevated concentrations of the following contaminants have been found in on-site subsurface soil: TCE, PCE, 1,2-DCE, toluene, xylene, 1,1,1-TCA, lead, chromium, and MCPP.

The results of the groundwater samples taken from on-site monitoring points indicated the presence of chloroform, ethylbenzene, xylene, TCE ,PCE, toluene, 1,2-DCE, 1,1-DCE, vinyl chloride, and benzene.

6.1.2 Identification of Point of Potential Contact (On-Site)

All available data indicates that a majority of the contamination is present in the subsurface, as contaminated subsurface soil, as contaminated groundwater, or as DNAPL present in the subsurface. The exception is the presence of contaminants in surface soil at the perimeter of the site (most likely just outside of the footprint where the soil cover was placed as a part of NYSDOT's 1988 IRM), as summarized in the previous section.

6.1.3 Summary of Human Exposure Pathway Analysis (On-site)

All groundwater in New York State is classified by the NYSDEC as GA (best usage, drinking water), however, groundwater in the area is currently not used for drinking water; the area is served with municipal water. Section 4.2 summarizes the findings of the "Determination of Groundwater Use," performed as a part of the Site Investigation (see Attachment 1). Direct contact with groundwater could occur if shallow well points are used within the plume for irrigation or other non-potable purposes.

Trespassers, who could obtain access to the site, could come in contact with the limited amount of surface soil contamination that is present around the perimeter of the site.

On-site workers could be exposed during excavation or subsurface maintenance activities via dermal contact with contaminated materials, inhalation of vapors and airborne particulates, or incidental ingestion due to soiled hands when working in the on-site area of contamination.

If there is future development in areas where subsurface contamination is present there is the potential for infiltration (and the potential for exposure) of contaminated groundwater/vapors into basements.

6.2 Habitat Based Assessment (On-site)

A habitat based assessment (HBA) is performed during a RI when it is determined that an impact to wildlife may exist as a result of contamination from the site. Field observations were made in conjunction with environmental sampling towards determining if such an assessment was necessary for this RI.

The potential impacts or routes of exposure to wildlife, from on-site contamination, include but are not limited to the following:

- Uptake of contaminants by plant life on or near the site.
- Consumption of contaminated plants by animals in the area.
- Direct contact with contaminants at the surface by animal life on or near the site.

Stressed vegetation on site was not found to exist. A large majority of the contamination identified at the site is subsurface and is not impacted by surface runoff during storm events. After consideration of the above mentioned potential impacts, relative to the conditions present at the site, it was determined that impacts to wildlife as a result of contamination from the site was not occurring. Therefore, the habitat based assessment was not carried any further.

Section 7 - CONCLUSIONS AND RECOMMENDATIONS

The site is underlain by approximately ten feet of overburden consisting of (from the surface down): a silty clay cover (approximately one foot thick - placed as a part of the 1988 IRM), approximately four-five feet of fill and disturbed soil consisting of cinders/brick/glass, up to seven feet of silt and clay with some sand. The bedrock present immediately below the overburden is a Dolostone.

Groundwater at the site was encountered near the bedrock overburden interface. A thin zone of groundwater (generally less than 3 ½ feet thick, and non-existent in some areas of the site) was found in the overburden and appears to flow to the south, towards the I-590 ramp. The overburden groundwater levels north of the site are lower than on-site (following surface elevations which are approximately five feet lower on the north side of the railroad tracks, compared to the surface elevations on-site). As a result, the possibility exists that there is some overburden groundwater which may flow from the northern edge of the site to the north. Bedrock groundwater elevations are approximately ten feet below the surface of the bedrock on-site and at, or just below the surface of the bedrock north of the site (MW-4D and MW-5D). Groundwater flow in the bedrock appears to flow to the northeast. Slug tests performed during the Site Investigation indicate average hydraulic conductivities at the overburden/bedrock interface of approximately 1.8×10^{-2} centimeters/second (cm/sec), and approximately 8.8×10^{-5} cm/sec in the shallow bedrock.

The findings of the Site Investigation indicated the presence of significant on-site volatile organic contamination in subsurface soil, overburden groundwater, and shallow bedrock groundwater (including the presence of DNAPL). In addition, the contamination has migrated to the north with significant contamination found in the downgradient bedrock wells (including DNAPL found in MW-4D).

The Site Investigation generated enough information, for the site area itself, to develop and screen remedial alternatives as a part of the Feasibility Study (FS). However, additional information is needed to define the extent of the contamination downgradient of the site. As a result, the site has been divided into two operable units: the on-site operable unit and the off-site operable unit. Since enough information is available for the on-site area, the FS for that operable unit will be performed while the investigation of the off-site area continues.

Recommendations for the off-site investigation include determining potential pathways for contaminant migration and the installation of additional bedrock monitoring wells to determine the extent of the contamination.

Section 8 - REFERENCES

Parsons. 1998. Site Investigation Summary Data Report for the Scobell Chemical Site. Prepared for the New York State Department of Environmental Conservation by Parsons Engineering Science. November 1998.

LMS. 1996. Davis-Howland Oil Corporation Remedial Investigation Report. Prepared for the New York State Department of Environmental Conservation by Lawler, Matusky, and Skeller Engineers & Galson/Lozier Engineers. October 1996.

EA. 1988. Environmental Study - Scobell Chemical Building. Prepared for the New York State Department of Transportation by Erdman, Anthony, Associates. October 1988.

NYSDOT. 1988. Sample and Test Location Maps (6) for Hazardous Waste Cleanup and Building Demolition, Scobell Chemical Co. Prepared by the New York State Department of Transportation. September 1988.

Monroe DOH. 1992. Grass Creek Stream Samples. Monroe County Department of Health Memorandum from Joseph J. Albert to Richard S. Elliott, P.E. May 13, 1992.

Seeler. 1995. Blossom Village Apartments Groundwater Assessment. Seeler Associates letter from Tim A. Seeler, P.E. to Ms. Susan Salone (Blossom Village Housing Development Fund, Inc.). May 18, 1995.

Insert Figure 2.1

Table 2.1
DATA SUMMARY FROM PREVIOUS SAMPLING/INVESTIGATIONS

DATA SUMMARY OF 1988 NYSDOT SOIL DATA
SAMPLE LOCATIONS WITH THE HIGHEST SOIL CONCENTRATIONS

Sample Location (Depth)	Toluene (ppm)	TCE (ppm)	PCE (ppm)	1,2-DCE (ppm)	Pest (ppm)	Herb (ppm)	EP Toxicity(mg/L)	
							Cr	Pb
88-29 (12"-36")	5.73		0.254	3.65				
(36"-60")	30.1		6.06	6.03				
(60"-104.4")	<0.020		<0.010	<0.01				
88-30 (36"-60")						12.9 (MCPP)		
88-60 (0-18")	0.0635	0.207		0.0555				
(18"-36")	2.84	0.118		76.1				
(84"-108")	22.6	3.84		1.63				
88-61 (0-18")	0.849	34.3		5.8				
(18"-36")	14.1	6.4		1				
(84"-107)	525	116		5				
88-62 (0-18")				6.25				
(18"-36")				1.11				
(84"-102")				2.4				
88-71 (Surface) “A”							8.32	
(18"-36") “B”								12.2
88-72 (Surface) “A”	0.601		0.181				758	
(12"-36")	0.515		0.0569					
(36"-60")	<5		<5					
(72"-80.4")	266	1.05	4.25					
88-73 (Surface) “A”							11.1	5.64
88-75 (Surface)							11.1	
88-76 (Surface)							15.3	
(0-18")								4.87
88-85 (0-18")	47.4	22.4	16.4					
(18"-36")	51.6	13	9.38					

DATA SUMMARY OF 1988 NYSDOT SOIL DATA
SAMPLE LOCATIONS WITH THE HIGHEST SOIL CONCENTRATIONS

Sample Location (Depth)	Toluene (ppm)	TCE (ppm)	PCE (ppm)	1,2-DCE (ppm)	Pest (ppm)	Herb (ppm)	EP Toxicity(mg/L)	
							Cr	Pb
88-89 (0-18")	19.3	1.38	36					
(18"-36")	530	6.32	73.6					
88-91 (0-18")	334							
88-92 (0-18")	126							
(18"-36")	74.9							
88-93 (0-18")	411							
88-93 (18"-36")	93.1							
88-95 (Surface)	<2.5							
(0-18")	<5							
(18"-36")	64							
88-96 (Surface)	0.037							
(0-18")	14.2							
(18"-36")	73.2							
88-97 (0-18")	574	1.92						
(18"-36")	139	<2.5						
88-98 (Surface)	<0.025							
(0-18")	37							
(18"-36")	364							
(36"-76")	989							

Summary of Sample Results from 5/92 Surface Water-Sediment Sampling from Grass Creek Drainage System

sample	cis-1,2-DCE (ppb)	TCE (ppb)	vinyl chloride (ppb)
surface water #3	310	140	6
surface water #4	63	42	1

5/95 GROUNDWATER SAMPLE COLLECTED FROM OPEN EXCAVATION AT BLOSSOM VILLAGE APARTMENTS (~1/2 MILE to the N-NE)

TCE	1,2-DCE
62 ppb	17 ppb

WATER SAMPLES TAKEN FROM LEACHATE HOLDING TANK							
Date Sample Collected	**Methylene Chloride (ppb)**	**1,2-DCE (ppb)**	**1,2-DCA (ppb)**	**TCA (ppb)**	**TCE (ppb)**	**PCE (ppb)**	**Toluene (ppb)**
4/10/89	32.8	1,360	122	31.8	224	302	150
7/6/92	36.2	9.5	21.7	93.4	435	114	<1.0

Table 3.1
SUMMARY OF RI SAMPLE COLLECTION/ANALYSES

Field Work Element	Sample Matrix	Number Of Samples	Analysis/Method [NYSDEC ASP]
Small diameter groundwater monitoring point installation	Subsurface soil	20 6 15 5 20	VOCs[1] SVOCs[2] Pesticides Pesticides/PCBs Metals
	Groundwater	11 6 6	VOCs Pesticides Metals
Miscellaneous Site Investigation Sample Collection	Surface water (including sample from seep prevention sump basin)	3 3 3	VOCs Pesticides Metals
	Sediment	3 3 3	VOCs Pesticides Metals
	Surface Soil	4 4 4	VOCs Pesticides Metals
Monitoring Well/ Vapor Extraction Well Installation	Groundwater	8 3 4 3 7	VOCs SVOCs Pesticides Pesticides/PCBs Metals
	Subsurface Soil	4 4 4 8	VOCs Pesticides Metals Moisture content, total organic carbon, particle size distribution
	Dense Non-Aqueous Liquid (DNAPL)	2	VOCs
	Drill Cuttings	2 2 2	TCLP[3] VOCs TCLP Pesticides/Herbicides TCLP Metals
Vapor Extraction Pilot Study	Soil Gas	4	VOCs

1 Volatile Organics Compounds
2 Semi-Volatile Organic Compounds
3 Toxicity Characteristic Leaching Procedure

Table 5.1
STANDARDS, CRITERIA, & GUIDANCE
Scobell Chemical Site - No. 8-28-076

Div./ Agcy.*	Title	Std./ Guid.	Requirements
DAR	Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants	G	▸ control of toxic air contaminants ▸ screening analysis for ambient air impacts ▸ toxicity classifications ▸ ambient standards - short term/annual
DAR	6 NYCRR Part 200 (200.6) - General Provisions; 1/29/93	S	▸ prohibits contravention of AAQS or causes air pollution
DAR	6 NYCRR Part 201 - Permits & Certificates; 3/31/93	S	▸ prohibits construction/operation w/o permit/certificate
DAR	6 NYCRR Part 211 (211.1) - General Prohibitions	S	▸ prohibits emissions which are injurious to human, plant, or animal life or causes a nuisance
DAR	6 NYCRR Part 212 - General Process Emission Sources	S	▸ establishes control requirements
DAR	6 NYCRR Part 257 - Air Quality Standards	S	▸ applicable air quality standards
DFW	Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA); 10/94	G	▸ habitat assessments ▸ contaminant impact assessments ▸ ecological effects of remedies ▸ remedial requirements ▸ monitoring ▸ checklist
DFW	Technical guidance for screening contaminated sediments; 7/94	G	▸ sediments screening levels
DER	TAGM HWR-89-4031 Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites; 10/27/89	G	▸ dust suppression during IRM/RA
DER	TAGM HWR-92-4030 Selection of Remedial Actions at Inactive Hazardous Waste Sites; 5/90	G	▸ remedy selection criteria/evaluations
DER	TAGM HWR-92-4042 Interim Remedial Measures; 6/1/92	G	▸ define and track IRMs
DER	TAGM HWR-92-4046 Determination of Soil Cleanup Objectives and Cleanup Levels; 1/24/94	G	▸ soil cleanup goals
DER	TAGM HWR-92-4048 Interim Remedial Measures - Procedures; 12/9/92	G	▸ identifying and implementing IRMs

DER	6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Site Remedial Program; 5/92	S	▸ requirements regarding remedial programs ▸ private party programs, state funded programs, state assistance to municipalities
DOW	Analytical Services Protocols (ASP); 11/91	G	▸ analytical procedures
DOW	TOGS 1.1.2 - Groundwater Effluent Limitations; 8/94	G	▸ guidance for developing effluent limits for groundwater
DOW	TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values; 10/93	G	▸ compilation of ambient water quality stds. and guidance values
DOW	TOGS 1.2.1 -Industrial SPDES Permit Drafting Strategy for Surface Waters; 4/90	G	▸ guidance for developing effluent and monitoring limits for point source releases to surface water
DOW	TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works; 10/26/94	G	▸ limits on new or changed discharges to POTWs strict requirements regarding bioaccumulative and persistent substances plus other considerations
DOW	6 NYCRR Part 702-15(a), (b), (c), (d) & (e) -	S	▸ Empowers DEC to Apply and Enforce Guidance where there is no Promulgated Standard
DOW	6 NYCRR Part 700-705 - NYSDEC Water Quality Regulations for Surface Waters and Groundwater; 9/1/91	S	▸ 700 - Definitions, Samples and Tests; 701 - Classifications Surface Waters and Groundwaters; 702 - Derivation and Use of Standards and Guidance Values; 703 - Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards;
DOW	6 NYCRR Part 750-757 - Implementation of NPDES Program in NYS	S	▸ regulations regarding the SPDES program
DRS	6 NYCRR Part 364 - Waste Transporter Permits; 1/12/90	S	▸ regulates collection, transport, and delivery of regulated waste
DSHM	TAGM 3028 "Contained In" Criteria for Environmental Media; 11/92	G	▸ Soil Action Levels
DSHM	6 NYCRR Part 360 - Solid Waste Management Facilities; 10/9/93	S	▸ solid waste management facility requirements landfill closures; C&D landfill requirements; used oil; medical waste; etc.
DSHM	6 NYCRR Part 370 - Hazardous Waste Management System: General; 1/14/95	S	▸ definitions of terms and general standards applicable to Parts 370-374 & 376
DSHM	6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes; 1/14/95	S	▸ haz. waste determinations
DSHM	6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities; 1/14/95	S	▸ manifest system and recordkeeping, certain management standards
DSHM	6 NYCRR Part 376 - Land Disposal Restrictions - 1/14/95	S	▸ identifies hazardous waste restricted from land disposal

DSHM	6 NYCRR Subpart 373-1 - Hazardous Waste Treatment, Storage and Disposal Facility Permitting Requirements; 1/14/95	S	▸ hazardous waste permitting requirements: includes substantive requirements
DSHM	6 NYCRR Subpart 373-2 - Final Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities; 1/14/95	S	▸ hazardous waste management standards e.g., contingency plan; releases from SWMUs; closure/post-closure; container/management; tank management; surface impoundments; waste piles; landfills; incinerators; etc.
DSHM	6 NYCRR Subpart 373-3 - Interim Status Standards for Owners and Operators of Hazardous Waste Facilities - 1/14/95	S	▸ similar to 373-2
OSHA/ PESH	29 CFR Part 1910.120; Hazardous Waste Operations and Emergency Response	S	▸ health and safety
USEPA	Hydrologic Evaluation of Landfill Performance (HELP) Model Hydrologic Simulation of Solid Wast Disposal Sites	G	▸ cover system performance/hydrology
USEPA	Integrated Risk Information System (IRIS)	G	▸ verified RfDs and cancer slope factors
USEPA	Risk Assessment Guidance for Superfund - Volume 1 - Human Health Evaluation Manual; 12/89	G	▸ human health risk assessments

DAR: Division of Air Resources
DEP: Division of Environmental Permits
DER: Division of Environmental Remediation
DFW: Division of Fish and Wildlife
DOH: Department of Health
DOW: Division of Water
DSHM: Division of Solid and Hazardous Materials
USEPA: US Environmental Protection Agency

ATTACHMENT 1:

SITE INVESTIGATION DATA SUMMARY REPORT