TECHNICAL REPORT

Remedial Design Work Plan

Chicago Pneumatic Tool Company
Frankfort, New York

November 1997
Revised February 1998

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

6723 Towpath Road, P.O. Box 66
Syracuse, New York, 13214-0066
(315) 446-9120

1. Introduction

1.1 General

This document presents a detailed Remedial Design (RD) Work Plan for the design of the New York State Department of Environmental Conservation- (NYSDEC-) selected remedy for addressing chemical constituents present in environmental media at the Chicago Pneumatic Tool Company site (site) located in Frankfort, New York. This work plan has been prepared by Blasland, Bouck & Lee, Inc. (BBL) at the request of Danaher Corporation and presents a detailed description and schedule of the activities necessary to design the NYSDEC-selected remedy for the site as presented in the NYSDEC's Record of Decision (ROD), dated March 29, 1996. The selected remedy includes ground-water collection and treatment, and excavation of soil and sediment from identified areas of concern.

Relevant background information, project objectives, and the work plan organization are presented in the following sections.

1.2 Background Information

This section presents relevant background information used to develop the strategy for implementing the selected remedy. A brief site description is presented below, followed by a summary of the site history and a description of the interim remedial measures (IRMs) implemented at the site.

1.2.1 Site Setting and History

The site is located in the Town of Frankfort, Herkimer County, New York, approximately one mile east of the City of Utica, New York, as presented on Figure 1.

The site consists of a 77-acre lot in an industrial setting, which is bordered to the north by Bleecker Street, to the south by wooded and agricultural land, to the west by an unnamed creek that drains the wooded area, and to the east by a property fence line bordering Industrial Park Drive. Surface water features at the site include the unnamed creek that flows northward along the western portion of the site (Area 1 on Figure 2), and a series of on-site drainage ditches that flow eastward along the southern portion of the site, and northward along the eastern portion of the site (Areas 4, 6, and 14 on Figure 2). Four separate surface-water outfalls at the site are regulated by a NYSDEC State Pollutant Discharge Elimination System (SPDES) Permit.

During the 1930s and early 1940s, the site was occupied by an amusement park and baseball field. A manufacturing building was constructed at the site in 1948 and was used as a pneumatic tool manufacturing facility until the facility's shut-down in early 1997. Additional structures at the site include a former foundry, former power plant, former oil storage building, aboveground oil tanks, and a garage.

As part of the historical site operations, waste oils were discharged into three unlined separation ponds (Area 7 on Figure 2) from 1966 through 1978. Waste oil from a metal chip handling facility was collected in an underground steel holding tank. The waste oil was then pumped to the first of three ponds located in the southern portion of the site. Water and oil were allowed to discharge to the next pond in the series and then ultimately to the on-site drainage ditch. When the ponds became filled with oil, the oil was pumped off and either disposed of off-site or burned as fuel in the power plant. This practice was discontinued in 1979, and the three separation ponds were closed and the underground storage tank removed. A skimmer pond (Area 5 on Figure 2) was constructed near the southeastern corner of the manufacturing building to intercept oil migrating in the drainage ditch from the metal chip handling area.

The skimmer pond currently discharges through an air stripper treatment system, which was constructed as an IRM in 1995. The treatment system discharges treated effluent to the eastern drainage ditch (Area 14 on Figure 2) which flows to an off-site drainage ditch (Areas 11 and 12 on Figure 2). The treated effluent is monitored on a monthly basis in accordance with the SPDES permit established for the treatment discharge outfall (SPDES Outfall 03A).

Various types of debris, such as empty crushed drums, tree stumps, granite blocks, and foundry sand, were disposed of on-site. An area was excavated west of the former separation ponds and used as a debris landfill for burial of this material (Areas 8, 9, and 10 on Figure 2).

Metal chips from the manufacturing process were stored in a chip chute area located along the south side of the manufacturing building until 1991 (Areas 2 and 3 on Figure 2). On occasion, some oil drainage from the former chip chute area migrated to the drainage ditch that drains to the skimmer pond (Area 4 on Figure 2).

1.2.2 Summary of Previous Site Investigations

The following site investigations have been performed at the site:

- A NYSDEC Phase I investigation, conducted in 1985;
- A United States Environmental Protection Agency (USEPA) site inspection, conducted in 1986;
- Environmental assessment activities performed by BBL between 1988 and 1991;
- A NYSDEC preliminary site assessment, conducted in 1990; and
- Remedial Investigation/Feasibility Study (RI/FS) Work Plan scoping activities performed by BBL in 1993.

The RI/FS was initiated in October 26, 1993 with the signing of the RI/FS Administrative Order on Consent (Order) between the NYSDEC and Chicago Pneumatic Tool Company (Index no. A6-0279-92-04). BBL performed the RI and supplemental RI (SRI) activities between 1993 and 1995.

Based on the results of the RI and SRI, the NYSDEC-approved FS Report (BBL, December 1995) presented an evaluation of remedial alternatives which addressed the constituents of interest in site media and presented a recommended alternative. Based on the results of the RI and SRI/FS, the NYSDEC issued the ROD for the site on March 29, 1996, which presented the NYSDEC-selected RA for the site. The components of the selected remedy are discussed in Sections 2 and 3.

1.2.3 Interim Remedial Measures

The following two IRMs have been implemented at the site:

- Surface Water IRM; and
- Storm Sewer Sediment Removal IRM.

Presented below is a summary of each IRM.

Surface Water IRM

This IRM was implemented at the site in March 1995 to collect and treat surface water containing concentrations of trichlorethylene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride (VC) originating from the clay pipe located along Bleecker Street. The IRM treatment system and all equipment controls are located in the southeastern corner of the manufacturing building and consists of a low-profile air stripper. The major elements of the surface water IRM are shown on Figure 2.

The air stripper treats influent pumped from two manholes that collect water from the skimmer pond overflow and clay pipe discharge. From the air stripper, treated water discharges by gravity to SPDES Outfall 03A, which is the surface water drainage ditch upstream of SPDES Outfall 003, on the southeastern corner of the site. The area around the air stripper is contained by a 6-inch high curb and drains into a trench drain/sump. A sump pump transfers collected water to the inlet of the air stripper.

The air stripper is designed to treat high flow (during rain or snow melt events) and normal operating conditions. Off-gas from the air stripper is discharged to the atmosphere through a 26-foot high, 12-inch diameter discharge stack.

An 8-inch diameter pipe was installed to allow the oil skimmer pond to overflow by gravity into a manhole designated as Pumping Manhole No. 1. Two submersible pumps installed in the manhole operate on a lead/lag/alternate sequence via level controls. Each of the two pumps are capable of pumping the normal operating flow of up to 65 gallons per minute (gpm) and can meet the high flow operating conditions of up to 130 gpm with both pumps running.

Water from the clay pipe along Bleecker Street flows by gravity via an 8-inch diameter pipe into a manhole designated as Manhole No. 2, located just south of Bleecker Street on the northern side of the site. Two submersible pumps installed in the manhole operate on a lead/lag/alternate sequence via level controls. Each pump is capable of pumping the current normal operating flow of up to 10 gpm and can meet the high flow operating condition of up to 20 gpm with both pumps running.

When the IRM was implemented, the design took into consideration the IRM's potential expanded future use as the remedial alternative for ground water and has the capacity to treat up to 250 gpm, therefore no additional upgrades will be required for the remedial activities proposed in this work plan.

Storm Sewer Sediment Removal IRM

This IRM was conducted in 1996 and 1997 to address the presence of inorganics and polychlorinated biphenyls (PCBs) detected within the sediments in the storm sewers at the site. The IRM was designed to remove sediments from the storm sewers.

This IRM consisted of the removal of sediments from the storm sewer system using high pressure water sprays to suspend the sediments. The washwater and sediments were then removed via a vacuum truck from the downstream manholes or outfalls. The sediments were separated from the washwater via gravity settling, and disposed off-site. The washwater was treated via a series of particulate filters and activated carbon units. The treated washwater was then discharged to the Oneida County sanitary sewer connection located on-site, in accordance with Oneida County sanitary sewer discharge standards.

As of October 1997, this IRM was completed except for the following storm sewers:

- The storm sewer located between SPDES Outfall 001 and the next upstream manhole (Manhole MH-1); and
- The storm sewer located between SPDES Outfall 002 and the next upstream manhole (Manhole MH-2).

These storm sewers did not undergo sediment removal during IRM implementation in 1996 because of flooding at the SPDES outfalls. This IRM will be completed in conjunction with the remedial activities described in this Work Plan.

Sediments removed from the storm sewers will be combined with excavated soil and sediments that contain greater than 50 parts per million (ppm) PCBs. These materials will be transported off-site for disposal at a facility permitted to receive Toxic Substances Control Act (TSCA) waste.

1.3 Project Objectives

The overall objectives of this RD Work Plan are:

- To provide the information necessary for the development of a detailed design and specification for implementation of the NYSDEC-selected remedy for the site, as presented in the March 29, 1996 ROD; and

- To provide further detail on the schedule for implementation of the RD/Remedial Action (RA) Activities.

The NYSDEC-selected remedy includes ground-water collection and treatment, and excavation of soil and sediment which contain chemical constituents at concentrations greater than cleanup objectives. The areal and vertical extent of soil/sediment to be removed, and the ground-water collection areas are presented on Figure 2.

1.4 Work Plan Organization

To present the information required for the development of a detailed design and specification of the NYSDEC-selected remedy, this Work Plan has been organized into the following sections:

Section	Description
1 - Introduction	This section provides relevant background information and project objectives.
2 - Soil/Sediment Removal, Treatment and Disposal	This section identifies key components of the RD for the selected soil/sediment remedy for the site and provides the information necessary for preparing the RD specifications for this RA.
3 - Ground-Water Removal and Treatment	This section identifies key components of the RD for the selected ground-water remedy for the site and provides the information necessary for preparing the RD specifications for this RA.
4 - Construction Quality Assurance Plan (CQAP)	This section presents the minimum requirements for preparation of the CQAP.

Section	Description
5 - Remedial Action Contingency Plan	This section presents the minimum requirements for preparation of the Remedial Action Contingency Plan.
6 - Sampling and Analysis Plan (SAP)	This section presents the minimum requirements for preparation of the SAP.
7 - Site Operation, Maintenance, and Monitoring (OM&M) Plan	This section presents the minimum requirements for preparation of the Site OM&M Plan.
8 - Site-Specific Health and Safety Plan (HASP)	This section presents the minimum requirements for preparation of the Site-Specific HASP.
9 - Pre-Design/Construction Data Collection	This section identifies pre-design/construction data collection needs.
10 - RA Administrative Activities	This section identifies administrative activities that will be required during RA implementation.
11 - Post-Remediation Data Collection Activities	This section identifies the minimum requirements for post-remediation data collection activities.
12 - Post Remediation Administrative Activities	This section identifies the required administrative activities required following completion of the RAs.
13 - Project Management Plan/Project Schedule	This section presents the project management organization and the anticipated project schedule for implementation of the RD/RA activities.

2. Soil/Sediment Removal, Treatment and Disposal

2.1 General

This section presents a detailed description of the soil/sediment removal and disposal activities to be conducted at the site. Activities associated with the implementation of this RA will include the following:

- Contractor Selection;
- Mobilization/Site Preparation;
- Soil/Sediment Removal;
- Ground Water and Surface Water Management;
- Soil/Sediment Dewatering;
- Verification Sampling and Analysis;
- Soil/Sediment Disposal;
- Soil Vapor Extraction (SVE) Treatment of Volatile Organic Compound- (VOC-) Impacted Soil;
- Lined Containment Cell Construction; and
- Site Restoration.

A description of the RA activities is presented below.

2.2 Cleanup Objectives

As set forth in the ROD, soil/sediment removal activities are required to address the presence of PCBs, four inorganic constituents, and a select number of chlorinated VOCs in soil/sediment at select areas throughout the site. Site-specific cleanup goals, to address certain constituents within the soil/sediment at the site, were provided in the ROD and are presented in the table below.

Chemical Constituent	Soil (ppm)	Sediment (ppm)
Total VOCs [1]	10.0	N.A.
Total Lead	25.5	25.5
Total Chromium	17.8	17.8
Total Copper	40.4	40.4
Total Zinc	101	101
Total PCBs[2]	1.0 (Surface)10.0 (Subsurface)	0.1 [2]

Notes:

1. Total VOCs represents the sum of the individual concentrations of VC, trans-1,2-DCE cis-1,2-DCE and TCE.

2. Due to analytical and construction constraints, a clean-up objective of 0.1 ppm is impractical. Accordingly, a clean-up objective of 1.0 ppm will be utilized for sediments.

3. Cleanup objectives for surface water must meet applicable Class D surface water quality standards as presented in Part 703 of Title 6 of the New York Compilation of Codes, Rules, and Regulations (6NYCRR Part 703).

4. ppm = parts per million.

5. Surface soil cleanup objectives pertains to soils located within 1.5 feet of the ground surface. Subsurface soil pertains to soils located at depths greater than 1.5 feet below ground surface.

Based on data presented in the RI and SRI, the estimated areal and vertical extent of soil/sediment containing chemical constituents at concentrations greater than the clean-up objectives are presented on Figure 2. RI and SRI soil/sediment data indicate that the total volume of soil/sediment to be addressed as part of this RA is approximately 12,790 in place cubic yards.

2.3 Contractor Selection

It is currently planned that one or more contractor(s) will be selected to implement the soil/sediment removal and disposal activities at the site based on competitive bidding. As part of the contractor selection process, a bid package will be prepared based on the RA technical specifications, which outlines the scope of the RA. The bid package will be provided to pre-qualified contractors to enable the contractors to prepare a bid to complete the RA. As part of the bidding process, contractors will be required to attend a pre-bid meeting at the site to discuss the scope of the RA. The NYSDEC will be notified of the date and time of the pre-bid meeting. A contractor will be selected to implement the RA based on the contractor's proposed overall approach for completing the RA and projected cost. The selected contractor(s) will prepare submittals required by the bid package for review and approval by Danaher Corporation prior to mobilization to the site [i.e., site-specific HASP, Soil Erosion and Sediment Control Plan, Decontamination Plan, etc.].

Additional contractor selection requirements are provided in Section 10.

2.4 Mobilization/Site Preparation

Prior to commencing the RA, the selected contractor(s) will perform mobilization and site preparation activities which may include the following:

C Mobilizing personnel, equipment, and materials to the site;

C Verifying the existing site conditions and identifying the location of all above-ground and underground utilities (e.g., power, gas, water, sewer, telephone, etc.), equipment, and structures (as necessary to implement the RA);

C Constructing a soil/sediment staging area(s) for gravity dewatering, stabilizing, and staging of excavated material. If the staging area(s) are constructed outside the perimeter of the on-site containment cell, then the staging area(s) will be bermed and lined with a low-permeability liner that will slope to a collection sump. In addition, precautions to protect the integrity of the liner will be installed and may include the installation of a drainage/soil layer and/or geotextiles over the liner;

- Installing erosion and sedimentation control measures in accordance with the provisions of the Soil Erosion and Sediment Control Plan will be prepared by the selected contractor(s). Soil erosion and sediment control measures that may be implemented at the site, include, but are not limited to, the use of silt fences, silt curtains, straw bale dikes, check dams, erosion control matting, revegetation of disturbed areas, and stream diversion. Soil erosion and sediment control activities will be installed (to the extent practical) prior to implementing intrusive activities at the site;

- Constructing temporary access roads (as needed) for ingress and egress of construction equipment, and transporting excavated soil/sediment to the on-site, lined containment cell and to the off-site disposal facility. Temporary access roads may include geotextile overlain with crushed stone or run-of-bank gravel;

- Abandoning ground-water monitoring wells located at the site which will not be used as part of the long-term ground-water monitoring program;

- Installing and maintaining temporary fencing or other temporary barriers to limit unauthorized or unknowing access to the areas where remedial activities will be conducted; and

- Clearing and grubbing the areas in the vicinity of the soil/sediment removal activities where vegetation will obstruct the performance of the soil/sediment removal activities. Vegetation with adhered impacted soil/sediment will be transferred to appropriate storage containers for disposal (either on- or off-site) in accordance with applicable regulations.

2.5 Soil/Sediment Removal

Following completion of the mobilization/site preparation activities, soil/sediment that contain chemical constituents at concentrations greater than the clean-up objectives will be excavated and disposed of in the on-site, lined containment cell constructed as part of the RA, or at an off-site disposal facility, dependent upon PCB concentrations. The on-site disposal activity will also include on-site treatment of the removed soil/sediment via SVE (see Section 2.11). The horizontal limits and depths of surface and subsurface soil/sediment excavation were estimated based on RI and SRI analytical data and are presented on Figure 2. The final vertical limits of excavation will not extend beyond the confining till unit which is located approximately four to eight feet below grade.

Presented below is a description of the soil removal activities, followed by a description of the sediment removal activities.

2.5.1 Soil Removal Activities

Soil removal activities will be conducted in Areas 2, 3, 7, 8, 9, 10, and 13 shown on Figure 2. Excavation of the impacted soils will generally be conducted using conventional construction equipment, such as backhoes, front-end loaders, dump trucks, etc. In areas where underground utilities or other piping are located, the soil removal activities may require hand shoveling. Railroad tracks located in the vicinity of the chip chute area (Areas 2 and 3) will be removed, as required, to permit soil/sediment excavation. Excavation of impacted subsurface soils may require the removal of soil from below the perched ground water and therefore controls may be required to manage ground-water seepage into the excavation. Soil removal activities which occur in areas with perched ground water also may need excavation reinforcement (such as sheeting) prior to initiation of soil excavation. Water management requirements for excavation activities performed below the water table are described in Section 2.6. Soil excavated from above the water table will generally not require dewatering prior to disposal. Soil excavated from below the ground-water table may require dewatering and possibly stabilization. Dewatering requirements are described in Section 2.7.

As described in Section 2.8 due to the potential need for excavation reinforcement such as sheeting, pre-excavation soil verification sampling will be implemented to confirm the horizontal extent of impacted soils to be removed prior to initiation of soil removal activities in the soil excavation areas associated with the chip chute area, the former debris landfill and separation ponds (Areas 2, 3, 7, 8, 9, and 10). The east lot (Area 13) verification sampling will be conducted post-excavation. Verification sampling also will be used for disposal purposes to determine the concentration of PCBs in the excavated soils. As indicated by the RI/SRI data, PCBs may be present in a portion of the excavated soils at concentrations greater than 50 ppm. Soils containing greater than 50 ppm total PCBs will be managed and disposed of in accordance with the Toxic Substances Control Act (TSCA) as presented in Part 761 of Title 40 of the Code of Federal Regulations (40 CFR 761) and the New York State hazardous waste regulations presented in the Part 361 of Title 6 of the NYCRR. PCB field test kits (i.e., Ensys™) will be used to screen the soils as they are being excavated. As a conservative measure, soils which contain greater than 40 ppm total PCBs (as indicated by field screening) will be considered a TSCA/New York State hazardous waste, requiring off-site disposal at a facility permitted to receive such materials. These soils will either be loaded directly into lined rolloffs for off-site disposal, or may be staged on-site to facilitate dewatering/stabilization, if required, prior to placement into rolloffs. Soil verification sampling will also be used to determine if removed soils contain greater than 10 ppm total VOCs of concern (i.e., the sum of the concentrations of VC, cis-1,2-DCE, trans-1,2-DCE, and TCE). Removed soils which contain more than 10 ppm total VOCs (and less than 50 ppm PCBs) will be segregated and treated on-site via SVE prior to final disposition into the lined containment cell.

At the completion of the soil removal activities and verification sampling, the excavated areas will be restored as described in the Section 2.13.

2.5.2 Sediment Removal

Sediment removal will be conducted in Areas 1, 4, 5, 6, 11, 12, and 14, as shown on Figure 2. The sediment removal activities will progress from upstream to downstream using standard excavation methods and equipment (i.e., trackhoe, bulldozers, front-end loaders, etc.). The sediment removal activities may also include the removal of soils located beneath the sediment which contain chemical constituents at concentrations above the clean-up objectives.

Access agreements will be required to conduct sediment removal activities in Areas 11 and 12, as these drainage ditches are located off site.

The sediment removal activities will consist of excavating impacted sediment (and soil) that contains PCBs at concentrations greater than 1 ppm in surface sediment and subsurface sediment (and soil) from the skimmer pond, unnamed creek, and on- and off-site drainage ditches. In addition, surface and subsurface sediment (and soil) which contain inorganic constituents or VOCs above the cleanup criteria will also be removed. The horizontal limits and depths of surface and subsurface soil/sediment excavation are presented on Figure 2. The final limits of excavation will be determined during the excavation activities and will be defined based on the results of verification sampling conducted within the excavation areas (see Section 2.8). In addition, as part of the sediment removal activities, storm sewers present within the drainage ditches may be cleaned and/or removed and replaced as necessary. As part of the RD specification phase, the storm sewers will be located and surveyed to verify the sewer invert elevations.

Excavation of impacted sediments may require the removal of sediments from below surface water present in the drainage ditches, creek and skimmer pond. During excavation of the sediments, controls may be required to manage surface water flow into the excavation. Surface water control requirements for excavation activities performed below surface water levels are described in Section 2.6. Sediments excavated from above the surface water level will generally not require dewatering prior to disposal. Sediments excavated from below the surface water level may require dewatering and possibly stabilization. Dewatering requirements are described in Section 2.7.

As described in Section 2.8, verification sampling will be implemented following removal of the impacted sediments. When verification sampling results indicate that the concentration of chemical constituents present in the remaining sediments are less than the cleanup objectives, the sediment excavation will be considered complete. A detailed description of the sediment verification requirements is presented in Section 2.8.

At the completion of the sediment removal activities and verification sampling, the excavated areas will be restored as described in Section 2.13.

2.6 Water Management

During the soil/sediment removal activities, surface and ground-water diversion methods may be implemented to minimize the amount of water that enters an excavation area. Presented below are potential surface water diversion methods followed by ground-water diversion methods.

2.6.1 Surface Water Diversion

Surface water diversion methods may include (but are not limited to) the following:

- Rechannelizing surface water flow around the soil/sediment removal areas by excavating a temporary ditch or installing piping to create a preferential flow path for the surface water around each excavation area;

- By-pass pumping of surface water around the excavation areas (i.e., using a high flow mechanical pump); and/or

- Dividing the drainage ditches or unnamed creek into sections by installing temporary earth dams and/or pre-fabricated man-made structures (i.e., water dams, etc.). The active excavation area within the drainage ditch or unnamed creek will have both an upstream dam (dam 1) and a downstream dam (dam 2) installed. Surface water upstream of the active excavation area will be by-pass pumped to a downstream section. Surface water within the active excavation area also will be pumped from the active excavation area (prior to initiation of sediment removal activities) to the downstream portion of the drainage ditch or creek . Following completion of the sediment removal activities within the active excavation area, an additional dam (dam 3) will be installed downstream of the next section to undergo sediment removal, establishing the next excavation area. Surface water within the next excavation area (between dam 2 and dam 3) will be bypass pumped downstream. Dam 2 will then be relocated downstream to allow for sediment removal in the former location of dam 2. Following completion of the sediment removal activities in the initial excavation area, upstream dam 1 shall be removed and reinstalled downstream of dam 3. This process will be repeated the entire length of the drainage ditch/unnamed creek.

The actual surface water diversion methods to be employed will be determined based on the RD and the selected contractor's work plan.

2.6.2 Ground-Water Diversion/Excavation Dewatering

During the soil/sediment removal activities, ground water (or surface water) that accumulates within the excavation area may be removed to assist in dewatering the soil/sediment and to facilitate sedimentation/erosion control. Ground water (or surface water) which accumulates within an excavation area will be removed via pumping (to the extent practical). To minimize the amount of soil/sediment being removed during pumping activities, a sump may be constructed within an excavation area using one of, or a combination of, the following techniques:

- Excavation of a sump and backfilling the sump with washed gravel;
- Cutting perforations into a cylindrical object (i.e., a corrugated metal pipe or 55-gallon drum) and wrapping the perforated object with a non-woven geotextile fabric; and/or
- Installing haybales and/or silt fence around the area that the water is being pumped from.

2.6.3 Water Handling

Water generated as a result of the above-described diversion/dewatering activities will be managed as follows:

- Surface water that is by-pass pumped from the unnamed creek and drainage ditches prior to commencement of soil/sediment removal activities will be discharged downstream of the removal activity area; and
- Surface or ground water removed from active excavation areas (i.e., after commencement of soil/sediment removal activities) will be treated on-site via a temporary water treatment system and then discharged to the Oneida County sanitary sewer connection located at the site in accordance with a temporary sewer discharge permit that will be obtained from Oneida County. The treated water will be sampled and analyzed for certain parameters as specified by Oneida County prior to discharging the water to the sanitary sewers.

The temporary water treatment system may include the following components:

- An influent holding/equalization and free-phase separation tank;
- A flash mix tank (for chemical addition);
- A flocculation tank (to facilitate coagulation of suspended solids);
- A clarifying tank for removal of settled solids;
- A multimedia filter;
- A carbon absorption vessel (to facilitate soluble PCB or VOC removal, if needed); and
- Final effluent tank.

The actual components of the temporary water treatment system will be designed and specified during the RD specification phase.

2.7 Soil/Sediment Dewatering

Excavated soil/sediment containing free liquids will require dewatering and/or stabilization prior to on- or off-site disposal. Generally, excavated soil/sediment that contains free liquid will be dewatered using gravity drainage at a staging area on the site. Following gravity dewatering, the paint filter test (USEPA SW-846 Method 9095) and/or visual observation may be used to determine if excavated material contains free liquids. If, after gravity drainage, excavated soil/sediment still contains free liquids, a stabilizing agent, such as quick lime, will be mixed with the soil/sediment to reduce moisture content. Gravity dewatering operations will be conducted in one or more dedicated staging areas constructed on site. The staging areas will be constructed to meet the following minimum requirements:

- The soil/sediment will be placed onto an impermeable membrane of sufficient strength and thickness to prevent puncture during use. The placement of soil/sediment into the staging area will not involve any equipment or procedures that may jeopardize the integrity of the underlying impermeable membrane;

- The staging area will be continuously covered with a properly anchored impermeable membrane, except while soil/sediment is actively being placed, stabilized, or removed. This membrane will be maintained for the duration of staging activities;

- A perimeter berm will be constructed around the staging area to contain water that has drained from the staged soil/sediment, and to mitigate the potential for surface water run-on to come in contact with the staged soil/sediment;

- The staging area will be sloped and equipped with a sump to collect water that has drained from the soil/sediment. The sump will be constructed in accordance with the description previously provided for ground-water diversion/excavation dewatering. Drained water will be removed from the sump as required and treated via the temporary water treatment system prior to discharge to the sanitary sewer;

- Stabilizing operations may be conducted within the staging area, but only if the integrity of the impermeable membrane and perimeter berm is maintained throughout the work. Stabilizing operations may also be conducted after the gravity dewatered soil/sediment has been loaded into lined rolloffs for off-site disposal;

- The location utilized for staging will not be a low-lying area where the surface water or ground water may accumulate;

- The location utilized for dewatering will be coordinated with other ongoing site operations, including, but not limited to remedial activities and operations conducted by the tenants occupying the property; and

- The staging area will be inspected daily and any noted deficiencies will be promptly addressed.

2.8 Verification Sampling and Analysis

2.8.1 General

This section presents the field screening and verification sampling program that will be implemented in conjunction with the surface and subsurface soil/sediment removal activities to confirm that the cleanup objectives are met in each of the excavation areas. Presented below is a general description of the proposed field screening and verification sampling program requirements, including methods for conducting field screening and verification sampling for PCBs, metals, and VOCs, and requirements for the verification SAP that will be prepared for implementation of the RA.

2.8.2 Pre-Excavation Soil Verification Sampling

To confirm the horizontal extent of soil removal, pre-excavation verification sampling will be conducted in the soil excavation areas associated with the chip chute area (Areas 2 and 3), and the former debris landfill and separation ponds (Areas 7, 8, 9, and 10).

Pre-excavation verification sampling will be conducted in these areas due to the potential that excavation reinforcements (such as sheeting) may be required to conduct the soil removal activities. As a result, post-excavation verification sampling would not be feasible, as the reinforcement materials would need to be removed prior to a sample being collected. In addition, extensive investigative activities were conducted in the chip chute area, and former debris landfill and separation ponds during the RI and SRI. This information was used in the FS to delineate the horizontal (and vertical) limits of these excavation areas. Therefore, the pre-excavation verification sampling will be used to confirm the horizontal limits of Areas 2, 3, 7, 8, 9, and 10.

The pre-excavation verification sampling will consist of installing one soil boring (or Geoprobe™) per 100 linear feet of proposed sidewall excavation for Areas 2, 3, 7, and 9 (Areas 8 and 10 are located within Areas 7 and 9, and therefore do not require confirmation of their horizontal limits). One verification soil sample will be collected per soil boring (or Geoprobe) from the depth interval that the historical analytical data (from the RI and SRI) indicates as having the highest likelihood of containing chemical constituents at concentrations above the cleanup criteria. The soil sample will be submitted to an analytical laboratory and analyzed for the following:

- VOCs of concern (i.e., cis-1,2-DCE, trans-1,2-DCE, TCE, and VC) by USEPA Method 8260; and
- Total chromium, copper, lead, and zinc by USEPA Method 6010.

In addition, pre-excavation verification soil samples associated with the former debris landfill (Area 9) also will be analyzed for total PCBs by USEPA Method 8080.

If the analytical results indicate that the pre-excavation verification soil sample contains one or more of the above-listed chemical constituents at concentrations greater than the cleanup criteria, an additional soil boring (or Geoprobe) shall be advanced (outside of the proposed sidewall) and a soil sample collected and analyzed as previously described. This process shall be repeated until the horizontal limits of the soil excavation areas (Areas 2, 3, 7, and 9) are confirmed.

Pre-excavation (and post-excavation) soil sampling to determine the vertical limits of soil removal in these areas is not required as the vertical limit of soil removal will extend to approximately the top of the confining till unit and the excavation activities will not extend into the till.

2.8.3 PCB Verification Sampling and Analysis

PCB field screening and verification sampling will be conducted in the excavation areas where RI and SRI data indicated that PCBs were present at concentrations above the cleanup objective, unless the excavation area has undergone pre-excavation verification sampling. The purpose of this sampling is to confirm that the total PCB concentration in the surface soil (to a depth of 0.5 feet) and sediments is less than 1 ppm and the concentration in the subsurface soil (depths greater than 0.5 feet) is less than 10 ppm. Field screening will also be conducted to characterize excavated soil/sediment for determining if the materials will be disposed of on or off-site.

The field screening process will consist of collecting soil/sediment samples at a minimum frequency of one sample per 1,000 square feet of bottom excavated area, and one sample per 100 linear feet of sidewall excavation area, unless the excavation area has undergone pre-excavation verification sampling. On-site drainage ditches, the skimmer pond, and the unnamed creek will be sampled on the bottom of the excavation area for field screening at a minimum frequency of one sample per 200 linear feet. In addition, sidewall samples will be collected from the skimmer pond at a frequency of one sample per 100 linear feet. Samples will be collected from the 0 to 6-inch depth below the excavation bottom/side surface.

If the field screening results indicate that the total PCB concentrations remain at a level greater than 1 ppm for sediment or 10 ppm for the subsurface soil, then additional soil/sediment removal will be performed, followed by additional field screening tests. When the results of the field screening tests indicate that the total PCB concentration is less than 1 ppm for sediment and surface soil or 10 ppm for subsurface soil, one additional soil/sediment sample will be collected from the field screening sample locations and submitted for laboratory analysis of total PCBs.

If the laboratory analytical results indicate that the clean-up objectives for total PCBs have been achieved at the sampling locations, no additional soil/sediment excavation will be required. If laboratory analytical results indicate that the clean-up objectives for total PCBs have not been achieved at a sampling location, additional soil/sediment excavation will be performed. Following the additional soil/sediment excavation, the excavation area will be resampled and the analytical results will be re-evaluated for conformance with the clean-up objectives. This cycle will be repeated until the analytical results indicate that the total PCB concentrations in the verification samples are less than 1 ppm for sediments and surface soil, and 10 ppm for subsurface soil.

Soil/sediment screening will also be performed in the field during the excavation activities to determine if the excavated soil/sediment will be disposed of in the on-site, lined containment cell, or at the off-site disposal facility. Ensys test kits will be used to determine the total PCBs concentration by personnel certified to conduct these field analyses. If the screening results indicate that the concentration of total PCBs in the excavated soil/sediment is equal to or greater than 40 ppm, the soil/sediment will then be considered to be a TSCA/New York State hazardous waste and will be transported off-site for disposal at a permitted facility. If the screening results indicate that the total PCB concentration is less than 40 ppm, one composite soil/sediment sample will be collected from the excavated soils and submitted for laboratory analysis to confirm that the soil/sediment remaining on-site do not contain greater than 50 ppm total PCBs. The soil/sediment will then be disposed in the on-site, lined containment cell.

2.8.4 Inorganic Verification Sampling and Analysis

Inorganic verification sampling and analysis will be performed in the excavation areas where the RI/SRI data indicated that inorganics were present in the soil/sediment at concentrations above the cleanup objective, unless the excavation area has undergone pre-excavation verification sampling. The inorganic verification sampling and analysis program will include collecting soil/sediment samples from the verification sampling locations selected for the PCB verification sampling, and submitting the samples for laboratory analysis of total chromium, copper, lead and zinc. No field screening will be conducted as part of the inorganic verification sampling program. Verification samples will be collected from the zero to six-inch depth below the excavation bottom/side surface. The sampling frequency will be identical to what is presented above for the PCB verification sampling program.

If the laboratory analytical results indicate that the concentration of inorganics present in the soil/sediment is less than the clean-up objectives, no additional soil/sediment excavation will be required. If the laboratory analytical results indicate that the concentration of inorganics exceeds the clean-up objectives, additional soil/sediment excavation will be performed. Following the additional soil/sediment excavation, the area will be resampled and the analytical results will be re-evaluated for conformance with the cleanup objectives. This cycle will be repeated until the analytical results indicate that the clean-up objectives have been achieved for the inorganics of concern.

2.8.5 VOC Verification Sampling and Analysis

VOC field screening and verification sampling will be conducted in excavation Area 13 (the east lot), where the RI/SRI data indicate that VOCs of concern were present in the soil at concentrations above the cleanup objectives (the remaining excavation areas will either undergo pre-excavation verification sampling or do not contain VOCs above the cleanup objectives). The purpose of this sampling is to confirm that the total VOC concentration (i.e., the sum of the four VOCs of concern) remaining in the surface and subsurface soil is reduced to less than 10 ppm. The field screening program will be conducted by measuring headspace VOC concentrations using a flame ionization detector (FID).

Field screening samples will be collected from the bottom surface and exposed sidewalls of the excavated area. The sampling will, at a minimum, consist of collecting samples at a frequency of one sample per 1,000 square feet of bottom excavated area, and from the sidewalls of the excavation area at a minimum of one sample per 100 linear feet of excavated sidewall. Samples will be collected from the zero- to six-inch depth below the excavation surface. As the field screening techniques will include measuring headspace VOC concentrations, the screening results will be used strictly as an indicator of the presence of VOC at the limits of excavation. Based on the results of the VOC screening activities, verification samples will be collected at the limits of excavation at the above-described sampling locations, frequency, and depth, and submitted for laboratory analysis of VC, trans-1,2-DCE, cis-1,2-DCE, and TCE. Total VOCs for each sample will be determined by summing the four individual VOCs.

If the laboratory analytical results indicate that the total VOC concentration in the soil is reduced to less than 10 ppm, the clean-up objectives will have been achieved and no additional soil excavation will be required at the sampling location. If the laboratory analytical results indicate that the total VOC concentration remains at a level greater than 10 ppm, additional soil excavation will be performed. Following the additional soil excavation, the excavation area will be resampled, and the analytical results will be re-evaluated for conformance with the clean-up criteria. This cycle will be repeated until the total VOC concentration at the soil/sediment sampling locations is less than 10 ppm.

Excavated soil that contains greater than 10 ppm total VOCs (and less than 40 ppm total PCBs) will be treated on-site via SVE prior to final disposition on-site in the lined containment cell.

2.8.6 Field Screening and Verification Sampling and Analysis Plan

A Field Screening and Verification SAP will be prepared as part of the RD specification and will describe the methods and procedures required to conduct field screening and verification sampling and analyses in areas where soil/sediment was excavated as part of the remedial activities. At a minimum, the plan will include the following:

- Pre-excavation verification sampling requirements;
- Post-excavation sampling locations and depths within each excavation area and minimum sampling frequency, based on the area of the excavation bottom and sidewalls;
- Procedures and equipment required for performing field screening for PCBs and VOCs in soil/sediment;
- Procedures and equipment required for collecting verification samples for laboratory analysis of PCBs, inorganics, and VOCs in soil/sediment;
- Required laboratory analytical methods for soil/sediment;
- Applicable cleanup objectives and screening criteria;
- Methods for evaluating the results of field screening and laboratory analytical results relative to the cleanup objectives;
- Procedures that will be employed if verification sampling indicates nonconformance with the cleanup objectives;
- Procedures and criteria for determining on- and off-site disposal for PCB-impacted soils; and
- Reporting and documentation requirements.

2.9 Soil/Sediment Disposal

Soil/sediment removed and dewatered (as necessary) as part of the remedial activities will be disposed of in one of the following manners:

- Off-site disposal at a TSCA-permitted landfill - for excavated soil/sediment that contains greater than 40 ppm total PCBs (as indicated by field screening);
- On-site treatment via SVE followed by placement in the lined containment cell - for excavated soil/sediment that contains less than 50 ppm total PCBs (as indicated by field screening and confirmed by laboratory analytical results) and contains greater than 10 ppm total VOCs (as indicated by field screening and laboratory analytical results); and
- Direct placement in the on-site lined containment cell - for excavated soil/sediment that contains less than 50 ppm total PCBs (as indicated by field screening and confirmed by laboratory analytical results) and less than 10 ppm total VOCs (as indicated by field screening and laboratory analytical results).

A detailed description of each of the disposal methods is presented in the following sections.

2.10 Off-Site Disposal

Excavated soil/sediment which contain greater than 40 ppm total PCBs (as a result of field screening) will be dewatered and stabilized (as necessary) and placed into lined rolloffs. The rolloffs will be loaded onto trucks and transported to a disposal facility permitted to accept TSCA/New York State hazardous waste. Prior to final disposition of the excavated materials, additional sampling and laboratory analysis may be required by the disposal facility to confirm the characterization of the soil/sediment. These analyses would be performed as requested by the disposal facility.

2.11 SVE Treatment of VOC Impacted Soil

2.11.1 General

This subsection presents the conceptual design for a SVE treatment system to remediate removed soils/sediments containing greater than 10 ppm total VOCs.

Ex-situ SVE treatment for VOCs followed by on-site disposal within the lined containment cell was selected by NYSDEC as the treatment technology for addressing approximately 2,330-cubic-yards of soil which contains total VOCs of concern at a concentration greater than 10 ppm. As part of ROD, NYSDEC required the following elements:

- A RD 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; and

- Treatability studies to ensure the effectiveness of SVE at achieving cleanup objectives.

According to the "Guide for Conducting Treatability Studies Under CERCLA: Soil Vapor Extraction" (USEPA, 1991), there are three levels of treatability studies that may be performed: remedy screening, remedy selection, and remedy design. Remedy screening was completed through the RI/FS process and remedy selection was completed through issuance of a ROD. Thus, a level three SVE treatability study is required to complete the final RD.

The remainder of this section presents the proposed SVE RD program, a conceptual design for the SVE system, and the treatability studies required to complete the final remedy design and ensure system effectiveness.

2.11.2 SVE Remedial Design Program

The SVE RD program will consist of the conceptual system design, treatability studies, and final remedy design. The conceptual SVE system design is presented below and will provide the basis for the final remedy design. The treatability studies are also described below and will be performed to provide site-specific design-related information necessary to complete the final remedy design.

2.11.3 SVE System Conceptual Design

The ex-situ SVE treatment system will consist of an estimated 2,330-cubic-yards of soil piled approximately 8-feet-high with perforated piping within an approximately 8,000-square-feet SVE treatment cell. The perforated piping will be connected with solid piping extending to a vacuum extraction blower. In order to avoid moving the soil to be remediated more than once, the SVE treatment cell will be placed directly on top of the on-site lined containment cell liner. Once SVE has been completed, treated soils will be capped in the same manner as the containment cell.

The SVE treatment equipment will consist of an air-water separator, air induction valve, in-line filter, vacuum extraction blower, and SVE system controls. The need for off gas treatment will be evaluated during the SVE treatability studies and will be included in the final remedy design, if required. The SVE treatment equipment will likely be housed in a pre-engineered enclosure or an existing structure, if deemed appropriate.

SVE Treatment Cell

Based on the RI/FS, three areas were identified with levels of VOCs that require treatment by SVE: Area 2, Area 8, and Area 10 (see Figure 2). As indicated on Figure 2, estimated volumes of soil to be treated at Areas 2, 8, and 10 are 580 cubic yards, 1,170 cubic yards, and 580 cubic yards, respectively.

VOC-impacted soils from each of the areas identified above will be excavated and composited into one above grade (ex-situ) SVE cell. The SVE cell will be covered with an impermeable geotextile to prevent rainfall from infiltrating the VOC-impacted soils, to prevent VOCs from volatilizing directly to the atmosphere, and to prevent short-circuiting of the vacuum extraction system.

SVE Equipment

Piping within the SVE cell will include a series of horizontal, parallel, slotted polyvinyl chloride (PVC) pipes running the length of the SVE cell to both provide fresh air into (air induction) and extract vapor-phase VOCs from the SVE cell. The SVE pipes may consist of 2- to 4-inch diameter Schedule 80 machine-slotted PVC piping with 0.020-inch slot widths running the length of the SVE cell. The number and spacing of SVE pipes will be determined during treatability testing. In order to provide flexibility in operation, piping may be configured such that by opening and closing a valve, a particular pipe may either provide fresh air into or extract VOC vapors from the SVE cell.

Air induction/extraction piping will be manifolded together using solid 4- to 6-inch diameter Schedule 80 PVC header pipe. The header pipe will likely be conveyed to treatment equipment located in the treatment enclosure. Through operation of the blower, a negative pressure will be applied to the piping, inducing a vacuum and air flow by which VOCs in the air space of the soil will be removed. The VOCs will pass through the blower and either be removed from the air stream with a vapor-phase treatment system or discharged directly to the atmosphere depending on permit requirements.

Unless an existing structure is deemed appropriate, an enclosure will house the SVE treatment equipment system controls. The enclosure is anticipated to be approximately 10-feet long by 15-feet wide by 10-feet high. The final dimensions and construction details of the SVE treatment enclosure will depend on the type of treatment equipment required and will be determined during final design. The primary purpose of the SVE equipment enclosure is to protect the SVE equipment from rain, extreme temperatures, and vandalism.

A conceptual process flow diagram is shown on Figure 3. As shown on Figure 3, the SVE air stream manifold will draw air flow and VOCs through a vacuum created by the blower. This air stream will flow through an air-water separator to remove condensate followed by an in-line filter to remove small diameter particles greater than 3 microns in size. From the in-line filter, the air stream will flow through the vacuum blower and then either be treated with a vapor-phase treatment system and discharged to the atmosphere or discharged directly. A SVE treatability study will be used to provide estimates of the air effluent concentrations to aid in determining the need for vapor-phase treatment and preparing an air discharge permit. Condensate collected in the air-water separator will be manually drained via gravity into a condensate storage container, likely a 55-gallon drum, during regularly scheduled maintenance inspections of the system. The amount of condensate that will be collected during operation of the SVE system is expected to be low because the SVE cell will be isolated from precipitation infiltration and from ground water. Any condensate collected will be transferred to the on-site air stripper for treatment prior to discharge.

The vacuum extraction blower will be sized based upon the results of treatability studies such that it will provide the required air flow from the SVE pipes. Fresh air induction into the SVE cell will occur under atmospheric temperature and pressure conditions and will not be supplied under a positive pressure. Based on experience with other SVE systems, the air flow rate is expected to be in the range of 200 cubic feet per minute (cfm) to 800 cfm, with vacuum ranging from approximately 20 inches of water (in water) to 80 in water.

System Controls

The SVE system will be designed with safety and control devices such that the SVE system can be operated without an operator on site. Pressure and air flow switches will be located on the inlet and discharge side of the vacuum extraction blower. These switches will shut the system down under high/low pressure, or low flow, and indicate an alarm condition. Alarm conditions will be relayed to an autodialer that will in turn notify the system operator via telephone of the alarm condition.

Operation

Operating parameters of the ex-situ SVE system (i.e., air flow rate, vacuum pressure, and VOC removal rate) will be estimated during SVE treatability studies and confirmed during ongoing operations and maintenance of the system. Flow rates through individual SVE pipes may be adjusted in order to maximize VOC removal rates and avoid channeling of air through SVE cell soils. These determinations will be made during operation of the SVE system. Adjustments of vacuum and air flow at individual SVE pipes will be accomplished through a combination of throttling the valve located at the entrance to the SVE pipe and measuring the pressure after an individual SVE pipe.

Operation of the SVE system will require an operator to start the blower at a main control panel and instrumentation located within the SVE equipment enclosure. The operator will also control the operation of any ancillary equipment, if necessary. During operation, vacuum, air flow rate, and air temperature will be measured by the operator. VOC concentrations will also be measured at a sample tap located near the discharge point using a photoionization detector (PID). Levels in the condensate storage container will be monitored to determine the need for emptying the container.

SVE system monitoring data will be frequently collected during the initial startup period to determine the necessary adjustments to optimize system performance. The SVE system monitoring will provide sufficient time series data to determine if the SVE system is working properly, to determine an appropriate schedule for long term operation and maintenance visits, and to determine when system shut-down may be possible.

Permitting

An air discharge permit to construct will be required for the SVE system. Air monitoring and treatment (if necessary) requirements specified in the air discharge permit will be addressed during final design.

System Shutdown

The SVE system will operate until VOC concentrations in soils are below the cleanup objectives of 10 ppm total VOCs as determined by USEPA Method 8260 Soil Analysis. This condition will be indicated when PID readings in SVE effluent air are not detected at concentrations near ambient air background conditions. Once the SVE effluent air is found to contain non-detectable PID readings, adjustments will be made to air flow pathways through the SVE cell via valves on the SVE pipes. If PID readings of SVE effluent air continue to be non-detectable, up to 10 soil samples will be obtained from the formerly impacted soils in the SVE cell and submitted for laboratory analysis of the VOCs of concern (i.e., VC, trans-1,2-DCE, cis-1,2-DCE, and TCE) by USEPA Method 8260. Total VOCs for each sample will be determined by summarizing the four individual VOCs. If the sum of the VOC analytical results are below 10 ppm, the treatment clean-up objective will have been met and the SVE treatment system will be permanently shut down.

If some soil samples are found to contain greater than 10 ppm total VOCs as defined above, the SVE system will be re-started and air flow will be preferentially directed, to the extent possible, through the impacted soils. Additional soil samples from those areas will be obtained until soils in the SVE cell are below 10 ppm total VOCs. Once these conditions are observed, NYSDEC will be notified that the SVE system was successful and a closure report will be provided to the NYSDEC within 90 days of shutdown.

2.11.4 Treatability Studies

Based on the conceptual SVE design discussed above, SVE treatability studies are required to aid in addressing the following design decisions:

- Number and spacing of SVE pipes;
- Requirements of the vacuum pump (air flow rate and vacuum requirements); and
- Requirements for off-gas treatment, if any (vapor-phase concentrations of VOCs).

To address these information needs, two treatability studies are being conducted as follows:

- SVE modeling using a combination of VENTING™ (ES&T, 1994) and MODFLOW to provide design information related to the air flow rate, vacuum pressure, vapor concentrations, VOC removal rate, and number and spacing of SVE pipes; and
- SVE system performance monitoring during initial startup.

Treatability Study 1 - SVE Modeling

Ground-water flow models such as MODFLOW may be used as an aid in designing SVE systems under the following assumptions:

- Vapor-phase density is relatively constant;
- The effect of vapor-phase pressure gradients on ground-water capillary effects is negligible; and
- Gravitational effects on vapor-flow are negligible.

The ex-situ SVE cell proposed for the site meets these assumptions. The primary adjustment in using ground-water flow models to simulate vapor flow is converting the traditional hydraulic conductivity parameter to intrinsic permeability and vapor-phase permeability using the density and viscosity of both water and air.

A three-dimensional MODFLOW model will be constructed to simulate gas flow through the proposed SVE cell. The purpose of the model will be to provide a conservative estimate of the maximum potential air flow rate that could be produced in the SVE cell and to aid in specifying the number and spacing of SVE pipes based on site-specific data. The air flow rate determined by the MODFLOW model will be used to specify the requirements of the vacuum extraction blower, estimate the maximum potential VOC removal rate for the SVE cell, and ultimately evaluate the need for off-gas treatment.

Based on the geometry of the SVE cell, as discussed above, MODFLOW will be required to provide the design information discussed above. To provide a conservative estimate of the maximum potential air flow rate, a range of intrinsic permeability values will be simulated based on the range of hydraulic conductivity values observed during the RI/FS. Additionally, up to three SVE piping scenarios will be evaluated to determine the most effective SVE piping design in terms of the number and spacing of SVE pipes.

VENTING Version 3.02 is a SVE model based on methods presented by Johnson et al. that estimates VOC recovery subject to a constant air flow rate specified by the user. A VENTING model will be constructed to simulate potential VOC recovery scenarios at the site. The purpose of the VENTING model will be to provide estimates of the potential VOC removal rate for each VOC identified, and ultimately to evaluate the need for vapor-phase treatment and aid in preparing an air discharge permit to construct. To accomplish this, the potential air flow rate determined by the MODFLOW model will be used as input to the VENTING model, in addition to the VOC concentrations observed during RI and SRI sampling activities.

Results of the SVE modeling will be used to provide specifications for the final remedy design in terms of the number and spacing of SVE pipes and power requirements of the vacuum extraction blower. Additionally, results of the SVE modeling will be used to evaluate the need for vapor-phase treatment, provide preliminary design specifications for vapor-phase treatment (if required), and provide a preliminary basis for preparing the air discharge permit to construct.

Treatability Study 2 - SVE System Performance Monitoring During Start-Up

After the SVE system is constructed, system performance monitoring data will be collected during the initial (i.e., the first four weeks) system start-up. The purpose of this treatability study will be to evaluate the SVE system performance and adjust air flow parameters in the SVE cell. To accomplish this, measurements will be collected from the following SVE treatment system components:

- The air flow rate, vacuum, and VOC concentration at each SVE pipe;
- The SVE system total air flow rate, vacuum, and VOC concentration;
- Condensate levels in the air-water separator; and
- Vapor-phase treatment system performance monitoring data, as required.

The data will be evaluated to ensure proper air flow pathways in the SVE cell have been established and to calculate the VOC removal rates.

Based on the data collected during the second treatability study, adjustments to the SVE system may be made, including:

- Adjusting the vacuum and air flow rate at individual SVE pipes to ensure proper air flow pathways within the SVE cell;
- Adjusting the air induction valve to maintain proper system vacuum; and
- Replacing the condensate storage container in the unlikely event that quantities of condensate generated during SVE treatment system operation are greater than expected.

2.11.5 On-Site Disposal

Following completion of the SVE treatment process, treated soil/sediment will be disposed of in-place by modifying the cover system over the on-site, lined containment cell to include complete coverage over both the PCB-impacted soil/sediment and the soil/sediment contained in the SVE treatment cell. Generally, the final disposal activities will consist of disconnecting piping and other SVE system-related obstructions from the exterior of the SVE treatment cell, and extending the cover system to cover the entire lined containment cell. The perforated piping inside of the SVE cell will be left in-place in the lined containment cell.

2.12 Lined Containment Cell Construction

2.12.1 General

Excavated soil/sediment subject to on-site disposal will be placed in the lined containment cell depicted on Figure 4. The containment cell will be designed with two separate containment areas for holding soil/sediment with total PCBs concentrations less than 50 ppm (as indicated by field screening and confirmed by laboratory analytical), and soil/sediment containing greater than 10 ppm total VOCs that will be treated using SVE. The containment areas will be constructed over a liner system and separated by a berm and low-permeability layer. The footprint of the proposed containment cell will occupy approximately 2 acres on the south side of the site with a maximum airspace volume of approximately 16,800 cubic yards. Because the exact volume of soils/sediment removal will be determined during remedy implementation, the containment cell design will accommodate a range of soil/sediment volumes. Other than the analyses to be conducted on the soil/sediment as part of the verification testing, no additional chemical or physical analyses will be conducted prior to placement of the soil/sediment into the lined containment cell. Toxicity characteristic leaching procedure (TCLP) analytical data previously generated during the RI and SRI indicate that the soil/sediment to be placed in the lined containment cell do not exhibit the characteristics of a hazardous waste.

Presented below is a description of the design of the liner, leachate collection, and cover systems, site access, and surface water control.

2.12.2 Liner System

The liner system will be constructed following the excavation and backfilling of Areas 7, 8, 9, and 10 near current grade on the southern side of the site, between the on-site drainage ditch located south of the foundry (Area 6) and the southern fence line. The ground surface will be fine-graded and free of protrusions prior to liner placement. The liner system will act as a barrier between the impacted soil/sediment and the backfilled clean soils following excavation, and prevent exfiltration from the containment cell to the surrounding soil. Initially, a perimeter berm will be constructed around the containment cell footprint and the liner subgrade will be prepared within the bermed area. A berm will also be constructed within the containment cell to separate the PCB-impacted soil/sediment from

VOC-impacted soil/sediment to be treated via SVE. The berms will be constructed using on-site or imported materials. The subgrade will be constructed by compacting and sloping the existing grade to provide adequate structural support of the containment cell and facilitate gravity leachate collection. The berms will be approximately 4 feet high with 2.5:1 (horizontal to vertical) side slopes and a 12-foot crest width, as shown on Figure 4. Following berm construction and subgrade preparation, a 60-mil, high density polyethylene (HDPE) liner will be placed over the perimeter berm and subgrade within the limits of the entire containment cell. A 12-inch thick granular drainage layer and leachate collection piping will subsequently be installed over the HDPE liner. The granular drainage layer and leachate collection piping will be covered with a 12-inch thick layer of protective soil. Excavated soil/sediment will be placed over the protective soil.

To facilitate rapid construction and reduce the necessity for on-site excavated soil/sediment stockpiling, the liner system will be constructed concurrent with the placement of soil/sediment. The construction of the liner may be partially complete when soil/sediment placement activities begin.

2.12.3 Leachate Collection System

A leachate collection system will be constructed as a component of the liner system. Leachate generated from soil/sediment located in the containment cell will be collected using a series of perforated collection pipes installed within the drainage layer of the liner system. The piping system will drain leachate to a collection manhole/pump station constructed adjacent to the containment cell (Figure 4). Leachate will be transferred from the collection manhole/pump station to a temporary leachate storage tank constructed adjacent to the containment cell. Leachate stored in the tank will be periodically transported off-site for appropriate treatment and disposal.

2.12.4 Cover System

At the completion of the soil/sediment placement activities within the containment cell, a cover system will be constructed to reduce infiltration into the containment cell and eliminate the potential for contact with the impacted soil/sediment. The cover system is shown on Figure 5 and will consist of the following components, listed sequentially from the top to bottom of the cover system:

- Vegetation;
- 6-inch-thick topsoil layer;
- 12-inch thick protective soil layer;
- Non-woven geotextile;
- 12-inch-thick granular drainage layer;
- 40-mil, HDPE geomembrane layer; and
- Geosynthetic clay liner (GCL).

The cover system will be constructed in two phases: The cover system will be constructed over the PCB-impacted soil/sediment at the eastern end of the containment cell while a temporary cover system, consisting of 10-mil synthetic membrane, will be installed over the VOC-impacted soils placed in the western end of the containment cell. In addition, a permanent 10-mil synthetic membrane barrier layer will be placed at the boundary of the PCB- and VOC-impacted soil/sediment placement areas. The placement of the temporary cover over the VOC-impacted soil/sediment will facilitate SVE treatment activities. At the conclusion of the SVE treatment activities, the final cover system (as described above) will be extended to cover the entire containment cell.

2.12.5 Access

An access road will be constructed at the perimeter of the containment cell to provide vehicular access to the containment cell and SVE treatment cell. At the conclusion of construction, the road will provide access for personnel conducting containment cell OM&M activities.

2.12.6 Surface Water Control

Surface water control will be achieved using a combination of overland flow across the cover system and proposed and existing drainage ditches located adjacent to the containment cell. Overland flow will be used to drain storm water run-off away from the cover system. A series of drainage ditches will be used to convey the storm water run-off from the containment cell off-site. A drainage ditch will be constructed adjacent to the new access road located along the southern side of the containment cell and will capture storm water run-off from the southern side of the containment cell. This drainage ditch will convey water to the existing on-site drainage ditch located south of the foundry. Storm water run-off generated on the northern side of the containment cell will be collected and conveyed off-site in the existing drainage ditch located south of the foundry.

2.13 Site Restoration

2.13.1 General

At the conclusion of the soil/sediment removal, disposal, and verification sampling and analysis activities, disturbed areas will be restored, to the extent practicable, to original conditions. The restoration work will include, at a minimum, grading, restoration of surfaces, and the establishment of vegetation. Fill materials imported to the site will be certified as clean materials prior to their use in restoration activities. Fill material certification requirements will be included as part of the RD Specifications. Miscellaneous waste and debris generated during the remedial activities will be disposed of in accordance with applicable federal, state, and local regulations.

The following subsections describe area-specific restorative work.

2.13.2 Restoration of Areas 2, 3, and 13

The site restoration activities in the chip chute area and east lot may include, but will not be limited to, completion of the following:

- Importing and placing select fill materials in the excavation areas to restore the profile of the original ground surface;

- Importing topsoil capable of supporting vegetative growth and placing a 6-inch thick layer of this soil over disturbed areas that were vegetated prior to disturbance;

- Seeding and mulching disturbed vegetated areas to reduce soil erosion;

- Restoring surface features disturbed, damaged, or destroyed during the performance of the work or as a result of any operation performed under the RA;

- Cleaning/decontaminating all equipment and materials prior to removal from the site; and
- Removing all waste, surplus materials, refuse, and temporary construction facilities from the site.

2.13.3 Restoration of Areas 1, 4, 5, 6, 11, 12, and 14

The site restoration activities in the skimmer pond, on- and off-site drainage ditches, and unnamed creek may include, but will not be limited to, completion of the following:

- Importing and placing select fill materials in the areas of excavation to restore the profile of the original ground, ditch, or creek bed surface;
- Importing crushed stone or rip rap and placing as necessary to prevent erosion of the drainage ditch, pond, or creek bed surfaces. A geotextile separation layer may be installed between the crushed stone or rip rap and native soils to prevent intrusion of native materials into the crushed stone or rip rap;
- Importing topsoil capable of supporting vegetative growth and placing a 6-inch thick layer of this soil on the drainage ditch and creek bed side slopes;
- Seeding and mulching disturbed areas, including the drainage ditch and creek side slopes, to reduce soil erosion;
- Restoring surface features disturbed, damaged, or destroyed during the performance of the work or as a result of any operation performed under the RA;
- Replacing culverts and subsurface piping removed as part of the work;
- Regrading the skimmer pond side slopes;
- Replacing culverts located along the on-site drainage ditches with reinforced concrete or corrugated metal pipe of similar size and length to the culverts currently in place;
- Selectively replacing piping and culverts in and around the skimmer pond with piping of similar construction and dimensions;
- Cleaning/decontaminating all equipment and materials prior to removal from the site; and
- Removing all waste, surplus materials, refuse, and temporary construction facilities from the site.

2.13.4 Post-Remedial Action Configuration of Areas 7, 8, 9, and 10

These areas are located in the immediate vicinity of the lined containment cell, and as such, the restoration of these areas will be dependent upon the subgrade specification for the lined containment cell. Excavation areas 7, 8, 9, and 10 will be backfilled with select fill and compacted to the requirements set forth in the RD specification.

3. Ground Water Treatment

3.1 General

A ground-water collection and treatment remedy was selected in the RD as part of the site remedy. The ground-water collection and treatment remedy involves installation of shallow ground-water collection trenches along the northern part of the site and south of the manufacturing building to collect shallow ground-water at an estimated rate of up to 10 gpm. Treatment of the collected ground water entails utilizing the existing treatment system previously installed as an IRM (as discussed in Section 1.2.3). Treated ground-water will be discharged via the existing SPDES Outfall 03A into the eastern drainage ditch and will be monitored, as required, under the facility's current SPDES permit.

3.2 Basis of Design

The ground-water collection and treatment remedy will utilize the IRM air stripper located in the existing manufacturing building at the site. The sources of water to the treatment system will be the skimmer pond, southern collection trench, clay pipe discharge, and the northern perimeter collection trench. The locations of the facilities are shown on the partial site plan on Figure 2 and a process flow diagram on Figure 6.

Modification to the existing treatment system includes installation of two collection trenches which will recover ground water at a conservative rate of up to 10 gpm. The locations of the two collection trenches were selected based on the direction of ground-water flow and ground-water analytical data presented in the RI and SRI. Ground water from the collection trenches will be piped to the existing collection manholes, where water will be pumped to the air stripper. The objective of the northern perimeter collection trench is to mitigate the potential migration beyond the immediate downgradient property line of ground-water containing VOCs of concern (i.e., TCE, cis-1,2-DCE, trans-1,2-DCE, and VC) that exceed Class GA ground-water standards. The objective of the southern collection trench is to mitigate the potential migration of VOCs of concern across the site from known potential source areas.

The basis of design for the ground-water collection and treatment remedy was developed using the IRM surface water treatment system basis of design. The basis for design for the IRM surface water treatment system is documented in a report entitled Surface Water Interim Measure Engineering Report (BBL, October 1994). This report was utilized by the NYSDEC to issue a SPDES Permit modification for Outfall 03A. The basis of design for the ground-water collection and treatment system for the high flow (or worst case) conditions is summarized in the table below.

Parameter	Skimmer Pond	Southern Collection Trench	Clay Pipe	Northern Perimeter Collection Trench	Treatment System Influent	Total Effluent
High Flow Operating Conditions						
Flow (gpm)	130	5	20	5	160	-
TCE (mg/l)	1.0	1.0	7.6	7.6	2.03	<0.010
Cis-1,2-DCE (mg/l)	0.32	0.32	0.5	0.5	0.35	<0.010
Trans-1,2-DCE (mg/l)	<0.04	<0.04	0.5	0.5	0.12	<0.010
VC (mg/l)	0.026	0.026	<0.01	<0.01	0.02	<0.010

Note:

mg/l = Milligrams per liter.

The basis of design of the modified IRM treatment system high flow operating condition is up to 160 gpm and is equal to the sum of the skimmer pond overflow, southern collection trench, clay pipe discharge, and the northern perimeter collection trench. The southern and northern collection trenches will add a total of approximately 10 gpm to the existing treatment system. The current treatment system, pumps, and transfer piping have sufficient capacity to treat water from these additional inputs.

The basis of design of the modified IRM treatment system, with respect to the influent VOC concentrations, are flow weighted concentrations from the skimmer pond overflow, southern collection trench, clay pipe discharge and the northern perimeter collection trench. Sampling of the ground water during the RI and SRI, in the area of the proposed trenches indicated lower concentrations of TCE, cis-1,2-DCE, trans-1,2-DCE, and VC than those used as the basis of the original design for the IRM. However, to be conservative, influent concentrations of TCE, cis-1,2-DCE, trans-1,2-DCE, and VC used as a basis of design for the surface water IRM treatment system design were also used as a basis of design for the modified treatment system design. The target effluent concentration of 0.01 mg/l will still be met for each parameter.

3.3 Collection Trenches

One of the collection trenches, designated as the northern perimeter collection trench, will be installed along the northern part of the site. This collection trench will be approximately 120-feet long by 3-feet wide by 10-feet deep and oriented as shown on Figure 2. This trench will include a six-inch-diameter HDPE perforated pipe installed near the base of the trench. The pipe will discharge directly into the existing Pumping Manhole No. 2.

A second collection trench, designated as the southern collection trench, will be installed south of the manufacturing building. This collection trench will be approximately 600-feet long by 3-feet wide by 8-feet deep and oriented as shown on Figure 2. This trench will include a six-inch diameter HDPE perforated pipe installed near the base of the trench. The trench will terminate at a concrete cut-off wall that will extend above the static ground-water level into unsaturated soil. A solid PVC pipe will connect the trench to the existing pumping Manhole No. 1.

The perforated pipes for each collection trench will be embedded in crushed gravel, which will be used to backfill the trench to above the depth of the static water table (i.e., to approximately two feet below grade). The crushed gravel within the trench, and the perforated pipe, will be surrounded by geotextile fabric to mitigate the influx of fine sediment into the trench. The remainder of the trench will be backfilled with soil to grade. Operation of the pumps within the pumping manholes will maintain a constant drawdown on the water level in the trench and thereby create an inward gradient from the surrounding formation. The water level in the two manholes will be controlled by the existing float switches. A typical collection trench section is shown on Figure 7.

Soil generated as a result of the collection trench excavation activities may be used as backfill during site restoration activities if the soil meets the fill material certification requirements presented in the RD specifications.

3.4 Implementation of the Ground-Water Collection and Treatment System

In parallel with the implementation of the existing IRM, an Air Permit Application to Construct and a SPDES Permit Modification Application were submitted to the NYSDEC. The SPDES permit will not need to be modified since the October 1994 Engineering Report that was approved by the NYSDEC included utilizing the existing IRM air stripper to treat up to 250 gpm. However, due to the increased flow rate, the existing Air Permit Application to

Operate will need to be modified. However, based on NYSDEC's Air Guide-1, the annual impacts and short-term impacts for all parameters will still be less than the Annual Guideline Concentrations (AGCs) and Short-Term Guideline Concentrations (SCGS). Subsequently, emissions controls will not be required.

3.5 Ground-Water Monitoring Plan

Following implementation of the ground-water collection and treatment system and completion of the soil/sediment removal activities, a Ground-Water Monitoring Plan will be implemented to assess the effectiveness of the remedial activities conducted at the site.

Ground-water monitoring will be conducted at the following locations:

- A new ground-water monitoring well to be installed downgradient of excavation areas 7 and 9, in the overburden to a maximum depth equal to the top of the confining till layer;

- A new ground-water monitoring well to be installed downgradient of the northern perimeter collection trench, in the overburden to a maximum depth equal to the bottom of the collection trench;

- Existing monitoring well MW6R, located in the northeast portion of the site;

- Existing monitoring well MW-13S, located downgradient of Area 13, the debris landfill and skimmer pond; and

- Existing monitoring well MW-14, located sidegradient of the debris landfill and Area 13.

Protocols for installing the new ground-water monitoring well will be provided in the RD Specifications. Ground-water sampling methods will be included in the SAP. The initial frequency of the ground-water monitoring program will be as follows:

- The first round of ground-water samples will be collected and analyzed for the constituents of concern immediately following completion of the remedial activities (excluding treatment of the soil/sediment by the SVE system); and

- Three rounds of ground-water samples will be collected semi-annually and analyzed for the constituents of concern.

The samples collected during the initial four rounds of ground-water monitoring will be submitted for laboratory analysis of the following parameters:

- Dichloroethene (cis and trans);
- Trichloroethene;
- Vinyl Chloride;
- Chromium;
- Copper;
- Lead;
- Zinc; and
- PCBs.

Based on the laboratory analytical results for the initial four sampling rounds, the analytical parameter list for subsequent ground-water monitoring events may be modified to include only the above-listed parameters that were detected at concentrations above the New York State Ground-Water Quality Standards and Guidance Values. Following the initial four sampling rounds, the ground-water monitoring frequency is anticipated to be on an annual basis (based on laboratory analytical results).

4. Construction Quality Assurance Plan

The CQAP will describe the site-specific components of construction quality to ensure that remedy construction meets or exceeds the RD criteria and specifications. The CQAP will include a program for construction observation and testing to assess whether the remedy construction is performed in accordance with the design specifications. The CQAP will also include the following:

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy;
- The qualifications of the quality assurance personnel that demonstrate they possess the training and experience necessary to fulfill project-specific responsibilities;
- The observations and tests that will be used to monitor construction and the frequency of performance of these activities;
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures as addressed in the plans and specifications;
- Requirements for project coordination meetings between the remediation contractor, engineer, and other involved parties;
- Description of the reporting requirements for quality assurance activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation; and
- Description of the final documentation retention provisions.

The CQAP will provide a detailed description of the inspection activities that will be used to monitor and control construction quality and ensure that remedy construction meets or exceeds the RD criteria and specifications. The CQAP will be prepared with consideration of the following guidance documentation: *Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities* (USEPA, 1986).

5. Remedial Action Contingency Plan

The Remedial Action Contingency Plan will describe the provisions required for responding to site-related emergencies that could occur during remedy implementation. The RACP will, at a minimum, present the following:

- A spill response plan for addressing spills that occur on-site during the remedy construction activities. The spill response plan will describe the methods, means, and facilities required to prevent soil, water, structure, equipment, and material impacts caused by spills; provide information regarding spill containment and cleanup; and provide information related to decontamination measures;

- An Air Monitoring Plan that identifies air monitoring requirements on-site and at the site perimeter for site-specific constituents of concern. The Air Monitoring Plan may contain requirements for personnel monitoring and site perimeter monitoring and will present trigger concentrations for site-specific constituents of concern that will require corrective action;

- Procedures and routes for emergency vehicular access/egress;

- Procedures for the evacuation of personnel from the site;

- A listing of contact personnel with phone numbers that, at a minimum, includes fire officials, ambulance service, local, county, and state police, local hospitals, and a spill response team. Procedures for notifying each party will also be included; and

- Routes to local hospitals, including written directions and a map that depicts the location of the site relative to the hospital(s).

6. Sampling and Analysis Plan

A SAP, consisting of a Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP), will be used for sampling and analysis activities associated with the remedial activities. The purpose of the SAP is to ensure that sampling data collection will be comparable to and compatible with previous site data collection activities, while providing a mechanism for planning and approving field activities. The QAPP component of the SAP presents the policy, organization, functional activities, and quality assurance and quality control protocols necessary to achieve data quality objectives dictated by the intended use of the data generated during sampling and analysis, while the FSP provides guidance for field sample collection activities by defining the necessary sampling and data-gathering methods. The SAP will be used as a guide for performing the following sampling and analytical activities:

- Field screening of soil/sediment removed from and located within the excavation areas;

- Pre- and post-verification sampling and analysis conducted on the bottom and sidewalls of the excavation areas; and

- Characterization of surface water and ground-water seepage.

The SAP prepared for the performance of the RI, titled Sampling and Analysis Plan (BBL, 1993) will be used to the extent possible for the performance of the above-described remedy-related sampling and analysis activities. Because the existing SAP was prepared specifically for the performance of the RI, and sampling and analytical requirements associated with the remedy will differ from those associated with the RI, an addendum to the existing SAP will be issued that presents information specific to the performance of the remedial action. The addendum may include additional and/or revised information related to one or more of the following topics:

- Sampling objectives, locations, procedures, handling, and documentation;
- Project organization;
- Field test kit protocols and procedures;
- Analytical procedures; and
- Data reduction, validation, and reporting.

7. Site Operation, Maintenance, and Monitoring Plan

The Site OM&M Plan will describe the requirements for the long-term OM&M of the on-site, lined containment cell, ground-water treatment system, and SVE system. The OM&M requirements for the containment cell, ground-water treatment system, and SVE system will be presented under one cover. At a minimum, the site OM&M Plan will include the following elements:

- A description of containment cell and leachate collection system components and features, including the liner and cover system layers, leachate collection piping, and leachate pumping and storage facilities;

- A description of the ground-water and SVE treatment system components, equipment, treatment processes, and operational features;

- A description of containment cell, leachate collection system, ground-water and SVE treatment system operation, including, but not limited to system start-up, shutdown, process operations, and alarms;

- Potential operating problems, methods to analyze operating problems, and corrective actions for normal operating problems;

- Routine containment cell and leachate collection system monitoring requirements, including inspection of the cover system components of soil and vegetative cover, and leachate collection system equipment, including piping and pumping systems, and leachate storage facilities;

- Routine ground-water treatment and SVE system monitoring and testing requirements, including inspection, sample collection, and analytical requirements;

- System failure provisions, including provisions for alternative treatment or discontinuing treatment system operation during system repair; and

- Data recording requirements, including inspection logs, laboratory analytical data records, and maintenance records.

In addition, the site OM&M Plan will include, as an attachment, manufacturer's information describing the technical specifications for the containment cell, and leachate collection, ground-water treatment, and SVE systems.

The draft OM&M Plan will be submitted to NYSDEC during implementation of remedial construction activities. Within 90 days of completion of remedial construction, a final OM&M Plan will be submitted to NYSDEC and implemented accordingly thereafter.

8. Site-Specific Health and Safety Plan

The HASP will be prepared to provide a mechanism for establishing safe working conditions at the site, where safety organization, procedures, and protective equipment requirements are established based on an analysis of potential site-related hazards. The HASP, at a minimum, will meet the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65). The HASP will include, but will not be limited to, the following components:

- Identification of Key Personnel - Identification of the on-site and off-site health and safety personnel responsible for the implementation of health and safety procedures. All on-site personnel involved in the activities will be required to maintain Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Training (29 CFR 1910.120 and 29 CFR 1926.65) and the corresponding 8-hour refresher course update;

- Training - A description of health and safety training requirements for supervisory and on-site personnel will be presented. Training requirements will include attending an initial site orientation prior to engaging in any on-site activities;

- Medical Surveillance - A description of appropriate medical examinations required for supervisory and on-site personnel to conduct the tasks associated with the performance of the remedy will be presented. Associated tasks may include the following: working with chemicals, heavy lifting, using respiratory protection, using personal protective equipment, and conducting hazardous waste operations in accordance with 29 CFR 1910.120 and 1926.65;

- Site Hazards - A description of chemical and physical hazards associated with the site will be presented in the HASP. In addition a discussion of identifying and mitigating foreseeable chemical and physical hazards associated with the work will be presented. Foreseeable chemical and physical hazards may include, but will not be limited to, hazards associated with exposure to constituents of concern, heavy equipment operation, site conditions, weather, biological hazards, materials handling, and work around excavated areas and water;

- Work Zones - A description of the work zones that will be established during the remedy will be presented. The work zones will be preliminarily delineated on a site plan that depicts the designation of zones including: (1) Exclusion Zones; (2) Contamination Reduction Zones; and (3) Support Zones. The level of personal protection required for each work zone will be specified;

- Personal Safety Equipment and Protective Clothing - The HASP will identify personal safety equipment and protective clothing to be used and available on-site. This will include identification of expected levels of protection for the work, and the action levels for personal protective equipment upgrades. Also included will be a respiratory protection program that meets the requirements of 29 CFR 1910.134, which establishes specific requirements for any respirator use;

- Personal Air Monitoring - Protocols and criteria associated with personal air monitoring of on-site personnel will be presented;

- Area Air Monitoring - Protocols and criteria associated with conducting area air monitoring at the limits of excavation or site perimeter will be presented;

- Equipment Cleaning - The methods and procedures for decontamination of personnel, vehicles, and equipment will be described;

- Confined Space Entry - The HASP will describe procedures for confined space entry in accordance with OSHA's Permit-Required Confined Space Standard (29 CFR 1910.146). In addition, requirements for Confined Space Entry Training for all authorized personnel in accordance with 29 CFR 1910.146 will be presented;

- Material Safety Data Sheets - Material Safety Data Sheets (MSDSs) for all materials to be brought on site, as well as constituents that are expected to be encountered in the course of remediation, will be presented as an attachment or appendix to the HASP;

- Excavation Safety - Excavation and trenching safety procedures as specified in 29 CFR 1926 subpart P including, but not limited to soil classification, excavation inspections, protective systems, and designated competent persons will be discussed; and

- Standard Operating Procedures and Safety Programs as required by applicable sections of Section 1910 of Title 29 of the Code of Federal Regulations (29 CFR 1910) and 29 CFR 1926.

9. Pre-Design/Construction Data Collection

Prior to the commencement of construction, specific site-related data will be collected to facilitate the development of the remedial design and remedy implementation. The data collection efforts include conducting a limited site topographic survey of areas critical to the development of the RD and pre-excavation verification sampling. A discussion of the pre-design/construction data collection activities is presented below.

A limited topographic survey was conducted in selected areas of the site to establish horizontal and vertical control and to facilitate the development of the grading plans that will be included in the remedial design. In the north/south direction, the survey was conducted from the southern fence line located south of the debris landfill and separation ponds (Areas 7, 8, 9, and 10) to the northern bank of the on-site drainage ditch (Area 6) located south of the foundry. In the vicinity of the debris landfill and separation ponds, survey control was obtained to determine the surface drainage patterns in the area. Along the on-site drainage ditch, survey control was obtained along the banks and centerline of the drainage ditch, from the western terminus of the ditch to the eastern site fence line. The topographic survey data will be used to develop a contour map of the surveyed areas for use in the design of the on-site, lined containment cell.

In addition, as discussed in Section 2.8, pre-excavation verification sampling will be conducted in select excavation areas prior to initiation of soil removal activities. The data generated from this activity will confirm the horizontal extent of those select excavation areas.

10. Remedial Action Administrative Activities

10.1 General

During the performance of the RA construction activities, numerous administrative activities will be performed, including developing contract documents, procuring a remediation contractor, reviewing remediation contractor submittals, performing construction oversight, completing construction, and selecting an analytical laboratory. A discussion of these topics is presented below.

10.2 Remedial Action Construction-Related Activities

Administrative activities associated specifically with the remedy construction will include the development of the contract documents, procuring a remediation contractor, reviewing and approving remediation contractor submittals, inspecting the construction activities for conformance with the contract documents, and determining when construction is complete. The following subsections describe provisions for these activities.

10.2.1 Contract Document Development

Following NYSDEC approval of this RD Work Plan, BBL, as the Engineer for the project, will prepare the contract documents for RA implementation. The purpose of the contract documents is to set forth the scope of the RA activities to be implemented by the remediation contractor. The contract documents will include a complete set of engineering drawings showing site plans and construction details, technical specifications describing the methods and materials required for remedy construction, and contractor bidding information. Each of these elements is further described below.

The engineering drawings will include an existing site plan, the proposed grading plans, including drainage and restoration details, and SVE and ground-water treatment system construction details. The technical specifications will include:

- Material and performance specifications for site work;
- Containment cell construction;
- Leachate collection;
- SVE and ground-water treatment systems construction;
- Specifications for erosion control, permitting, and contractor health and safety;
- Schedule requirements; and
- Other pertinent information.

Bidding information will include the following requirements for contractor bids:

- A description of the remediation contractor's approach for completing the remedy;
- Proposed work, staging/dewatering, and decontamination areas;
- Traffic patterns;
- Water treatment and diversion methods;
- Temporary roadways; and
- Clearing and grubbing.

In addition, the bidding requirements will include requirements for the remediation contractor's proposed schedule, including start/end dates and major project milestone dates, descriptions of regulatory compliance plans, proposed off-site disposal facilities, and proposed sources for obtaining earthen materials and manufactured equipment. Upon completion, the contract documents will be released to prospective remediation contractors to begin the process of procuring a remediation contractor.

10.2.2 Remediation Contractor Procurement

When the development of the contract documents has been completed, the contract documents, in the form of a bid package, will be released to a select number of contractors to solicit bidding on the performance of the remedy construction. Following receipt of the bid package by the prospective bidders, a pre-bid meeting will be conducted at the site. During the pre-bid meeting, prospective bidders will be allowed to discuss the project elements and view the work area. Following the receipt of the bids, the remediation contractor will be selected based on the proposed method for remedy implementation, bid price, proposed schedule, and experience and qualifications.

10.2.3 Submittals and Submittal Review

As a requirement of the contract documents, the remediation contractor will provide the Engineer with submittals that may include shop drawings, materials samples, technical specifications, and work plans. The Engineer, will review the submittals for general conformance with the requirements of the contract documents, and notify the remediation contractor of the submittal approval status.

10.2.4 Construction Quality Assurance and Inspection

Full-time construction observation services will be provided by the Engineer. The purpose of the construction monitoring is to ensure that the requirements of the contract documents are satisfied by the remediation contractor. The Engineer will observe and document the RA construction activities, and will be responsible for the following activities during construction:

- Documenting materials and equipment delivered to the site to verify conformance with the requirements of the contract documents and approved remediation contractor submittals and shop drawings;
- Monitoring the remediation contractor's survey control for evaluating payment quantities;
- Reviewing and approving remediation contractor change orders and invoices;
- Maintaining a daily log of remediation contractor activities. The daily log will include a description of work performed, weather conditions, site visitors, and construction problems and associated solutions;
- Maintaining a photographic record of construction progress to be included in the construction certification report;
- Overseeing quality assurance/quality control testing performed by the remediation contractor to ensure compliance with the contract documents;
- Conducting field screening and verification sampling;
- Maintaining a record of all field screening and verification sampling and analytical results, including sampling methods, locations and depths, frequency, and analytical results;
- Identifying construction problems and instances of non-compliance with the contract documents, and assisting in the resolution of the problems; and
- Preparing a punch list of items to be completed by the remediation contractor near the end of the project, and ensuring that the remediation contractor completes the items on the punch list.

10.2.5 Completion of Construction

As the remedy construction nears completion, the Contractor will issue the Notice of Substantial Completion, stating the remediation contractor has completed the remedy construction in general compliance with the requirements of the contract documents. Upon issuance of the Notice of Substantial Completion, the remediation contractor, NYSDEC, and the Engineer, will participate in a site walk-through to identify outstanding tasks that are to be completed by the remediation contractor prior to the completion of construction. The parties conducting the site walk-through will collectively compile a punch list of outstanding tasks. Following the site walk-through, the remediation contractor will complete the punch list items, and upon verification of the remediation contractor's completion of the items by the Engineer, construction will be complete.

10.3 Analytical Laboratory Selection

Laboratory analytical services will be required for conducting verification sampling during remedy implementation. To select an analytical laboratory, the engineer will prepare a request for pricing (RFP) for laboratory analytical services. The RFP will request pricing for PCB, metals, and VOC analysis of soil, sediment, and ground-water samples, laboratory quality assurance/quality control measures, and current USEPA Contract Laboratory Services Protocol (CLP) and NYSDEC Analytical Services Protocol (ASP) certification, related experience, and qualifications. The analytical laboratory will be selected on the basis of pricing, certification status, experience, and qualifications.

11. Post-Remediation Data Collection Activities

At the conclusion of the remedy construction activities, a survey will be performed by the Engineer to obtain horizontal and vertical control in the vicinity of the lined containment cell. The survey control will be obtained on the containment cell and at the perimeter of the cell, in areas where drainage structures and access roads were constructed.

12. Post-Remediation Administrative Activities

12.1 General

Administrative activities that will be conducted following the completion of the RA include the development of as-built drawings and preparation of a construction certification report. A discussion of these topics is presented below.

12.2 Record Drawings

At the completion of the RA construction activities, the Engineer will prepare record drawings that show the final configuration of the site following the performance of the RA. The record drawings will be prepared using information from the red line construction drawings provided by the remediation contractor and survey data collected at the conclusion of the remedy construction activities. The record drawings will be sealed and signed by a professional Engineer registered in the State of New York.

12.3 Construction Certification Report

At the completion of the RA construction activities, a certification report for remedy construction will be prepared and submitted to the NYSDEC for review. The purpose of the construction certification report is to provide documentation of the remedial activities. The report will include the following information:

- Summary of the construction activities;
- Observation and testing data, including sample collection locations and results;
- Summary of construction problems and solutions;
- Summary of changes from design and material and performance specifications;
- Certification statement sealed and signed by a professional Engineer registered in the State of New York; and
- Sealed and signed as-built drawings.

13. Project Management Plan/Project Schedule

13.1 General

This section presents the project management organization and anticipated project schedule associated with implementation of the RD and RA activities. The project management organization and anticipated project schedule are presented below.

13.2 Project Management Organization

The preparation of the RD requires the integration of personnel from the organizations identified below, collectively referred to as the Project Team.

BBL, on behalf of Danaher, has overall responsibility for the preparation of the RD as required by the ROD and Consent Order. Ms. Vita DeMarchi, P.G., of Secor International, Inc. will provide project coordination and review. A listing of key project management personnel is provided below.

Project Title	Company/Organization	Name	Phone Number
Regional Office Project Manager	NYSDEC	Phillip G. Waite, P.E.	(315) 785-2513
Project Manager	Danaher Corporation	Carl S. Grabinski, Esq.	(773) 625-1500 x 136
Project Coordinator/ Hydrogeologic Advisor	Secor International, Inc.	Vita A. DeMarchi, P.G.	(315) 484-7874
Project Officer	Blasland, Bouck & Lee, Inc.	Tyler E. Gass, C.P.G., P.H.G.	(303) 231-9115
Project Officer - Engineering	Blasland, Bouck & Lee, Inc.	Edward R. Lynch, P.E.	(315) 446-9120
Project Manager - Remedial Design	Blasland, Bouck & Lee, Inc.	Margaret A. Carrillo-Sheridan, P.E.	(315) 446-9120
Engineering Task Manager	Blasland,. Bouck & Lee, Inc.	Donald F. Sauda	(315) 446-9120

13.3 Project Schedule

Presented below is the schedule for the implementation of the RD and RA activities.

Activity	Completion Time Frame
Name and Qualifications of Supervising Contractor Submitted to NYSDEC	5 days after effective date of Administrative Order on Consent (Order).
Draft RD/RA Work Plan Submitted to NYSDEC	45 days after receipt of NYSDEC approval of supervising contractor.
Final RD/RA Work Plan Submitted to NYSDEC	30 days after receipt of NYSDEC comments on or approval of Draft RD/RA Work Plan.
Draft RD Specifications Submitted to NYSDEC, Following Completion of Treatability Study & Site Topographic Survey	160 days after receipt of NYSDEC approval of Final RD/RA Work Plan.
Final RD Specifications Submitted to NYSDEC	45 days after receipt of NYSDEC comments on or approval of Draft RD Specifications.
Name and Qualifications of Supervising Contractor for Remedial Construction Submitted, Following Request for Bids and Contract Award	90 days after receipt of NYSDEC approval of Final RD Specifications.
Completion of Remedial Construction and Submittal of Draft Operation & Maintenance Plan to NYSDEC	240 days after NYSDEC approval of supervising contractor.
Final Operation & Maintenance Plan, "As Built" Drawings, Final Engineering Report and Certification Submitted to NYSDEC	90 days after completion of remedial construction.
NYSDEC Certification of Completion of Remedial Construction	60 days following submittal of "as built" drawings, final Engineering report, and certification to NYSDEC.
Implementation of OM&M Plan	Following receipt of NYSDEC approval of OM & M Plan.

Table of Contents