FINAL
ENGINEERING REPORT

Remedial Action
Former Chicago Pneumatic
Tool Company
2200 Bleecker Street
Utica, New York 13501
NYSDEC Site No. 622003
January 2000
Final August 2001

Prepared for:
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July 8, 2003

I, Paul M. Fisher, P.E., as a licensed Professional Engineer in the State of New York, certify that the Final Engineering Report, As-Built Drawings, and Operation, Maintenance, and Monitoring Manual, for the Remedial Action at the former Chicago Pneumatic Tool Company located in Utica, New York, has been prepared in accordance with good engineering practice. I further certify that the Remedial Design was implemented and that all construction activities were completed in accordance with the New York State Department of Environmental Conservation approved Remedial Design and/or approved changes, and were personally witnessed by me or by a person under my direct supervision.

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REMEDIAL ACTION

FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK
NYSDEC Site No. 622003

ACRONYMS AND ABBREVIATIONS

6 NYCRR Part 364	Part 364 of Title 6 of the New York State Compilation of Codes, Rules and Regulations
29 CFR 1910	Part 1910 of Title 29 of the Code of Federal Regulations
40 CFR 761	Part 761 of Title 40 of the Code of Federal Regulations
ºF	Degrees Fahrenheit
cis-1,2-DCE	cis-1,2-Dichloroethene
trans-1,2-DCE	trans-1,2-Dichloroethene
AAA	AAA Environmental, Inc. Project Prime Contractor
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
BBL	Blasland, Bouck & Lee, Inc.
bgs	Below Ground Surface
CECO	CECO Building Systems
CMP	Corrugated Metal Pipe
CP	Chicago Pneumatic Tool Company
CQA	Construction Quality Assurance
CWA	Clean Water Act
cy	Cubic Yards
Danaher	Danaher Corporation
DUP	Duplicate
GAC	Granular Activated Carbon
Galson	Galson Laboratories
GCL	Geosynethic Clay Liner
gpm	Gallons Per Minute
HELP	Hydrologic Evaluation of Landfill Performance
HDPE	High Density Polyethylene
HP	Horsepower
ISACC	Intelligent System for Automatic Control and Communication by Sensaphone
KW	Kilowatt
mm	Millimeter
MP	Material and Performance
mph	Miles Per Hour

NMPC	Niagara Mohawk Power Corporation
NYSDEC	New York State Department of Environmental Conservation
OCWQPC	Oneida County Department of Water Quality and Pollution Control
OMM	Operation, Maintenance, and Monitoring
OSHA	Occupational Safety and Health Administration
OVM	Organic Vapor Meter
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
ppb	Parts Per Billion
PPE	Personal Protection Equipment
ppm	Parts Per Million
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
PW	Parratt-Wolff, Inc.
QA	Quality Assurance
QC	Quality Control
RAF	Remedial Action Facility
RCP	Reinforced Concrete Pipe
ROW	Right-of-Way
RPM	Revolutions Per Minute
SECOR	*SECOR International Incorporated*, Project Engineers
SOLMAX	SOLMAX Corporation
SPDES	State Pollutant Discharge Elimination System
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
sy	Square Yard
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Constituent List
TRI	TRI Environmental Inc.
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOC	Volatile Organic Compound

ASSOCIATED DOCUMENTS

Abbreviation:	Title:	Author:	Date:
Phase 1	Phase I Investigation	BBL	1985

Abbreviation:	Title:	Author:	Date:
---	Preliminary Site Assessment	NYSDEC	1990
RI/FS	Health and Safety Plan - Addendum #1 Remedial Investigation/Feasibility Study	BBL	10/95
Order	Administrative Order on Consent Index No. B6-0491-96-04	NYSDEC	10/26/93
RI	Remedial Investigation Report	BBL	10/94
IRM	Surface Water Interim Remedial Measures (Design)	BBL	10/94
IRM-DWG	IRM Contract Drawing	BBL	04/95
IRM O&M	IRM Operation & Maintenance Manual	BBL	04/95
RI/FS	Health and Safety Plan - Addendum #1 Remedial Investigation/Feasibility Study	BBL	10/95
SRI/FS	Supplemental Remedial Investigation Report/Feasibility Study	BBL	12/95
ROD	Record of Decision - Site No. 622003	NYSDEC	3/29/96
RD	Remedial Design Work Plan	BBL	11/97
RDS	Remedial Design Specifications	BBL	4/98
---	RDS-Appendix A - Minimum Requirements for Preparation of Plans	BBL	4/98
RDS-FSP	RDS-Appendix B - Remedial Action Field Sampling Plan	BBL	4/98
RDS-QAPP	RDS-Appendix C - Remedial Action Quality Assurance Project Plan	BBL	4/98
RDS-MP	RDS-Appendix D - Material and Performance Specification	BBL	4/98
---	RDS-Appendix E - SVE System Basis of Design	BBL	4/98
---	RDS-Appendix F - SVE Startup Procedures	BBL	4/98
RDS-AMP	RDS-Appendix G - Site-Specific Air Monitoring Plan	BBL	4/98
	RDS-Appendix H - Construction Quality Assurance		

Abbreviation:	**Title:**	**Author:**	**Date:**
RDS CQAP	Plan	BBL	4/98
RDS-HASP	RDS Health and Safety Plan for Remedial Action Activities	BBL	6/98
RDS-DWG	RDS Contract Drawings (Revised 6/98)	BBL	4/98
FER	Final Engineering Report (Final)	*SECOR*	8/01
---	FER-Appendix A - Construction Site Management Plan	*SECOR*	1/00
---	FER-Appendix B - Site-Specific Health and Safety Plan	*SECOR*	1/00
---	FER-Appendix C - Contract Submittals	*SECOR*	1/00
---	FER-Appendix D - Permits and Certificates	*SECOR*	1/00
---	FER-Appendix E - Analytical Data	*SECOR*	1/00
---	FER-Appendix F - Data Verification	*SECOR*	1/00
---	FER-Appendix G - Disposal Manifests and Weight Ship	*SECOR*	1/00
---	FER-Appendix H - Soil Compaction Data	*SECOR*	1/00
---	FER-Appendix I - Concrete Test Data	*SECOR*	1/00
---	FER-Appendix J - Correspondence with NYSDEC	*SECOR*	1/00
---	FER-Appendix K - Dust Monitoring Data	*SECOR*	1/00
---	FER-Appendix L - Vapor Monitoring Data	*SECOR*	1/00
---	As-Built Drawings (Final)	*SECOR*	8/01
OMM	Operation, Maintenance, & Monitoring Manual (Final)	*SECOR*	4/01

EXECUTIVE SUMMARY

This Final Engineering Report (FER) provides the information associated with implementation of the Remedial Action (RA) conducted at the former Chicago Pneumatic Tool Company (CP) site, located in Utica, New York, between May 1998 and December1999. The CP site is listed as a New York State Department of Environmental Conservation (NYSDEC) Inactive Hazardous Waste Site (Site No. 622003). The RA was implemented in accordance with the Administrative Order on Consent (Index No. B6-0491-96-04) entered into between CP and the NYSDEC, dated August 26, 1997. The selected RA was set forth in the NYSDEC Record of Decision (ROD), dated March 29, 1996.

Prior to the RA, interim remedial measures (IRM) were developed and implemented. In October 1994, an Engineering Report and Contract Drawings, were submitted to NYSDEC that proposed a surface water IRM and included the installation of two manhole pump stations; underground gravity drainage pipelines from the oil skimmer pond and a clay pipe to the manhole pump stations; transfer pipelines from the manhole pump stations to a low-profile air stripper located within the southeast corner of the former manufacturing building; and an underground effluent discharge pipeline. An air quality permit and a SPDES Permit Modification Application were also submitted to NYSDEC. On November 14, 1994, NYSDEC issued a Certificate to Operate (Number 6-2126-00004100049-0) for the air emission from the low-profile air stripper. On November 28, 1994, NYSDEC issued a modification to CP's existing SPDES permit for a new SPDES-permitted outfall designated as Outfall 03A for the treated water discharge from the low-profile air stripper. Construction of the surface water IRM began on January 16, 1995, and on March 2, 1995, the system was placed in full operation.

The RA included excavation with off-site disposal (948 cy) and on-site containment of soil and sediment (16,117 cy) from 14 identified areas of concern, and collection and treatment of groundwater, as further detailed in this FER. Implementation of the RA resulted in the remaining on-site Remedial Action Facility (RAF), which includes the groundwater collection trenches and treatment system, the containment cell, leachate collection manhole, leachate storage system, RAF building, perimeter site components, and groundwater monitoring wells.

The RA was completed in accordance with the Remedial Design Specifications (RDS), which included the RA Contract Drawings and Material Performance (MP) Specifications. This FER is supported by separately bound As-Build Drawings and Contract Drawings, and Appendices, which include performance and contractor submittals, and support data. Additionally, the FER is supported by an Operation, Maintenance, and Monitoring (OMM) Manual prepared to set forth guidance associated with maintaining the resulting RAF.

The RA was conducted by Danaher Corporation (Danaher). *SECOR International Inc. (SECOR)*, Syracuse, New York, was retained by Danaher to implement the RA Engineering and Construction Quality Assurance (CQA). AAA Environmental Inc. (AAA), Syracuse, New York, was retained as the primary construction contractor executing the RA.

Parratt-Wolff, Inc. (PW), East Syracuse, New York, provided material testing associated construction. LaFave, White, & McGivern L.S., P.C., Rome, New York, provided survey services. SOLMAX Corporation (SOLMAX), Quebec, Canada provided the installation and testing of geosynthetic materials and applied the geosynthetic clay liner (GCL) associated with construction of the containment cell. Excavated soil and sediment requiring off-site disposal as Toxic Substances Control Act (TSCA)-

regulated waste was shipped to Chemical Waste Management's solid waste landfill located in Model City, New York.

This FER is organized into sections corresponding to the associated RDS Work Task, as set forth in the RDS document. Each Work Task section details the associated RA activities conducted. The 12 RDS Work Tasks include the following:

- Work Task 1 - Pre-Remediation Activities;
- Work Task 2 - Soil Excavation;
- Work Task 3 - Sediment Removal;
- Work Task 4 - Pipe Cleaning/Replacement;
- Work Task 5 - Monitoring Well Abandonment;
- Work Task 6 - Temporary Water Treatment System;
- Work Task 7 - Soil/Sediment Disposal Requirements;
- Work Task 8 - Groundwater Collection Trenches;
- Work Task 9 - Miscellaneous Materials Handling/Site Security;
- Work Task 10 - Handling, Transportation, and Off-Site Disposal of Waste Materials;
- Work Task 11 - Site Restoration/Demobilization; and
- Work Task 12 - Standby Operations.

1.0 WORK TASK 1 - PRE-REMEDIATION ACTIVITIES

In accordance with the Remedial Design Specifications (RDS), the pre-remediation activities consisted of the following:

- Preparation and submittal of all required Contractor plans, drawings, and necessary submittal documentation by AAA Environmental, Inc. (AAA);
- A pre-remediation meeting held on site with Danaher Corporation (Danaher), *SECOR International Incorporated (SECOR)*, the New York State Department of Environmental Conservation (NYSDEC), and AAA on June 28, 1998. Daily and weekly project coordination meetings were held during Remedial Action (RA) implementation; and
- Mobilization/site preparation activities.

A description of each above identified activity is presented in the following subsections.

1.1 Contractor Submittals

As set forth in the RDS, 14 days following contract award, and at least seven days prior to scheduled mobilization, AAA submitted four copies of the following plans for review and approval by Danaher and *SECOR*:

- Site Management Plan;
- Site-Specific Health and Safety Plan (HASP);
- Remedial Action Contingency Plan;
- Erosion and Sedimentation Control Plan; and
- Decontamination Plan.

Subsequent to approval, a copy of the above plans was forwarded to the NYSDEC. The plans listed above are provided in Appendix A and B. AAA also provided four copies of the following information in submittal form to Danaher and *SECOR* for review and approval:

- Identification of names and addresses of proposed backfill sources and the type of backfill material to be obtained from each source;
- Proposed dust control measures to be implemented during the various phases of the remedial activities, including the location of potable water to be utilized; and
- Proposed vapor suppression measures and at least one alternate measure to be implemented during various phases of remedial activities.

Two 5-gallon bucket samples of each type of backfill were provided. For each type of backfill, samples were obtained from two different sources. The backfill samples were submitted to Galson Laboratories (Galson), of East Syracuse, New York, for analysis of the following parameters:

- Polychlorinated biphenyls (PCBs);
- Target constituent list (TCL) volatile constituents;
- TCL semi-volatile constituents;
- Target analyte list (TAL) inorganics;
- Sieve analysis in accordance with American Society for Testing and Materials (ASTM) D-422;
- Modified proctor compaction test (ASTM D 1557);
- Minimum/maximum relative density test in accordance with ASTM D 4253 and ASTM D 4254 for Types (2) and (3) select fill;
- Permeability test in accordance with ASTM D 2434 for Type (2) and (3) select fill; and
- Atterberg Limits in accordance with ASTM D 4318 for soil fill material, defined in Section Material and Performance (MP)-02222.

Dust control and vapor suppression were addressed in accordance with AAA's Site Management Plan. AAA was responsible to control the dust caused by the construction process and suppress vapor, as necessary and determined by *SECOR*. This is further described in Section 9.3.
AAA submitted the following information in addition to shop drawings and operation and maintenance information for any proposed equipment and materials for the temporary on-site water treatment system, soil vapor extraction (SVE) system, and containment cell;

- Design and operation specification;
- Theory of operation and functional diagrams;
- Recommended installation arrangement, locations, wiring criteria;
- Performance data and certification;
- Name, address, and phone number of a manufacturer's representative; and
- Other information as requested by *SECOR* for evaluation of substitute equipment and/or materials.

<u>Submittal Requirements</u>

The submittals were prepared in accordance with requirements set forth in the RDS, Appendix A - Minimum Requirements for Preparation of Plans. All required contract submittals were reviewed by

Danaher and *SECOR*. Comments on the submittals from *SECOR* were submitted in transmittal form to AAA. Copies of each accepted final submittal are provided in Appendix C. *SECOR* marked each submittal package, as appropriate, to indicate the following:

- "Reviewed and Accepted" if no objections were observed or comments made.
- "Reviewed and Accepted as Noted" if minor objections, comments, or additions were made, but resubmittal is not necessary.
- "Resubmit" if objections, comments, or additions were extensive. In this case, the submittal was revised and resubmitted.
- "Rejected" if the submittal did not comply, even with reasonable revision, with contract conditions. In this case, AAA was required to resubmit a new or modified submittal that achieved the scope and intent of the work specified in the contract within three working days of receiving the rejection on the original submittal.

AAA was permitted to perform any activity that directly or indirectly involved an item or items covered by a submittal until a "Reviewed and Accepted" or "Reviewed and Accepted as Noted" stamp was provided by *SECOR*. AAA submitted four final copies of all revised and/or accepted final submittals to *SECOR*. A Copy of the accepted submittal was forwarded to the NYSDEC.

1.1.1 Site Management Plan

A Site Management Plan was prepared and submitted by AAA on July 22, 1998. The site management plan provided a detailed approach to the RA, and included specific design information and work responsibilities for the implementation of each work task set forth in the RDS. The site management plan addressed the following RA work tasks:

- Work Task 1 - Pre-Remediation Activities;
- Work Task 2 - Soil Excavation;
- Work Task 3 - Sediment Removal;
- Work Task 4 - Pipe/Cleaning and Replacement;
- Work Task 5 - Monitoring Well Abandonment;
- Work Task 6 - Temporary Water Treatment System;
- Work Task 7 - Soil/Sediment Disposal;
- Work Task 8 - Groundwater Collection Trenches;
- Work Task 9 - Miscellaneous Material Handling/Site Security;

- Work Task10 - Handling, Transportation, and Off-Site Disposal of Waste Materials;
- Work Task 11 - Site Restoration/Demobilization; and
- Work Task 12 - Standby Operation.

The Site Management Plan is provided in Appendix A.

1.1.2 Site Specific Health and Safety Plan

On July 23, 1998, AAA submitted a site-specific HASP. The HASP was compared with minimum requirements for preparation of plans set forth in Appendix A of the RDS and the minimum federal requirements of Part 1910 of Title 29 of the Code of Federal Regulations (29 CFR 1910) and Part 1926 of Title 29 of the Code of Federal Regulations (29 CFR 1926) (which includes 29 CFR 1910.120 and 29 CFR 1926.65). The AAA HASP covered all personnel who were employed by AAA to perform work at the site, including direct employees as well as subcontractors. A copy of AAA's HASP is provided in Appendix B.

1.1.3 Contingency Plan

On July 23, 1998, AAA submitted to *SECOR* a Remedial Action Contingency Plan (Appendix B) that included, at a minimum, the following:

- A spill response plan for addressing spills that occur on site during remedial activities;
- A spill prevention control and countermeasures (SPCC) plan;
- A plan for addressing high water levels in the Unnamed Creek and on/off-site drainage ditches;
- A plan to address air quality exceedances during excavation of soils and sediments;
- Procedures and routes for emergency vehicular access/egress;
- Procedures for evacuating personnel from the site;
- A listing of all contact personnel with phone numbers, including: AAA; *SECOR*; the NYSDEC; fire officials; ambulance services; local, county, and State Police; and local Hospitals;
- Methods to contain gasoline/diesel fuel spills, if these fuels were brought on site; and
- Routes to local hospitals, including written directions and a map that depicted the location of the site relative to the hospital.

1.1.4 Erosion Control Plan

An Erosion and Sedimentation Control Plan (E&SC) was submitted on July 22, 1998, prior to AAA mobilizing to the site. The E&SC (Appendix A) described the measures implemented by AAA to prevent accelerated erosion during remedial activities. The E&SC consisted of the following:

- A detailed description of the erosion/sedimentation control structures (e.g., silt fence and hay bales) vegetative support measures used to control erosion and siltation for each stage of the project;
- A figure showing the location of erosion and sedimentation control measures;
- An implementation schedule for installing erosion and sedimentation control measures; and
- A maintenance schedule for erosion control measures.

The erosion and sediment control measures were installed in accordance with the RDS guidance, Contract Drawings and New York State Guide for Urban Erosion and Sediment Control and constructed prior to clearing and grubbing activities.

1.1.5 Decontamination Plan

A Decontamination Plan was submitted on July 22, 1998, prior to AAA mobilizing to the site. The Decontamination Plan (Appendix B) identified the appropriate procedures and methods that were employed to properly decontaminate project-related equipment and personnel. The plan addressed the generation, collection, and handling of solids, liquids, personal protective equipment (PPE), and other related wastes generated during remedial activities. Disposal of solids, liquids, and other materials generated during decontamination was conducted in accordance with the RDS.

All equipment taken off site by AAA required final visual inspection by SECOR. In general, the inspection area consisted of a bermed and lined pad with a low-permeability liner sloping to a sump. Each piece of equipment was observed by SECOR for any visible soil or other debris prior to removal of equipment from the site.

1.1.6 Temporary Water Treatment System

The final temporary water treatment system submittal was provided on August 12, 1998. This submittal is found in Section MP-11001 provided in Appendix C and reviewed further in Section 6.0. The submittal included the following:

<u>Shop Drawings</u>

The shop drawings detailed the following components:

- Equipment size, dimensions, and materials of construction;
- Piping connection size and types;
- Electrical wiring diagrams and schematics; and

- Elementary control diagrams.

Operation and Maintenance (OM) Manual

The OM manual included the following information:

- Mobilization, startup testing, normal operations, troubleshooting, and shutdown procedures;
- Preventative or routine maintenance requirements;
- Lubrication schedules;
- Recommenced spare parts list;
- Calibration and alignment information;
- Care and cleaning of surfaces; and
- Manufacturer's Operation and Maintenance (OM) Manuals.

1.1.7 Change Orders

The RA incurred 75 approved change orders, which are summarized in Table 1-1. Change order no. 1 was related to bonding requirements not included in the original contract agreement with AAA. Of the remaining 74 approved change orders, 70 are further discussed in corresponding sections of the FER identified in Table 1-1. As noted by the description and associated FER section number, the majority (80%) of these change orders are related to the difference between actual and specification assumed quantities, which did not affect the intent or design basis of the RA. The remaining four approved change orders (nos. 19, 30, 49, and 59) were related to minor incidental work that did not directly affect the RA. Although the Engineer approved these minor changes individually, they were grouped together on a monthly basis, under one change order, for administrative and contractual purposes.

1.2. Meetings

1.2.1 Pre-Remediation Meeting

On July 22, 1998, following contract award and prior to mobilization, a pre-remediation meeting was held at the site to introduce project team members representing Danaher, *SECOR*, AAA, and the NYSDEC. The meeting was conducted to review contract requirements, establish a detailed schedule of operations, and resolve issues raised by attending parties. AAA presented their Site Management Plan, Erosion and Sediment Control Plan, and Decontamination Plan during the site walkover. The HASP and Contingency Plan were submitted the next day.

The pre-remediation meeting minutes were summarized and distributed to the project team members in correspondence dated July 29, 1999.

1.2.2 Coordination Meetings

Daily and weekly project coordination meetings between AAA and *SECOR* were held at the site. Daily meetings were attended by AAA's on-site Project Supervisor and *SECOR's* Project Engineer to discuss day-to-day operations, schedule, health and safety items, weather, outstanding issues, and general status of the project. Weekly meetings were held to discuss issues including project status, schedule, scope of work, changes to the contract, and overall project implementation issues. Weekly meetings were periodically attended by NYSDEC.

1.3 Mobilization/Site Preparation Activities

Site mobilization and preparation activities were initiated by AAA and *SECOR* on July 23, 1999. AAA was responsible for the following site preparation activities:

- Coordinate with *SECOR* for access to on-site water and electrical service;

- Verification of existing site conditions and identification, marking, and verification of all aboveground and underground utilities, equipment, and structures;

- Installation of a visual and physical barrier around the base of the utility poles located within the east parking lot area and in the vicinity of remedial activities; and

- Mobilization of manpower, equipment, and materials to the site to implement remedial activities. Equipment that arrived on site was visually inspected by *SECOR*.

1.3.1 Office Trailers

AAA provided and maintained two mobile office trailers with access stairs; one for use by AAA and one for use by *SECOR*, Danaher, and the NYSDEC. The trailers were mobilized on July 26, 1998, and were anchored in place using manufacturer-supplied components. The trailer for *SECOR*, Danaher, and the NYSDEC was furnished with electric, heat, air conditioning, and two separate telephone connections. A portable electric generator was used to supply temporary electric service until construction electric service was established. Other related items as required in the RDS were furnished with the trailer for

SECOR. These items included:

- Two phone lines;
- Copy machine;
- Facsimile machine;
- Two file cabinets;
- Drafting table;
- Two desks;
- Eye wash station; and
- First aid kit.

Additionally, AAA provided and maintained portable sanitary services and a portable water supply for use by all personnel engaged in the RA. The trailers were centrally located east of the former foundry building to provide visibility to the majority of the RA areas.

1.3.2 Permits

AAA obtained the following permits to initiate the remedial activities:

- General Building Permit from Town of Frankfort;
- Water Permit from the Town of Frankfort for hydrant usage; and
- Permit from Oneida County Department of Water Quality and Pollution Control (OCWQPC) for discharging into the sanitary sewer.

The structural construction also required regulatory final inspections. Copies of the permits and acceptance inspection are provided in Appendix D.

1.3.3 Meteorological Station

On July 7, 1998, *SECOR* installed a Met One meteorological system in accordance with the requirements set forth in the site-specific Air Monitoring Plan included in the RDS, Appendix G. The meteorological system was used to measure and record wind speed, wind direction, and temperature. The system sensors were mounted on a 13.2 meter Rohn 25G galvanized steel communications structure. The wind speed and wind direction sensors were mounted at the 10-meter level; the temperature sensor was mounted at the 3-meter level. The meteorological system was grounded using a lightning protection system provided by the manufacture. Meteorological data was recorded at 15-minute intervals using a Campbell Scientific data logger. Meteorological data was documented daily by *SECOR* on daily construction reports, used to determine the site boundaries located upwind and downwind of remedial action work areas.

1.3.4 Erosion Control

AAA installed the appropriate soil erosion and sedimentation control measures (silt fence, hay bales, non-woven fabric) within the RA areas, as required. The silt fence was utilized to intercept runoff occurring from overland flow. The silt fence was installed in accordance with specific guidelines set forth in the New York Guidelines for Urban Erosion and Sediment Control. AAA provided additional erosion control, primarily in the drainage ditches, at the request of the NYSDEC and *SECOR*.

The silt fence was installed parallel to the ground surface contours and downgradient of any clearing, grading, or excavation activities. Contract Drawing G-10 identifies the approximate locations where a silt fence was installed.

Hay bale dikes wrapped in non-woven fabric were implemented to dissipate runoff velocity and provide filtration, minimizing downgradient migration of soil particles. Contract Drawing G-17 identifies the approximate locations where hay bale dikes were used. The non-woven wrapped bales were secured to grade by staking each bale with two wooden stakes.

The erosion control measures remained in place until restoration activities were complete.

1.3.5 Clearing and Grubbing

Clearing and grubbing activities were conducted between July 27 and July 29, 1998. Prior to initiating soil excavation activities, woody growth and surface vegetation were cleared from all remediation and construction areas. Prior to initiating clearing activities, all members of the clearing crew received site-specific training. The clearing contractor was responsible for the safe operation of the clearing equipment as well as the crew's adherence to the requirements of the site-specific HASP. Triple-S of Buffalo, New York, was contracted by AAA to perform the clearing and grubbing activities. All homogenized vegetation and tree stumps were staged separately from excavated soils prior to disposal as discussed further in Section 10.0. Clearing and grubbing is discussed below for each area.

<u>Areas 2, 3, 4, 5, and 6</u>

- Clearing abovegrade vegetation in the vicinity of Areas 2, 3, 4, 5, and 6 was achieved utilizing a gas-powered weed-eater. The vegetation in contact with the impacted sediment was not segregated for disposal. The vegetation in contact with impacted sediment was excavated and staged with the sediments for gravity dewatering, confirmation sampling, and disposal.

Areas 7, 8, 9, 10, and 13

- Clearing abovegrade vegetation in the vicinity of Areas 7, 8, 9, 10, and 13 was achieved utilizing a track drive all-terrain vehicle equipped with an industrial mower deck. This method homogenized woody growth and surface vegetation in place, minimizing the volume of vegetation requiring off-site disposal.

Areas 1, 11, 12, and 14

- Clearing abovegrade vegetation in the vicinity of Areas 1, 11, 12, and 14 was achieved by utilizing a track driven all terrain vehicle with an industrial mower deck. This method homogenized woody growth and surface vegetation in place, minimizing the volume of vegetation requiring off-site disposal. Clearing activities in Area 1 consisted of developing access points approximately 30 feet across at intervals of less than 100 feet, in order to maintain the stability and integrity of the creek banks. Clearing and access to Areas 11, 12, and 14 followed the existing terrain, which served as a temporary construction haul road.

Footprint of the Containment Cell

- Existing piles of debris (concrete, asphalt and gravel) located in the footprint of the containment cell were moved by AAA to the west side of the East Lot parking area.

- Clearing abovegrade vegetation (i.e., trees greater than 6 inches in diameter) in the vicinity of the containment cell was achieved by utilizing a rubber tire Hydro-Axe. This method removed and segregated the trees for on-site chipping and staging separately. Tree stumps and root debris were unearthed and staged separately from soils for future disposal.

Clearing the site for construction also included removal of other large objects. This involved the relocation of large granite test blocks, located within Area 9. Several sections of chain link fence required dismantling and disposal.

1.4 Tables

1-1 Change Order Summary

Insert Table 1-1 Change Order Summary Page 2

2.0 WORK TASK 2 - SOIL EXCAVATION

The soil excavation activities consisted of soil excavation at the following seven RA areas:

- Chip Chute (Areas 2 and 3);
- Debris Landfill (Areas 9 and 10);
- Separation Ponds (Areas 7 and 8); and
- East Lot (Area 13).

The excavated soil was placed within a bermed and lined staging area for gravity dewatering and confirmation sampling prior to final disposal under one of the NYSDEC-approved methods outlined in Section 7.0. The horizontal extent of the excavated soil areas is presented on As-Built Drawing G2. The RDS anticipated versus the RA actual soil waste volume excavated at each area is summarized in Table 2-1, provided at the end of this section.

2.1 Pre-Excavation Activities

Pre-excavation activities were conducted prior to initiating soil removal activities in each of the areas. Pre-excavation activities included:

- Pre-excavation verification sampling;
- Establishment of exclusion zones;
- Field verification of utilities;
- Removal of railroad tracks in Area 2 and 3;
- Installation of a temporary vapor barrier along the perimeter of the loading dock in Areas 2 and 3, as well as notification to the occupants;
- Clearing of brush, trees, and surface vegetation;
- Relocation of granite test blocks from Areas 9 and 10;
- Establishment of erosion control measures;
- Abandonment of monitoring wells; and
- Relocation of other material (i.e., asphalt, fencing, etc.).

Areas 2 and 3

Erosion control measures were established around Areas 2 and 3 and at the upstream intersection of the adjacent drainage ditch (Area 4). Erosion control included hay bales wrapped in non-woven geotextile fabric placed to intercept and collect fine sand and silt particles potentially released during excavation activities.

An exclusion zone was established around Areas 2 and 3 that consisted of construction of a vapor barrier along the perimeter of the loading dock to minimize the potential for vapor and dust exposure to building tenants. Personnel working within the building and in the immediate area of the excavation were notified and diverted during excavation.

The locations of all utilities were verified in the field. The excavation was advanced with hand tools in areas suspected of containing utility lines. Utilities encountered in Areas 2 and 3 included a 4-inch diameter gas pipe, a 8-inch diameter water main for fire protection pipe, underground electrical (located near the foundry building), the storm sewer pipes, and other miscellaneous pipes into the manufacturing building. Engineering supports and bracing were used to secure the utility lines during excavation activities.

The railroad tracks located in the vicinity of Area 2 and 3 were dismantled, cut, and staged. The cut sections of rails and railroad ties were staged separately from the excavated soil to permit characterization prior to disposal (see Section 10.0 for disposal).

Areas 7, 8, 9, 10, and 13

Pre-excavation verification soil sampling was conducted in Areas 7, 8, 9, and 10 in accordance with the procedures identified in the RDS, Appendix B - Sampling and Analysis Plan (SAP). Following the completion of the pre-excavation verification soil sampling activities, the horizontal limits of the excavations were established from analytical data, and staked to define the excavation perimeter.

Brush, trees, and other surface vegetation were cleared, as necessary, to allow excavation of soils. Abovegrade portions of trees and brush were cut and staged separately from the excavated soils prior to disposal (see Section 10.0 for disposal).

The granite testing blocks located in the vicinity of Areas 9 and 10 were relocated to the former tank farm area in the southwest portion of the site.

Monitoring wells MW-1 (Area 10) and MW-5 (Area 13) were abandoned in accordance with Work Task 5 (described in Section 5.0).

2.1.1 Pre-Excavation Verification Sampling

Pre-excavation verification soil sampling was conducted between June 9 and June 12, 1998, in accordance with procedures set forth in the RDS and FSP. Verification sampling was conducted in Area 7 (former separation ponds) and Area 9 (former debris landfill) to verify the horizontal limits of the proposed excavation perimeter. The final acceptable in-field verification sample locations for Area 7 and

Area 9 are shown on Figures 2-1 and 2-2, respectively. In summary, the Area 9 excavation perimeter remained very close to that set forth in the RDS. The Area 7 excavation perimeter was modified based on visual observations, field screening, and analytical verification sample data. Note that Area 8 was within the perimeter of Area 7 and Area 10 was within the perimeter of Area 9; therefore, verification sampling of Areas 8 and 10 was not required. Table 2-2 and 2-3 summarize the pre excavation verification soil sample results for Area 7 and 9, respectively. The tables and figures are provided at the end of this section.

Information resulting from the pre-excavation verification-sampling program was submitted to the NYSDEC in a letter dated July 6, 1998. A copy of the letter is provided in Appendix J. The sampling process, analytical results, and definition of the modified areas are summarized in the following section.

As part of the pre-excavation verification-sampling program, Geoprobe soil borings were advanced, as follows:

- Around the anticipated excavation perimeter of Area 7 and Area 9;
- At locations 2 feet radially outward from the anticipated perimeter of each excavation area;
- At locations 4 feet radially outward from the anticipated perimeter of each excavation area; and
- At locations some distance radially outward from the anticipated perimeter of each area determined by the construction quality assurance (CQA) personnel, based on either visual and/or photoionization detector (PID) field screening.

The Geoprobe soil boring locations were marked in the field with wooden stakes along the anticipated perimeter of each area in accordance with the FSP (one verification sample per 100 linear feet). Geoprobe soil borings were performed by Parratt-Wolff, Inc., (PW) of East Syracuse, New York, using a track driven rig equipped with a Geoprobe sampling device. Soil samples were collected using a nominal 2-inch inside diameter by 2-foot long standard split spoon. Split spoons were decontaminated with Alconox solution followed by a distilled water rinse, 10 percent nitric acid rinse, distilled water rinse, hexane rinse, methanol rinse, and a distilled water rinse. Rinse water generated during pre-excavation sampling was placed in a 1,000-gallon polyethylene tank for future disposal in the on-site temporary water treatment system.

Soil samples were classified on site for:

- Soil color;
- Composition;
- Moisture content; and
- Any indications of impact (oil, staining, odor).

Field screening included the use of a PID to determine the presence of volatile organic compounds (VOCs) in soil headspace. One verification soil sample was collected for analytical laboratory verification at each perimeter sample location at the predetermined depth interval where the highest concentration of constituents were previously detected during the RI or the SRI, as set forth in the FSP. The samples were placed in the laboratory-provided glassware. Galson of East Syracuse, New York, performed the laboratory analysis.

Soil samples were submitted for laboratory analysis or laboratory archive, as follows:

- One sample from each location at the anticipated perimeter of the excavation area was submitted for laboratory analysis for the constituents of concern identified for that area, as set forth in the FSP; and

- The samples from each location, advanced 2 feet, 4 feet, or some distance radially out from the anticipated limits of the excavation, were submitted to the laboratory; however, they were archived, pending analysis. These samples were released for analysis only when the initial perimeter sample did not meet the cleanup objectives. The archived samples were released in a phased approach until analytical data indicated cleanup objectives were met.

Verification soil samples selected for laboratory analysis from Areas 7 and 9 were analyzed for metals of concern (chromium, copper, lead, and zinc) using United States Environmental Protection Agency (USEPA) SW-846 6010/7000 Series Methods. Verification soil samples collected for laboratory analysis from Area 7 also were analyzed for VOCs of concern [cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2 dichloroethene (trans-1,2-DCE), and vinyl chloride (VC)] using USEPA SW-846 Method 8260. Verification soil samples from Area 9 also were analyzed for PCBs using USEPA SW-846 Method 8082.

Based on the analytical results of the verification sampling, the confirmed Area 7 and Area 9 perimeter was determined, as shown on Figures 2-2 and 2-3. Table 2-2 and Table 2-3 present the analytical results for the verification soil samples for Areas 7 and 9, respectively. The Galson analytical laboratory results are provided in Appendix E.

Prior to initiating drilling/boring activities, the existence and location of underground pipe, electrical equipment, and gas lines were determined. All members of the drilling team received site-specific training prior to beginning work, as per the HASP. The driller was ultimately responsible for the safe operation of the drill rig, as well as the crew's adherence to the requirements the site-specific HASP. Drilling conducted in the vicinity of Areas 9 and 10 was accomplished by positioning drill rig such that no part, including cables, came within minimum clearances of 15 feet horizontal and 15 feet vertical of the highest tension power lines, which Niagara Mohawk Power Corporation determined was acceptable, for 101-200 kV system voltage.

2.1.1.1 Area 7

In general, the soil profile in Area 7 consisted of brown, medium to fine sand, little gravel, grading to dark brown to gray, medium to fine sand and silt at approximately 3.5 feet below ground surface (bgs). The soil samples were generally tight and ranged from damp to moist.

Based on the analytical results of the verification perimeter soil-sampling program conducted in Area 7, the north perimeter was confirmed, as set forth in the RDS. The east, south, and west anticipated perimeters were modified based on the analytical verification data. The final Area 7 modified perimeter is shown on Figure 2-2. The analytical verification data are summarized in Table 2-2. The sampling, verification, and perimeter adjustment for the four aforementioned sides are described in detail below.

North Perimeter

As set forth in the FSP, two verification soil borings (VA7-1N and VA7-2N) were advanced and one soil sample from each was collected on either side of the north perimeter of Area 7. Seven additional soil borings were advanced north of VA7-2N (VA7-2Na through VA7-2Ng). Six additional soil borings were advanced north of VA7-1N (VA7-1Na through VA7-1Nf).

Soil samples obtained from VA7-1N through VA7-1Nb and VA7-2N through VA7-2Nb exhibited soil-staining, odors, and elevated PID headspace readings (> 10 parts per million [ppm]). Based on the guidance set forth in the FSP, these samples were assumed to exceed VOC limits; therefore, were not submitted to the laboratory for analysis. Soil sample VA7-1Nc and VA7-2Nc were analyzed as a verification sample for the north perimeter.

The soil samples were collected between 3 and 5 feet bgs, as set forth in the FSP, with the exception of VA7-2Nc, which was collected between 5 and 6 feet bgs to remain consistent with the sample profile collected at other locations and targeted for analysis. Area 7 perimeter verification soil sample VA7-2Nc was targeted for metals analysis. Area 7 perimeter verification soil sample VA7-1Nc was targeted for metals and VOC analysis because it bordered Area 8.

The analytical results indicate that the concentrations of target metals in sample VA7-2Nc and target metals and VOCs in sample VA7-1Nc was below the site-specific cleanup objectives established by the NYSDEC for the Site. Figure 2-2 shows the confirmed Area 7 north perimeter based on the verification samples.

The table below summarizes the verification sample information for the Area 7 north perimeter:

Sample ID	**Depth (feet)**	**Sample Location**	**Analysis**	**Results**
VA7-1N	3 - 5	6' south of VA7-Inc	Not Analyzed	NA
VA7-1Na	3 - 5	4' south of VA7-1Nc	Not Analyzed	NA
VA7-1Nb	3 - 5	2' south of VA7-1Nc	Not Analyzed	NA
VA7-1Nc	3 - 5	On anticipated north perimeter	Target Metals and VOCs	< Cleanup Objectives See Table 2-2
VA7-1Nd	3 - 5	2' north of VA7-1Nc	Not Analyzed	Archived
VA7-1Ne	3 - 5	4' north of VA7-1Nc	Not Analyzed	Archived
VA7-1Nf	3 - 5	6' north of VA7-1Nc	Not Analyzed	Archived
VA7-2N	3 - 5	6' south of VA7-2Nc	Not Analyzed	NA
VA7-2Na	3 - 5	4' south of VA7-2N	Not Analyzed	NA
VA7-2Nb	5 - 7	2' south of VA7-2Nc	Not Analyzed	NA
VA7-2Nc	5 - 6	On anticipated north perimeter	Target Metals	< Cleanup Objectives See Table 2-2
VA7-2Nd	3 - 5	2' north of VA7-2Nc	Not Analyzed	Archived
VA7-2Ne	3 - 5	4' north of VA7-2Nc	Not Analyzed	Archived
VA7-2Nf	3 - 5	6' north of VA7-2Nc	Not Analyzed	Archived

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA7-2Ng	3 - 5	8' north of VA7-2Nc	Not Analyzed	Archived

East Perimeter

As set forth in the FSP, one verification soil boring (VA7-1E) was advanced and one soil sample was collected along the anticipated east perimeter of Area 7. Three additional soil borings were advanced east of VA7-1E (VA7-1Ea through VA7-1Ec) and soil samples were archived at the laboratory.

The soil samples were collected between 3 and 5 feet, as set forth in the FSP, with the exception of VA7-1Eb, which was collected between 5 and 7 feet to remain consistent with the soil type targeted in the FSP. Area 7 east perimeter verification soil sample VA7-1E was targeted for metals analysis.

The analytical results confirm the concentrations of target metals in sample VA7-1E are below the site-specific cleanup objectives established by the NYSDEC for the Site.

Based on review of the RI data relative to the delineation of Areas 7 and 8, modified verification sample locations were targeted to further define the Area 7 east perimeter. Two soil borings (VA7-1E-W1 [archived] and VA7-1E-W2 [analyzed]) were advanced west of VA7-1E. The Area 7 modified perimeter verification soil sample VA7-1E-W2 was targeted for metals analysis.

The analytical results confirm the concentrations of target metals in sample VA7-1E-W2 were below the site-specific cleanup objectives established by the NYSDEC for the Site. Figure 2-2 shows the modified Area 7 east perimeter based on the verification samples.

The table on the next page summarizes the verification sample information for the Area 7 east perimeter:

Sample ID	Depth (Feet)	Verification Sample Location	Analysis	Results
VA7-1E	3 - 5	On anticipated east perimeter	Target Metals	< Cleanup Objectives See Table 2-2
VA7-1Ea	3 - 5	2' east of VA7-1E	Not Analyzed	Archived
VA7-1Eb	5 - 7	4' east of VA7-1E	Not Analyzed	Archived
VA7-1Ec	3 - 5	6' east of VA7-1E	Not Analyzed	Archived
VA7-1E-W1	3 - 5	10' west of VA7-1E	Not Analyzed	Archived
VA7-1E-W2	3 - 5	15' west of VA7-1E	Target Metals	< Cleanup Objectives See Table 2-2

South Perimeter

As set forth in the FSP, two verification soil borings (VA7-1S and VA7-2S) were advanced and one soil sample from each was collected along the anticipated south perimeter of Area 7. Three additional soil borings were advanced south of VA7-1S (VA7-1Sa through VA7-1Sc) and south of VA7-2S (VA7-2Sa through VA7-2Sc), and soil samples were archived at the laboratory.

The soil samples were collected between 3 and 5 feet bgs, as set forth in the FSP, with the exception of VA7-2Sa, VA7-2Sb, VA7-2Sc, and VA7-1S, which were collected between 5 and 6 feet bgs to remain consistent with soil type targeted. Area 7 perimeter verification soil sample VA7-2S was targeted for metals analysis. Area 7 perimeter verification soil sample VA7-1S was targeted for metals and VOC analysis because it bordered Area 8.

The analytical results confirm the concentrations of target metals in sample VA7-1S and VA7-2S are below the site-specific cleanup objectives established by the NYSDEC for the Site.

Based on review of the RI and SRI data relative to the delineation of Areas 7 and 8, modified sample locations were targeted to further define the Area 7 south perimeter. Three soil borings (VA7-2S-N1 [archived], VA7-2S-N2 [archived], and VA7-2S-N3 [analyzed]) were advanced north of VA7-2S. One soil boring (VA7-1S-N1 [analyzed]) was advanced north of VA7-1S.

The Area 7 modified perimeter verification soil sample VA7-2S-N3 was targeted for metals analysis. The Area 7 modified perimeter verification soil sample VA7-1S-N1 was targeted for metals and VOCs, because it was within the anticipated limits of Area 8.

The analytical results indicate that the concentrations of target metals in sample VA7-2S-N3, and target metals and VOCs in sample VA7-1S-N1 are below the site-specific cleanup objectives established by the NYSDEC for the Site. Figure 2-2 shows the modified Area 7 east perimeter based on the verification samples.

The table below summarizes the verification sample information for the Area 7 south perimeter:

Sample ID	Depth (Feet)	Sample Location	Analysis	Results
VA7-1S	5 - 7	On anticipated south perimeter	Target Metals and VOCs	< Cleanup Objectives See Table 2-2
VA7-1Sa	3 - 5	2' south of VA7-1S	Not Analyzed	Archived
VA7-1Sb	3 - 5	4' south of VA7-1S	Not Analyzed	Archived
VA7-1Sc	3 - 5	6' south of VA7-1S	Not Analyzed	Archived
VA7-2S	3 - 5	On anticipated south perimeter	Target Metals	< Cleanup Objectives SeeTable 2-2
VA7-2Sa	5 - 6	2' south of VA7-2S	Not Analyzed	Archived
VA7-2Sb	5 - 6	4' south of VA7-2S	Not Analyzed	Archived
VA7-2Sc	5 - 6	6' south of VA7-2S	Not Analyzed	Archived
VA7-2S-N1	3 - 5	10' north of VA7-2S	Not Analyzed	Archived
VA7-2S-N2	3 - 5	15' north of VA7-2S	Not Analyzed	Archived

Sample ID	Depth (Feet)	Sample Location	Analysis	Results
VA7-2S-N3	3 - 5	20' north of VA7-2S	Target Metals	< Cleanup Objectives See Table 2-2
VA7-1S-N1	3 - 5	5' north of VA7-1S	Target Metals and	< Cleanup Objectives See Table 2-2

West Perimeter

As set forth in the FSP, one verification soil boring (VA7-1W) was advanced and one soil sample was collected along the anticipated west perimeter of Area 7. Fourteen additional soil borings were advanced west of VA7-1W (VA7-1Wa through VA7-1Wn). One soil sample was collected per boring at depths between 3 and 5 feet bgs, as set forth in the FSP.

Soil borings VA7-1W through VA7-1Wk exhibited soil staining, odors, and elevated PID headspace readings (> 100 ppm). Based on the guidance set forth in the FSP, samples VA7-1W through VA7-1Wk were not submitted to the laboratory for analysis. Area 7 west perimeter verification soil sample VA7-1Wl was targeted for metals and VOC analysis. The analytical results indicate that the concentrations of VOCs in sample VA7-1Wl are below the site-specific cleanup objectives established by the NYSDEC for the Site; however, the concentration of copper was over the site-specific cleanup objective. Therefore, verification sample VA7-1Wm was released for metals analysis at the laboratory. The analytical results indicate that the concentrations of targeted metals in sample VA7-1Wm were below the site-specific cleanup objectives established by the NYSDEC for the Site.

Based on the verification sample results for VA7-1Wm (approximately 48 feet from the anticipated west perimeter) and based on a review of the RI and SRI data relative to the delineation of Areas 7 and 8, modified sample locations were selected to further delineate the west perimeter of Area 7. Three soil borings (VA7-1We-S1 [analyzed], VA7-1We-S2 [archived], and VA7-1We-S3 [archived]) were advanced south of VA7-1We (10 feet west of the anticipated west perimeter). Three soil borings (VA7-1We-N1 [analyzed], VA7-1We-N2 [analyzed], and VA7-1We-N3 [archived]) were advanced north of VA7-1We. One soil boring (VA7-1Wf2 [analyzed]) was advanced west of VA7-1We. Soil sample VA7-1Wf2 exhibited soil-staining, odors, and elevated PID headspace readings (> 10 ppm). This sample was analyzed to determine if the additional soil in the expanded perimeter area is targeted for the SVE cell or general waste cell.

The Area 7 modified perimeter verification soil samples VA7-1We-S1, VA7-1Wf2, VA7-1We-N1, and VA7-1We-N2 were targeted for metals and VOC analysis.

The analytical results indicate that the concentrations of target metals and VOCs in samples VA7-1We-S1, VA7-1Wf2, and VA7-1We-N2 were below the site-specific cleanup objectives established by the NYSDEC for the Site.

The table below summarizes the verification sample information for the Area 7 west perimeter:

Sample ID	Depth (Feet)	Sample Location	Analysis	Results
VA7-1W	3 - 5	On anticipated west perimeter	Not Analyzed	Headspace >10 ppm
VA7-1Wa	3 - 5	2' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wb	3 - 5	4' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wc	3 - 5	6' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wd	3 - 5	8' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1We	3 - 5	12' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wf	3 - 5	16' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wg	3 - 5	20' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wh	3 - 5	26' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wi	3 - 5	34' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wj	3 - 5	42' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wk	3 - 5	44' west of VA7-1W	Not Analyzed	Headspace >10 ppm
VA7-1Wl	3 - 5	46' west of VA7-1W	Target Metals and VOCs	Copper > 40 ppm See Table 2-2
VA7-1Wm	3 - 5	48' west of VA7-1W	Target Metals	< Cleanup Objectives See Table 2-2
VA7-1Wn	3 - 5	50' west of VA7-1W	Not Analyzed	Archived
VA7-1We-S1	3 - 5	4' south of VA7-1We	Target Metals and VOCs	< Cleanup Objectives See Table 2-2
VA7-1We-S2	3 - 5	12' south of VA7-1We	Target Metals and VOCs	< Cleanup Objectives See Table 2-2
VA7-1We-S3	3 - 5	24' south of VA7-1We	Not Analyzed	Archived
VA7-1We-N1	3 - 5	13' north of VA7-1We	Target Metals and VOCs	Copper > 40 ppm See Table 2-2
VA7-1We-N2	3 - 5	26' north of VA7-1We	Target Metals	< Cleanup Objectives See Table 2-2
VA7-1Wf2	3 - 5	4' west of VA7-1We	Target Metals and VOCs	< Cleanup Objectives See Table 2-2

2.1.1.2 Area 9

Based on the analytical results of the verification perimeter soil-sampling program conducted in Area 9, the west and south perimeters were confirmed as set forth in the FSP and RD Specifications. The east and north perimeters were modified based on the analytical verification data. The final Area 9 modified perimeter is shown on Figure 2-3. The analytical data are summarized in Table 2-3. Note that Area 10 is within the perimeter of Area 9; therefore, separate sampling was not required for Area 10. The sampling, verification, and subsequent perimeter adjustment for the four sides are described in detail below.

<u>North Perimeter</u>

As set forth in the FSP, three verification soil borings (VA9-1N, VA9-2N, and VA9-3N) were advanced and one soil sample from each was collected along the anticipated south perimeter of Area 9. Three additional soil borings were advanced north of VA9-1N (VA9-1Na through VA9-1Nc), VA9-2N (VA9-2Na through VA9-2Nc), and VA9-3N (VA9-3Na through VA9-3Nc), and soil samples were archived. The soil samples were collected between 4 and 6 feet bgs, as set forth in the FSP. Area 9 north perimeter verification soil samples VA9-1N, VA9-2N, and VA9-3N were targeted for metals and PCBs analysis.

The analytical results indicate that the concentrations of target PCBs in samples VA9-1N, VA9-2N and VA9-3N are below the site-specific cleanup objectives established by the NYSDEC for the Site. The analytical results indicate that the concentrations of one metal in samples VA9-1N (copper), VA9-2N (copper), and VA9-3N (zinc) were above site-specific cleanup objectives established by the NYSDEC for the Site.

Based on the guidelines set forth in the FSP, the archived soil samples (VA9-1Na, VA9-2Na, and VA9-3Na), collected 2 feet radially outward from the anticipated north perimeter of Area 9, were targeted for metals analysis. The results indicated that the concentrations of target metals in sample VA9-1Na were below the site-specific cleanup objectives. The analytical results indicate that the concentrations of copper in samples VA9-2Na and VA9-3Na were above the cleanup objectives. The archived soil samples (VA9-2Nb and VA9-3Nb) collected 4 feet radially outward from the anticipated north perimeter of Area 9 were targeted for metals analysis. The results indicated that the concentrations of target metals in sample VA9-2Nb and VA9-3Nb were below the site-specific cleanup objectives. The modified perimeter is shown on Figure 2-3.

The table below summarizes the verification sample information for the Area 9 north perimeter:

Sample ID	**Depth (Feet)**	**Sample Location**	**Analysis**	**Results**
VA9-1N	4 - 6	On anticipated north perimeter	Target Metals and PCBs	Copper > 40 ppm See Table 2-3
VA9-1Na	4 - 6	2' north of VA9-1N	Target Metals and PCBs	< Cleanup Objectives See Table 2-3
VA9-1Nb	4 - 6	4' north of VA9-1N	Not Analyzed	Archived
VA9-1Nc	4 - 6	6' north of VA9-1N	Not Analyzed	Archived
VA9-2N	4 - 6	On anticipated north perimeter	Target Metals and PCBs	Copper > 40 ppm See Table 2-3
VA9-2Na	4 - 6	2' north of VA9-2N	Target Metals	Copper > 40 ppm See Table 2-3
VA9-2Nb	4 - 6	4' north of VA9-2N	Target Metals	< Cleanup Objectives See Table 2-3
VA9-2Nc	4 - 6	6' north of VA9-2N	Target Metals	< Cleanup Objectives See Table 2-3
VA9-3N	4 - 6	On anticipated north perimeter	Target Metals and PCBs	Zinc > 100 ppm See Table 2-3
VA9-3Na	4 - 6	2' north of VA9-3N	Target Metals	Copper > 40 ppm See Table 2-3
VA9-3Nb	4 - 6	4' north of VA9-3N	Target Metals	< Cleanup Objectives See Table 2-3
VA9-3Nc	4 - 6	6' north of VA9-3N	Target Metals	< Cleanup Objectives See Table 2-3

East Perimeter

As set forth in the FSP, two verification soil borings (VA9-2E and VA9-1E) were advanced and one soil sample from each was collected along the anticipated north perimeter of Area 9. Three additional soil borings were advanced east of VA9-2E (VA9-2Ea through VA9-2Ec), and soil samples were archived. Four additional soil borings were advanced east of VA9-1E (VA9-1Ea through VA9-1Ed) and soil samples were archived. In general, the soil profile consisted of moist, brown, medium to fine sand, some silt, little gravel to dark brown to gray, medium to fine sand at approximately 3.5 feet bgs. The soil samples were collected between 4 and 6 feet bgs, as set forth in the FSP.

Soil boring VA9-1E and VA9-2E exhibited soil-staining, odors, and elevated PID headspace readings (> 10 ppm). Based on the guidance set forth in the FSP, these samples were assumed to be in exceedance and not submitted to the laboratory for analysis. Area 9 east perimeter verification soil samples VA9-2Ea and VA9-1Ea were targeted for metals and PCBs analysis. The analytical results indicate that the concentrations of target metals and PCBs in samples VA9-2Ea and VA9-1Ea were below the site-specific cleanup objectives established by the NYSDEC for the Site.

The table below summarizes the verification sample information for the Area 9 east perimeter:

Sample ID	**Depth (Feet)**	**Sample Location**	**Analysis**	**Results**
VA9-1E	4 - 6	On anticipated east perimeter	Not Analyzed	NA
VA9-1Ea	4 - 6	2' east of VA9-1E	Target Metals and PCBs	< Cleanup Objectives See Table 2-3
VA9-1Eb	4 - 6	4' east of VA9-1E	Not Analyzed	Archived
VA9-1Ec	4 - 6	6' east of VA9-1E	Not Analyzed	Archived
VA9-1Ed	4 - 6	8' east of VA9-1E	Not Analyzed	Archived
VA9-2E	4 - 6	On anticipated east perimeter	No Sample Recovery	NA
VA9-2Ea	4 - 6	2' east of VA9-2E	Target Metals and PCBs	<Cleanup Objectives See Table 2-3
VA9-2Eb	4 - 6	4' east of VA9-2E	Not Analyzed	Archived
VA9-2Ec	4 - 6	6' east of VA9-2E	Not Analyzed	Archived

South Perimeter

As set forth in the FSP, three verification soil borings (VA9-1S, VA9-2S, and VA9-3S) were advanced and one soil sample from each was collected along the anticipated south perimeter of Area 9. Three additional soil borings were advanced south of VA9-1S (VA9-1Sa through VA9-1Sc), VA9-2S (VA9-2Sa through VA9-2Sc), and VA9-3S (VA9-3Sa through VA9-3Sc), and soil samples were archived.

The soil samples were collected between 4 and 6 feet bgs, as set forth in the FSP. Area 9 south perimeter verification soil samples VA9-1S, VA9-2S and VA9-3S were targeted for metals and PCBs analysis. The analytical results indicate that the concentrations of target metals and PCBs in samples VA9-1S, VA9-2S, and VA9-3S were below the site-specific cleanup objectives established by the NYSDEC for the Site. The table below summarizes the verification sample information for the Area 9 south perimeter:

Sample ID	Depth (Feet)	Sample Location	Analysis	Results
VA9-1S	4 - 6	On anticipated south perimeter	Target Metals and PCBs	< Cleanup Objectives See Table 2-3
VA9-1Sa	4 - 6	2' south of VA9-1S	Not Analyzed	Archived
VA9-1Sb	4 - 6	4' south of VA9-1S	Not Analyzed	Archived
VA9-1Sc	4 - 6	6' south of VA9-1S	Not Analyzed	Archived
VA9-2S	4 - 6	On anticipated south perimeter	Target Metals and PCBs	< Cleanup Objectives See Table 2-3
VA9-2Sa	4 - 6	2' south of VA9-2S	Not Analyzed	Archived
VA9-2Sb	4 - 6	4' south of VA9-2S	Not Analyzed	Archived
VA9-2Sc	4 - 6	6' south of VA9-2S	Not Analyzed	Archived
VA9-3S	4 - 6	On anticipated south perimeter	Target Metals and PCBs	< Cleanup Objectives See Table 2-3
VA9-3Sa	4 - 6	2' south of VA9-3S	Not Analyzed	Archived
VA9-3Sb	4 - 6	4' south of VA9-3S	Not Analyzed	Archived
VA9-3Sc	4 - 6	6' south of VA9-3S	Not Analyzed	Archived

West Perimeter

As set forth in the FSP, one verification soil boring (VA9-1W) was advanced and one soil sample was collected along the anticipated west perimeter of Area 9. Four additional soil borings were advanced west of VA9-1W (VA9-1Wa through VA9-1Wd), and soil samples were archived.

The soil samples were collected between 4 and 6 feet bgs, as set forth in the FSP, with the exception of VA9-1Wc, where a sample was not collected due to poor soil volume recovery. Area 9 west perimeter verification soil sample VA9-1W was targeted for metals and PCBs analysis. The analytical results indicate that the concentrations of target metals and PCBs in sample VA9-1W were below the site-specific cleanup objectives established by the NYSDEC for the Site.

The table below summarizes the verification sample information for the Area 9 west perimeter:

Sample ID	Depth (Feet)	Sample Location	Analysis	Results
VA9-1W	4 - 6	On anticipated west perimeter	Target Metals and PCBs	< Cleanup Objectives See Table 2-3
VA9-1Wa	4 - 6	2' west of VA9-1W	Not Analyzed	Archived
VA9-1Wb	4 - 6	4' west of VA9-1W	Not Analyzed	Archived
VA9-1Wc	4 - 6	6' west of VA9-1W	No Recovery	NA
VA9-1Wd	4 - 6	8' west of VA9-1W	Not Analyzed	Archived

2.2 Soil Removal

The soil removal activities consisted of excavating impacted soil from Areas 2, 3, 7, 8, 9, 10, and 13 to the limits shown on As-Built Drawing G2 and in accordance with the RDS and methods outlined in AAA's Site Management Plan. The excavated soil was placed within a bermed and lined staging area for gravity dewatering and confirmation sampling prior to final disposal under one of the NYSDEC-approved methods outlined under RDS Work Tasks 7, 9, and 10. In general, the vertical limits of the excavations were determined in the field, based on field measurements of the excavation depth and confirmation that the excavations were advanced to the top of till. The horizontal limits were determined, based on the verification samples collected and analyzed in accordance with the RDS FSP. The horizontal limits of the soil excavation were physically marked in the field and subsequently surveyed. As-Built Drawing G2 illustrates the final horizontal limits. Table 2-1 reports the anticipated, modified, and final soil volumes excavated from each area.

2.2.1 Excavation

All excavation activities were conducted in accordance with Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1926 Subpart P (Excavations). Excavation of Areas 7 and 9 was performed utilizing alternative methods to the proposed sheet piling, which was described in the RDS. Review of test pits, geological logs, soil borings, and monitoring wells in the vicinity of excavation Areas 7 and 9 indicated that slope stability could be managed without the use of sheet piles. The soil type was determined to be Type A and the maximum allowable slope for excavations 20 feet or less in depth is 3/4:1, which provided the excavation guidance for Areas 7 and 9.

Prior to initiating soil excavation activities, *SECOR* met with Niagara Mohawk Power Corporation (NMPC) representatives to discuss soil excavation methods. Agreement was reached to minimize disturbance to the subsurface soils in the vicinity of two existing electrical poles (CNYP #12 and CNYP #13), located adjacent to excavation Areas 9 and 10 such that the integrity of the electrical distribution system (i.e., poles, electrical lines, guywires, etc.) would not be jeopardized.

Daily inspections of all excavations, the adjacent areas, and protective systems were made by *SECOR* and AAA representatives. Evidence of a situation that could possibly result in cave-ins, indications of failure of protective systems, hazardous atmosphere, or other potentially hazardous conditions were identified and immediately remedied. Before initiating excavation, underground utilities were identified.

PPE for the excavation work consisted of Modified Level D. This level of protection was adjusted as necessary, depending on the results of real-time air monitoring data. Air monitoring was conducted continuously during all excavations for carbon monoxide where internal combustion engines were utilized. Air monitoring for organic vapors for the purpose of estimating worker exposure level was conducted in the workers breathing zone utilizing a Thermal Environmental Equipment Organic Vapor Meter (OVM) Model 580 B. All readings were recorded at least hourly or more frequently, as determined by the health and safety supervisor.

During soil staging activities associated with Area 8 soil excavation, sustained total organic vapor levels of 10 ppm were detected within the Exclusion Zone. The VC action levels were not exceeded (0.5 ppm). Based on the guidelines set forth in the Air Monitoring Plan (AMP), workers were upgraded to Level C. The monitoring frequency was increased during the remainder of the Area 8 excavation and staging activities.

Soil excavation activities preceded in the following order of progression: Areas 13, 2, 3, 7, 8, 9 and 10. A detailed description of each excavation area is discussed further below followed by a discussion on soil staging.

2.2.1.1 Areas 2 and 3

The soil excavation activities associated with Areas 2 and 3 (former chip chute area) were conducted between August 19 and August 29, 1998. The Area 2 and 3 excavations consisted of excavating the area to the limits shown on Figure 2-1 and on As-Built Drawing G2. The final horizontal limits of the Area 2 excavation measured 50 feet (from west to east) by 36 feet (south of the loading dock). The vertical limits coincided with the top of till, which ranged between 4 and 5 feet bgs.

The final horizontal limits of the Area 3 excavation measured 124 feet (from west to east) by 34 feet to 36 feet (south of the loading dock). The vertical limits coincided with the top of till, which ranged between 5 to 6 feet bgs.

In general, the soil profile consisted of damp, brown, medium-to-fine sand, some silt, trace gravel with some evidence of black-stained soils, some red brick, and fine metal fragments extending approximately 3.5 to 4 feet bgs. The soils within the vicinity of the former foundation of the chip chute consisted of very moist to wet, black-stained, medium-to-coarse sand, some gravel with metal fragments and wood debris. The 12-inch diameter corrugated metal pipe (CMP) culvert located within Area 2 and Area 3 exhibited holes and visible debris, as viewed from the interior of the pipe. In order to access potentially impacted material below the stormwater pipe and due to its relative poor condition, the pipe was dismantled in 10-foot preassembled lengths and staged within a decontamination pad for cleaning, as discussed in Section 4.0. The culvert was replaced, as discussed in Section 11.2.

Area 2 and 3 excavations were advanced utilizing a Caterpillar (CAT) 311 track driven excavator equipment with toothless 2-cubic yard (cy) bucket, that provided an undisturbed soil face during retrieval and minimized soil mixing. The excavation approach varied from that proposed in AAA's Site Management Plan. This was primarily due to the fact that the concrete loading dock wall was in good condition and that the excavation did not extend below its foundation. The revised excavation approach progressed from the east end of Area 3 and proceeded west, incorporating Area 3, and then Area 2. Backfill placement followed behind the excavation to avoid jeopardizing the integrity of the loading dock foundation. Following the excavation and backfill of Area 2, storm water trench drains located at the base of the loading docks northwest of Area 2, which were connected to the culvert, were cleaned. Sediment within the drains was placed directly in the containment cell. The drains were then flushed with a high-pressure wash and the rinse water was collected and treated by the temporary water treatment system (See Section 6.0).

The total volume of soil removed from Area 2 was 345 cy and 870 cy from Area 3. The anticipated and actual excavated soil volumes are reported in Table 2-1.

2.2.1.2 Areas 7 and 8

The soil excavation activities associated with Areas 7 and 8 (former separation ponds) were conducted between August 27 and September 11, 1998. The horizontal limits of Areas 7 and 8 were determined based on the analytical results of the verification soil samples, as set forth in the FSP and discussed in Section 2.1.1. Areas 7 and 8 were excavated to the limits shown on Figure 2-2 and on As-Built Drawing G2. The vertical limits coincided with the top of till, which ranged between 5 feet and 11 feet bgs.

In general, the soil profile at Areas 7 and 8 consisted of damp, brown, medium-to-fine sand, some silt, trace gravel, grading to dark brown to gray, medium-to-fine sand and silt at approximately 3 to 6 feet bgs. Staining, moderate odors, and dense soils were observed. A 4-inch vitrified clay drainage pipe was encountered in the vicinity of the modified east perimeter, approximately 3 feet bgs; the pipe interior contained visible debris. The 4-inch vitrified clay pipe and approximately 4 cy of soils that surrounded the pipe were removed outside the proposed extent of excavation and handled with the Area 7 material.

A 1-foot by 2-foot concrete drainage distribution box and piping were encountered at approximately 5 feet bgs at the intersection of Area 7 and Area 8. The distribution box exhibited debris, visual staining, and elevated OVM readings (> 20 ppm). In accordance with the FSP, the distribution box and associated piping were staged and handled with the Area 8 material and later placed in the containment cell.

A 4-inch diameter, vitrified clay pipe was encountered during the west end excavation of Area 7. The pipe and adjacent soils, 5 feet either side and extending to the till, were removed and handled with Area 7 material. The pipe excavation extended to the west and abutted Area 9.

The Area 7 and 8 excavations were advanced utilizing a CAT 320 track-driven excavator equipped with a toothless 3/4-cy bucket that provided an undisturbed soil face during retrieval and minimized soil mixing. The excavations were advance in accordance with the guidance set forth in OSHA Standard 1926 Subpart P. The excavations were advanced and backfilled in sections, from east to west, in order to maintain sidewall stability and minimizing contamination of backfill material.

The actual soil volume removed from Areas 7 and 8 was 2,242 cy and 1,298 cy, respectively. The anticipated, modified, and actual soil waste volumes are reported in Table 2-1.

2.2.1.3 Areas 9 and 10

The excavation activities associated with Areas 9 and 10 (former debris landfill) were conducted between October 27 and November 11, 1998. The horizontal limits of Areas 9 and 10 were determined based on the analytical results of the verification soil samples, as set forth in the FSP and discussed in Section 2.1.1. Areas 9 and 10 were excavated to the limits as shown on Figure 2-1 and on As-Built Drawing G2. The vertical limits of the excavation coincided with the top of till, which ranged between 5 feet to 9 feet bgs.

In general, the soil profile consisted of moist-to-wet, brown, medium-to-fine sand, some silt, some gravel, some black-stained soil, medium-to-large metal fragments (greater than 6 inches), and large granite test blocks, 3 feet to 5 feet bgs. The soils in portions of Area 10 ranged from wet-to-saturated, dark brown to black, medium-to-coarse sand, black stained, with perched water approximately 3.5 feet bgs.

The material excavated from Area 10 underwent mechanical screening to segregate and remove materials greater than 4- inches in diameter prior to placement into the SVE portion of the containment cell. Material greater than 4-inches in diameter, identified as Area 10G, was placed into the general waste portion of the containment cell, which is reviewed in Section 7.4.1.

A 6-inch diameter, vitrified clay pipe was encountered on the north side of Area 9. The pipe and adjacent soils, 3 feet on either side and extending to the till, were removed and handled with Area 9 material. The pipe excavation extended north to Area 6.

The Areas 9 and 10 excavations were advanced utilizing a CAT 320 track-driven excavator equipped with a toothless 3/4-cy bucket that provided an undisturbed soil face during retrieval and minimized soil mixing. The excavations were advanced in accordance with the guidance set forth in OSHA Standard 1926 Subpart P. The excavations were advanced and backfilled in sections, in order to maintain sidewall stability and minimized contamination of backfill material. The actual soil volume removed from Areas 9 and 10 was 5,230 cy and 345 cy, respectively. The anticipated, modified, and actual soil waste volumes are reported in Table 2-1.

2.2.1.4 Area 13

The excavation activities associated with Area 13 (east parking lot) were conducted between August 10 and August 22, 1998. The final horizontal limits of Area 13 were determined based on visual screening, OVM screening, infield ENSYS, and laboratory analyses, as set forth in the FSP. The excavation measured 75 feet from south to north, defined on the south by verification sample VA13-SS (1-3') and defined on the north by VA13-NSa (1-3'), as shown on Figure 2-4 and on As-Built Drawing G2 and discussed further in Section 2.2.2. The excavation measured 35 feet and 50 feet from east to west, defined on the west by verification samples VA13-WSa (1-3') and VA13-NWS (1-3') and on the east by VA13-ES (1-3'). In general, the soil profile consisted of damp-to-moist, brown, medium-to-fine sand, trace silt, trace gravel, some black-stained soils.

The Area 13 excavation was advanced utilizing a CAT 320 track-driven excavator equipped with a toothless 3/4-cy bucket, that provided an undisturbed soil face during retrieval and minimized soil mixing. The asphalt atop Area 13 was excavated with the underlining soils and disposed of as waste. In accordance with the Site Management Plan, the soils were loaded directly into dump trailers for off-site disposal at an approved hazardous waste (Toxic Substances Control Act [TSCA]) facility. A small volume of Area 13 waste required temporary staging within a bermed area, lined with two 20 mil (0.020") layers of polyethylene sheeting, due to transport truck availability. Off-site disposal is reviewed in Section 10.0.

The excavation was advanced from the south extent proceeding north. Each section was protected with polyethylene sheeting to prevent contamination of sidewalls, as the excavation process required 7 days to complete. The actual soil volume removed from Area 13 was 600 cy. The anticipated and actual soil waste volumes are reported in Table 2-1.

2.2.1.5 Soil Staging

Soil staging areas were constructed to allow excavated soil to solidify (dewater) to process containment cell material (i.e., breaking up, sieving), and to conduct confirmation sampling to determine final soil disposal option. Staging areas consisted of bermed soil lined with a minimum of 20-mil polyethylene sheeting. The staging areas were graded toward a sump to allow for collection of leachate generated during the dewatering process. The leachate generated during dewatering was transferred via an on-site vacuum truck for treatment through the temporary water treatment facility (see Section 6.0). The main soil staging area was constructed over Areas 9 and 10, the former debris landfill. This soil staging area was chosen for its close proximity to the containment cell, and because potential cross-contamination to the underlying soil was a non-issue. Thus, Area 9 and 10 excavations occurred last, after the staged soils were placed in the containment cell. The soil within the staging areas was covered with polyethylene sheeting to control fumes and limit exposure to weather.

2.2.2 Post-Excavation Verification Soil Sampling

Post-excavation verification soil sampling was conducted in Areas 2 and 3 (former chip chute area) and Area 13 (East Parking lot) to verify the horizontal limits of the excavation perimeter. The acceptable final verification soil sample locations for Areas 2 and 3 are shown on Figure 2-1 and for Area 13 on Figure 2-4 Post-Excavation verification soil sample results are summarized in Table 2-4. Tables and figures are provided at the end of this section.

2.2.2.1 Areas 2 and 3

Post-excavation soil sampling at Areas 2 and 3 was conducted between August 19 and August 29, 1998, to determine the acceptable horizontal limits of the excavations. Post-excavation verification was conducted instead of pre-excavation verification soil sampling, due to the presence of extensive underground utilities in the vicinity of Areas 2 and 3. Note that the north and west boundaries were pre-established at the building loading dock and paved parking area, respectively. Area 2 verification sampling was conducted on the south perimeter sidewall. Area 3 verification sampling was required on the south and east perimeter sidewalls.

The Areas 2 and 3 excavations extended to the anticipated predetermined perimeter. One soil sidewall sample was collected from the open sidewall. A hand-operated, stainless steel auger was advanced at 2-foot intervals outward of the anticipated perimeter excavation wall to collect additional verification samples. Each soil sample was observed for the presence of visible waste material and screened using an OVM to determine the presence of volatile organic vapors in the sample headspace. Samples were submitted for laboratory analysis or laboratory archived, as described below:

- One sidewall sample from each initial location at the anticipated perimeter of the excavation area was submitted for laboratory analysis for the constituents of concern identified for that area, as set forth in the FSP; and
- Additional auger samples from each location, at 2-foot intervals radially out from the anticipated perimeter of the excavation, were submitted to the laboratory; however, they were archived, pending analysis. These samples were released for analysis only when the previous perimeter sample did not meet the cleanup objectives. The achieved samples were then released in a phased approach until analytical results indicated cleanup objectives were achieved.

In accordance with the FSP, the post-excavation verification samples selected for laboratory analysis from Areas 2 and 3 were analyzed for metals of concern (chromium, copper, lead, and zinc) using

USEPA SW-846 6010/7000 Series Methods. Post-excavation verification soil samples collected from Area 2 were also analyzed for VOCs of concern [cis-1,2-DCE, trans-1,2-DCE, trichloroethylene (TCE), and VC], using USEPA SW-846 Method 8260. Table 2-4 presents the analytical results of the verification soil samples collected.

Area 2: Verification Perimeter Sampling Results

Based on the analytical verification soil samples, the south perimeter was modified 4 feet from the initial anticipated perimeter. The Area 2 modified perimeter (actual excavation area) is shown on Figure 2-1 and on As-Built Drawing G2, and the analytical verification data are summarized in Table 2-4.

The table below summarizes the verification sample information for the Area 2 south perimeter.

Sample ID	**Depth (feet)**	**Sample Location**	**Analysis**	**Results**
VA2-1S	2 - 3.5	On the anticipated south perimeter	Target Metals and VOCs	> Cleanup Objectives See Table 2-4
VA2-1Sa	2 - 3.5	2' south of VA2-1S	Target Metals	> Cleanup Objectives See Table 2-4
VA2-1Sb	2 - 3.5	4' south of VA2-1S	Target Metals	< Cleanup Objectives See Table 2-4

Area 3: Verification Perimeter Sampling Results

Based on the analytical results of the verification soil samples, the east and south perimeter were modified 9 feet and 8 feet, respectively, from the initial anticipated perimeter. The Area 3 modified perimeter (actual excavation area) is shown on Figure 2-1 and on As-Built Drawing G2, and the analytical verification data are summarized in Table 2-4.

The table below summarizes the verification sample information for the Area 3 east perimeter:

Sample ID	Depth (feet)	Sample Location	Analysis	Results
	2-4	On anticipated east perimeter	Target Metals	> Cleanup Objectives See Table 2-4
VA3-1Ea	2-4	9' east on VA3-1E	Target Metals	<Cleanup Objectives See Table 2-4

The table below summarizes the verification sample information for the Area 3 south perimeter:

Sample ID	Depth (feet)	Sample Location	Analysis	Result
VA3-2S	2-4	On anticipated south perimeter	Target Metals	> Cleanup Objectives See Table 2-4
VA3-1S	2-4	On the anticipated south perimeter	Target Metals	> Cleanup Objectives See Table 2-4
VA3-1Sa	2-4	2' south of VA3-1S	Target Metals	> Cleanup Objectives See Table 2-4
VA3-1Sb	2-4	4' south of VA3-1S	Target Metals	> Cleanup Objectives See Table 2-4
VA3-1Sc	2-4	6' south of VA3-1S	Target Metals	< Cleanup Objectives See Table 2-4
VA3-2Sa	2-4	2' south of VA3-2S	Target Metals	> Cleanup Objectives See Table 2-4
VA3-2Sb	2-4	4' south of VA3-2S	Target Metals	> Cleanup Objectives See Table 2-4
VA3-2Sc	2-4	6' south of VA3-2S	Copper	> Cleanup Objectives See Table 2-4
VA3-2Sd	2-4	8' south of VA3-2S	Copper	< Cleanup Objectives See Table 2-4

2.2.2.2 Area 13

Post-excavation verification soil sampling for Area 13 occurred between August 10 and August 22, 1998. One post-excavation soil sample was collected from each sidewall (one per 100 linear feet of sidewall). Post-excavation soil samples were not required from the bottom of Area 13, as the excavation extended into the top of till. A total of five verification soil samples were collected from the sidewalls of the excavation VA13-SS (1-3') (south sidewall), VA13-ES (1-3') (east sidewall), VA13-WSa (1-3') (west sidewall), VA13-NWS (1-3') (northwest sidewall) and VA13-NS (north sidewall) (1-3').

The verification soil samples collected from the sidewalls of the excavation were composited from four discrete samples collected in a 2-foot radius, at a depth between 1 feet and 3 feet bgs. Soil samples were collected using a stainless steel scoop. A portion of each verification soil sample was visually characterized and screened for VOCs in headspace using an OVM. In addition, the samples were field screened utilizing ENSYS test kits to determine the presence of PCBs at concentrations greater than 1 ppm. Samples were submitted for analysis when the sample did not contain visible waste materials or noticeable odors, exhibit elevated OVM headspace screening, or contain PCBs at concentrations greater than 1 ppm. Area 13 verification soil samples were analyzed for PCBs using USEPA SW-846 Method 8082.

The table below summarizes the verification soil sample information for Area 13:

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA13-ES	1-3	East sidewall	Target PCBs	<Cleanup Objectives See Table 2-4
VA13-WSa	1-3	West sidewall	Target PCBs	<Cleanup Objectives See Table 2-4
VA13-NSa	1-3	North sidewall	Target PCBs	<Cleanup Objectives See Table 2-4
VA13-NWS	1-3	Northwest sidewall	Target PCBs	<Cleanup Objectives See Table 2-4
VA13-SS	1-3	South sidewall	Target PCBs	<Cleanup Objectives See Table 2-4

2.3 Confirmation Soil Sampling

Confirmation soil samples were collected and analyzed from staged soil to determine the appropriate method of handling and disposal, in accordance with the FSP. One composite confirmation soil sample was collected from every 500 cy of soil/sediment excavated from the areas shown on As-Built Drawing

G2. The handling and disposal alternatives for the excavated soil/sediment were as follows:

- Excavated soil/sediment containing PCBs at concentrations greater than 50 ppm were segregated for disposal as a TSCA/New York State hazardous waste;

- Excavated soil/sediment containing PCBs at concentrations less than 50 ppm and VOCs of concern at concentrations greater than 10 ppm were segregated for placement in a specified section (SVE) of the on-site containment cell; and

- Excavated soil/sediment containing PCBs at concentrations less than 50 ppm, VOCs of concern at concentrations less than 10 ppm, and/or metals at concentrations above site-specific cleanup goals were placed in the general waste section of the on-site containment cell.

The confirmation soil samples were analyzed, as follows:

- A portion of the composite sample of material excavated from Areas 2, 8, and 10 were screened for VOCs using an OVM. If the screening results indicated total VOC concentration in the sample headspace was less than 20 ppm, the remaining portion of the sample was submitted for laboratory analysis to confirm that the concentration of total VOCs of concern was less than 10 ppm. If the screening results indicate that the total VOC concentration in the sample headspace was greater than 20 ppm, the material will be placed in the on-site containment cell for SVE treatment.

- A portion of the composite sample of material excavated from Areas 9 and 10 was field screened for PCBs using ENSYS PCB field test kits designed to analyze for Aroclors 1254 and 1260. If field-screening results indicated the total PCB concentration was less than 40 ppm, the remaining portion of the sample was submitted for laboratory analysis to confirm that the concentration of PCBs was less than 50 ppm. If the laboratory analysis confirmed PCBs were less than 50 ppm, the material was disposed of in the on-site containment cell. If the ENSYS field test kit screening results indicated the total PCB concentration was greater than 40 ppm, the material was transported for off-site disposal as a TSCA/NYS hazardous waste.

Table 2-5 summarizes the confirmation soil sample data for Areas 2, 8, 9, and, 10. In accordance with the FSP, Areas 3 and 7 did not require confirmation sampling as excavated soil from the area were handled and disposed as TSCA/NYS hazardous waste. Confirmation soil sampling, handling, and the soil disposal alternative for each area are described below.

2.3.1 Area 2

As set forth in the FSP, one composite confirmation soil sample (CA2-1) was collected from Area 2 during excavation and field screened for the presence of VOCs of concern (> 20 ppm), in the sample headspace. The sample exhibited soil staining, odor, and an OVM reading greater than 1,000 ppm in the sample headspace. Based on the guidance set forth in the FSP, the sample was not submitted for laboratory analysis. The soil was directed to a lined staging area dedicated to SVE material, for later placement into the on-site containment cell, as set forth in the RDS Section 7.0. Table 2-5 summarizes the confirmation soil sample data.

2.3.2 Area 8

As set forth in the FSP, three composite confirmation soil samples (CA8-1, CA8-2 and, CA8-3) were collected from Area 8 during excavation. The composite samples were collected at approximately 450-cy intervals and field screened with an OVM for the presence of VOCs of concern (> 20 ppm) in the sample headspace. The samples exhibited soil staining, odor, and an OVM reading greater than 500 ppm in headspace. Based on the guidance set forth in the FSP, the soil was directed to the SVE section of the containment cell. Table 2-5 summarizes the confirmation soil sample data.

2.3.3 Areas 9 and 10

As set forth in the FSP, four composite confirmation soil samples (CA9-1, CA9-2, CA9-3 and, CA9-4) were collected from Area 9 and one composite confirmation soil sample (CA10-1) was collected from Area 10. The samples were collected during excavation at intervals of approximately 500 cy. A portion of the composite soil samples collected from Areas 9 and 10 were field screened for PCBs using ENSYS PCB field test kits designed to analyze for Aroclors 1254 and 1260. A portion of the composite sample collected from Area 10 was field screened with an OVM for the presence of VOCs of concern in the sample headspace.

The ENSYS field screening results for the confirmation soil samples collected from Areas 9 and 10 indicated that total PCB concentrations were less than 40 ppm; the remaining portion of each composite sample was submitted for laboratory analysis to confirm that the PCB concentration were less than 50 ppm.

The analytical results confirmed that the concentrations of total PCBs in these five samples were less than 50 ppm; therefore, this material was directed to the general waste section on-site containment cell.

The OVM field screening results for confirmation soil sample collected from Area 10 (CA10-1) indicated total VOCs in the sample headspace of greater than 400 ppm. Based on the guidance set forth in the FSP, this soil was directed to the SVE portion of the containment cell. Table 2-5 summarizes the confirmation soil sample data.

2.4 On-Site Topsoil

As part of the containment cell construction, the topsoil, (6-12") within the footprint of the containment cell was mechanically stripped between August 3 and August 21, 1998, using a track-driven CAT 5M dozer. The construction process consisted of first clearing and grubbing to remove surface vegetation, as reviewed in Section 1.3.6. Once surface vegetation was removed, topsoil was removed in the vicinity of the footprint of the containment cell to allow for the development of the subgrade. The horizontal extent of topsoil removed appears on As-Built Drawing G2.The volume of topsoil removed was 2,923 cy.

Excavation and Staging

The stripped topsoil was stockpiled along the southeast portion of the site extending east west between power pole CNYP #9 and CNYP #12. The general dimension of the topsoil berm was 15 feet wide by 5 feet high by 850 feet long.

Characterization Sampling

Soil samples were collected from the bermed topsoil to characterize the topsoil removed from the footprint of the containment cell and vicinity. Three composite soil samples (ESB-1, SSB-1, and SSB-2) were collected evenly spaced along the berm. Each sample was composed of four discrete samples within a 50-foot radius. The general soil profile consisted of damp, dark brown, fine organic silty sands, trace clay, low plasticity, moderate organic odor, with traces of tree fragments and vegetation.

The characterization soil samples were analyzed for metals of concern, VOCs of concern, and total PCBs. The analytical results indicate that the concentration of target metals in samples ESB-1, SSB-1, SSB-2, and total PCBs in samples SSB-1 and SSB-2 were above site-specific cleanup objectives established by the NYSDEC for the site.

Table 2-6 summarizes the characterization soil sample data for the on-site topsoil.

Select Waste

Based on analytical results, homogeneous particle size, and the available capacity within the containment cell, the on-site topsoil was characterized as select waste and directed to the containment cell for disposal. Prior to placement, the topsoil was mechanically screened to remove any particles greater than 3- inches in diameter including, but not limited to, wood, metal, brick, or concrete.

2.5 Tables

2-1 Anticipated vs. Actual Soil Waste Volumes

2-2 Pre-Excavation Verification Soil Sample Results - Area 7

2-3 Pre-Excavation Verification Soil Sample Results - Area 9

2-4 Post-Verification Soil Sample Results

2-5 Confirmation Soil Samples

2-6 Characterization On-Site Topsoil Sample Results

2.6 Figures

2-1 Areas 2 and 3 Verification Sample Locations

2-2 Areas 7 and 8 Verification Sample Locations

2-3 Areas 9 and 10 Verification Sample Locations

2-4 Area 13 Verification Sample Location

3.0 WORK TASK 3 - SEDIMENT REMOVAL

The sediment removal activities consisted of excavating sediments from the following seven RA areas:

- Unnamed creek (Area 1);
- On-site drainage ditches (Areas 4, 6, and 14);
- Off-site ditches (Areas 11 and 12);
- Skimmer pond (Area 5);
- Dredged material stockpiled adjacent to Area 4 (identified as Area 4D);
- Old stream bed emanating from Area 6 ditch (identified as Area 6A); and
- Seep located along Area 6 ditch (identified as Area 6 Seep).

The excavated sediment was placed within a bermed and lined staging area for gravity dewatering. Confirmation sampling was conducted to determine the final disposal alternatives in accordance with the NYSDEC-approved methods outlined in Sections 7.0 and 10.0 of this document. The horizontal limits of the sediment removal activities are presented on As-Built Drawing G2. The vertical limits of the excavation activities were verified in the field in accordance with guidance set forth in the RDS, Appendix B- FSP.

3.1 Pre-Excavation Activities

Pre-excavation activities were conducted prior to initiating soil removal activities. Pre-excavation activities consisted of clearing and grubbing, cleaning State Pollutant Discharge Elimination System (SPDES) Outfalls 001 and 002, cleaning catch basins, and completion of soil excavation activities in Areas 2 and 3. Pre-excavation activities are described by area below.

<u>Areas 1, 11, 12, and 14</u>

- Access points along the east perimeter of Area 1 were cleared at 100-foot intervals with a minimum width of 30 feet, to allow existing vegetation to provide stability to the creek banks;
- Vegetation in the vicinity of Areas 11, 12, and 14 were cleared to accommodate access for sediment removal activities;
- Stockpiled roofing materials were relocated from the existing access road associated with off-site Areas 11 and 12. The roofing material was relocated approximately 10 feet east of the access road, on the same property;

- Temporary earth dams were installed to provide surface water diversion to minimize the amount of water entering the excavation areas;

- Pumps were installed at upstream locations to intercept surface/stormwater and divert flow from the excavation area; and

- Sections of pipes associated with SPDES Outfalls 001 and 002 were cleaned, as described in Section 4.0-Pipe Cleaning/Replacement.

Areas 4, 5, and 6

- Areas 2 and 3, located upstream of Areas 4 and 5, were excavated and backfilled prior to initiating sediment removal in Areas 4 and 5 to reduce the potential for redistribution of material from the excavation to the drainage ditches. Two upstream grates and catch basins located in the truck loading area adjacent Areas 2 and 3 were cleaned;

- Surface vegetation was cleared along the perimeter of Areas 4, 5, and 6;

- All upstream and downstream culverts, as noted on As-Built Drawing G2, were cleaned, removed, or replaced, as discussed in Section 4.0 - Pipe Cleaning/Replacement; and

- The skimmer tank and appurtenance from Area 5 were dismantled.

3.2 Sediment Removal

In general, the sediment excavations proceeded from upstream to downstream using standard excavation methods and equipment. The sediment excavations were advanced utilizing a CAT 311 B or CAT 320 B track driven excavator equipped with a 1/2-cy toothless bucket, which left an undisturbed soil face on retrieval of soil waste. Any culverts encountered were cleaned or replaced accordingly prior to continuing excavation of downstream sediment. As-Built Drawing G2 identifies the sediment removal and culvert replacement locations. The total volume of sediment excavated from each area is summarized in Table 2-1.

As part of all sediment excavation activities, surface water/stormwater was diverted or bypass pumped, as necessary, to minimize the amount of water that entered the excavation. Water pumped from the excavation area was transferred to the temporary on-site treatment facility (see Section 6.0) with use of a vacuum truck. Excavated sediment was placed into lined staging areas for gravity dewatering, stabilization, and confirmation sampling. The sediment excavated from Areas 6 and 12 was staged separately from the others areas, since it required off-site disposal as TSCA material.

PPE for the sediment excavation activities consisted of Modified Level D. Air monitoring was conducted continuously during all excavations for carbon monoxide where internal combustion engines were utilized. Air monitoring for organic vapors in the workers breathing zone for organic vapors was conducted for the purpose of estimating worker exposure level, utilizing a Thermal Environmental Equipment OVM Model 580 B. All readings were recorded at least hourly, or more frequently, as determined by the health and safety supervisor. Prior to entering a manhole to implement stormwater diversion measures, confined space measures were implemented per the regulatory requirements outlined in 29 CFR 1910.146 (Permit-Required Confined Spaces).

3.2.1 Area 1

The sediment removal activities at Area 1 were conducted between September 28 and October 3, 1998. Prior to initiating sediment removal activities, a temporary earthen dam spanning the entire width of Area 1 and covered with polyethylene sheeting was placed approximately 15 feet downstream of SPDES Outfall 001. The placement of the earthen dam in this location provided a retention basin for surface water/stormwater associated with SPDES Outfall 001. The 20-inch CMP and a 36-inch reinforced concrete pipe (RCP) that drained the off-site property to the south and discharge into Area 1 were controlled by installing an earthen berm upstream of the culvert. Stormwater influence from SPDES Outfall 001 was managed utilizing a rubber tire mounted, diesel powered 4-inch centrifugal pump with an 800 gallons per minute (gpm) capacity rating. Stormwater from the retention basin was pumped to an upstream location for temporary storage.

Stormwater diversion at SPDES Outfall 002 was accomplished by placing a mechanical plug in the 24-inch CMP at SPDES Manhole 002. Stormwater from the manufacturing building roof leaders was pumped from the manhole to the northern drainage ditch using a 6-inch, diesel powered centrifugal pump with a 2,250-gpm capacity rating.

Area 1 sediments were excavated to the approximate horizontal limits shown on As-Built Drawing G2. The sediment excavation activities proceeded from upstream to downstream. The sediment in the vicinity of the steel piles located in front of the downstream 36-inch RCP culvert were hand excavated and placed into the excavator’s bucket. The sediments were loaded into a 10-wheel dump truck and placed into a lined staging area adjacent to Area 1, in the northwest corner of the site. The tailgate of the dump truck was lined with polyethylene sheeting to prevent leaking. The sediment was stabilized with calcium oxide within the staging area, and subsequently transferred to the staging area adjacent to the containment cell.

The volume of sediment excavated from Area 1 was 260 cy.

3.2.2 Areas 4 and 4D

The sediment removal activities at Areas 4 and 4D were conducted on September 14 and 15, 1998. Prior to initiating sediment removal activities, soil excavation in Areas 2 and 3 were completed and the parking lot catch basins and culvert in Areas 2 and 3 were cleaned. Completing RA activities in Areas 2 and 3 eliminated the potential that Area 4 and 14 sediment would be impacted subsequent to excavation. Surface/stormwater diversion measures, consisting of constructing an earthen dam wrapped in polyethylene was installed at the upstream end of Area 4. The surface/stormwater within Area 4 was bypass pumped downstream into Area 5 (the skimmer pond) using a 3-inch pump rated for 350-gpm maximum. Bypass pumping surface/stormwater into Area 5 allowed any potential sediments generated to settle out.

The Area 4 sediments were excavated to the approximate limits shown on As-Built Drawing G2. The Area 4D sediments excavation measured approximately 10 feet wide by 180 feet long by 2.5 feet deep. The sediment removal activities proceeded from upstream to downstream. The sediments were loaded into a 10-wheel dump truck and place in the lined staging area located over the top of Area 9 material. The tailgate of the dump truck was lined with polyethylene to prevent the potential for leaking. The Areas 4 and 4D sediments did not require chemical stabilization.

The sediment volumes removed from Areas 4 and 4D were 132 cy and 140 cy, respectively.

3.2.3 Area 5

The Area 5 sediment removal activities were conducted between September 25 and September 26, 1998. The water within the Area5 Skimmer Pond was removed utilizing a vacuum truck and treated through the on-site temporary water treatment system. Prior to initiating sediment removal activities, the CMPs at the downstream ends were placed within an on-site decontamination pad, as discussed in Section 4.0. A 6-inch diameter high-density polyethylene (HDPE) pipe that collected the surface water from the skimmer pond, as part of the IRM, was removed from the IRM Manhole #1. The penetration into the manhole was plugged with a rubber boot and was retained in place with a stainless steel clamp. An existing perimeter CMU retaining wall was pulverized and staged with the excavated sediments.

The equipment associated with the skimmer tank was dismantled, decontaminated and disposed of as C&D, as discussed in Section 10.0. The sediment within the skimmer tank underwent analytical waste characterization to determine disposal options. The analytical results indicated that the sediment was within the on-site disposal criteria (less than 40 ppm PCB and less than 10 ppm VOCs of concern). Upon verbal approval by the NYSDEC, the skimmer tank sediments were directed to the general waste portion of the containment cell. The skimmer tank was cut in half, to allow for cleaning of the interior with absorbent pads. Wipe sample analytical results of the interior of the skimmer tank for PCBs were below cleanup objectives for the site. The tank was disposed of as described in Work Task 10.

The horizontal limits of the excavation were determined based on post excavation verification sediment samples, in accordance with protocol set forth in the RDS, Appendix B-FSP. The vertical limits coincided with the top of till, which ranged between 4 feet and 5 feet bgs.

The Area 5 excavation was advanced utilizing a CAT 311 B track driven excavator equipped with a toothless 2-cy bucket that provided an undisturbed sidewall soil face. In general, the sidewall soil profile consisted of moist, brown, medium-to-fine sand, some gravel, grading to dark brown to gray, medium-to-fine sand and silt at approximately 4 feet bgs, cohesive and tight. The Area 5 sediment required chemical stabilization and in-place dewatering prior to excavation.

The volume of sediment removed from Area 5 was 186 cy.

3.2.4 Area 6, 6A and 6 Seep

The Area 6 sediment removal activities occurred between September 16 and September 22, 1998. Prior to initiating sediment removal activities, the CMPs in Area 6 were cleaned and replaced. Surface/stormwater diversion measures consisted of a 3-inch pump with a 350-gpm rating installed at an upstream location and bypass pumped downstream into Area 5 (the skimmer pond), where any sediment generated during the process was allowed to settle out. The majority of sediments excavated from Area 6 were placed directly into lined dump trailers for subsequent off-site disposal as TSCA-regulated waste. A portion of Area 6 sediments was staged and required chemical stabilization and dewatering prior to off-site disposal.

The Area 6 sediment was excavated to the approximate limits shown on As-Built Drawing G2. The volume of TSCA waste excavated for off-site disposal was 238 cy.

During Area 6 Sediment Removal Activities, at the eastern end of Area 6, what was presumed to be a former drainage ditch was encountered, identified by *SECOR* as Area 6A. The soils consisted of damp, brown medium to find sand and silt 3 feet bgs. Due to the close proximity to Area 6, which contained sediments with PCBs less than 50 ppm, confirmation soil sampling was required by the guidelines set forth in the FSP. Field screen and laboratory analysis confirmed that the Area 6A sediments contained PCBs less than 40 and VOC of concern greater than 10 ppm. Based on the guidelines set forth in the FSP, the Area 6A sediment was directed to the SVE portion of the cell. The volume excavated from Area 6A was 100 cy.

On May 19, 1999, an oily sheen was noted located from a point along Area 6 ditch (see Drawing G2). Approximately 30 cy of additional soil around the seep was excavated on June 10, 1999, and direct loaded into roll off containers for off-site disposal. The seep was attributed to a segment of remaining pipe that appeared to emanate from Areas 7 and 8. Remediation of the Area 6 Seep was addressed in correspondence to the NYSDEC, included in Appendix J.

3.2.5 Area 11

The Area 11 off-site sediment removal activities were conducted between October 7 and October 8, 1998. Prior to initiating sediment removal activities, all upstream sections of pipes were cleaned, as discussed in Section 4.0. Surface/stormwater diversion measures consisted of an earthen dam wrapped in polyethylene located at the upstream end of Area 12. Area 11 was allowed to gravity drain for a 24-hour period prior to initiating sediment removal activities.

The Area 11 sediments were excavated to the approximate limits shown on As-Built Drawing G2. The sediment removal activities proceeded from upstream to downstream. The sediments were loaded into an 18-cy articulated dump truck and placed in the lined staging area located in the east parking lot. The Area 11 sediments required chemical stabilization with calcium oxide within the lined staging area prior to placement into the containment cell.

The sediment volume removed from Area 11 was 204 cy.

3.2.6 Area 12

The Area 12 off-site sediment removal activities were conducted between October 6 and October 7, 1998, in conjunction with Area 11. Prior to initiating sediment removal activities, all upstream sections of pipes were cleaned, as discussed in Section 4.0. Surface/stormwater diversion measures consisted of constructing an earthen dam wrapped in polyethylene located at the upstream end of Area 12. Area 12 was allowed to gravity drain for a 12-hour period prior to initiating sediment removal activities.

The Area 12 sediments were excavated to the approximate limits shown on As-Built Drawing G2. The sediment removal activities proceeded from upstream to downstream. The sediments were loaded into an 18-cubic yard articulated dump truck and placed in the lined staging area located in the east parking lot.

The Area 12 sediments required chemical stabilization with calcium oxide within the lined staging area prior to off-site disposal as TSCA-regulated material.

The sediment volume removed from Area 12 was 80 cy.

3.2.7 Area 14

The Area 14 sediment removal activities were conducted on October 5, 1998. Prior to initiating sediment removal activities, all upstream sections of pipes were cleaned, as discussed in Section 4.0. Surface/stormwater diversion measures consisted of an earthen dam wrapped in polyethylene located at the upstream end of Area 14. Area 14 was allowed to gravity drain for a 12-hour period prior to initiating sediment removal activities.

The Area 14 sediments were excavated to the approximate limits shown on As-Built Drawing G2. The sediment removal activities proceeded from upstream to downstream. The sediments were loaded into a 16-cy articulated dump truck and placed in the lined staging area located in the east parking lot. The Area 14 sediments required chemical stabilization with calcium oxide within the lined staging area prior to disposal within the containment cell.

The sediment volume removed from Area 14 was 54 cy.

3.3 Sediment Staging

Sediment staging areas were constructed to allow excavated sediment to dewater or undergo chemical stabilization prior to final disposal. Typical sediment staging areas consisted of bermed hay bales or earth berms lined with a minimum of two layers of 20-mil polyethylene sheeting. Staged sediment from all areas, except Areas 4 and 4D, required chemical stabilization prior to final disposal. Three sediment staging areas; one staging area was located in the northwest portion of the site adjacent to Area 1 and measured approximately 20 feet by 30 feet and was utilized for stabilization of Area 1 sediments prior to placement in the containment cell. The two other staging areas were constructed in the east parking lot and measured approximately 40 feet by 80 feet.

3.4 Post-Excavation Sediment Verification Sampling

Post-excavation sediment verification sampling was conducted in Areas 1, 4, 5, 6, 6A, 6 Seep, 11, 12, and 14 to provide data that confirmed constituents of concern are not present in the remaining sediment at concentrations greater than the cleanup objectives. Post-excavation sampling was conducted in accordance with the procedures set forth in the FSP. The sediment samples were collected using a hand-operated stainless steel auger. One post-excavation sediment sample was collected from the bottom of the aforementioned areas at a frequency of one sample per 200 linear feet. Each sediment verification sample was collected from a depth of 0 to 6 inches below the bottom of the excavation. One post-excavation sediment verification sample was also collected from each sidewall of Area 5 (the Skimmer Pond), at a distance one-third from the bottom of the pond, and at a frequency of one per sidewall. A bottom sample was not taken at Area 5 because the excavation extended into the till.

Each sediment verification sample was composited from four discrete samples collected within a 2-foot radius. A portion of each sediment verification sample was visually characterized and field screened using an OVM for VOCs in headspace. In addition, field-testing for the presence of PCBs was conducted using Ensys test kits. The composite sample was placed into appropriate sample containers and submitted for laboratory analysis. Samples were not submitted to the laboratory if they exhibited an elevated OVM, contained any visible waste material, and contained PCBs at concentrations greater than 1 ppm (based on ENSYS field test kits) additional sediment was removed and additional verification samples were collected if these conditions were observed.

Selected verification samples submitted to the laboratory underwent analysis for PCBs (USEPA SW-846 Method 8082), VOCs of concern (USEPA SW-846 Method 8260), or metals of concern (USEPA 6000/7000 Series Method). The sediment verification sample results are summarized in Table 3-1.

3.4.1 Area 1

Post-excavation sediment sampling occurred between October 1 and October 3, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 1 at a frequency of one sample per 200 linear feet. Four post-excavation sediment verification samples were collected and analyzed for PCBs and metals of concern:

- VA1-1 (0-6");
- VA1-2 (0-6");
- VA1-3 (0-6"); and
- VA1-3a (0-6").

The analytical verification data results indicated that the concentration of target PCBs and metals of concern in samples VA1-1 and VA1-2 were below the cleanup objectives. Concentrations of PCBs in sample VA1-3 were below the cleanup objectives; however, the metals of concern in sample VA1-3 were above the cleanup objectives. Based on the guidelines established in the FSP, additional sediment was removed from the section of drainage ditch represented by that verification sample point (up to 200 feet), and sediment verification sample VA1-3a (0-6") was collected for metal analysis. The analytical results indicated that the concentrations of target metals of concern in sample VA1-3a were below the cleanup objectives established by the NYSDEC for the site.

The table below summarizes the post-excavation verification sample information for Area 1:

Sample ID	Depth (Feet)	Sample Location	Analysis	Results
VA1-1	0 - 0.5	200 feet north of SPDES Outfall 001	Target Metals and PCBs	< Cleanup Objectives See Table 3-1
VA1-2	0 - 0.5	400 feet north of SPDES Outfall 001	Target Metals and PCBs	< Cleanup Objectives See Table 3-1
VA1-3	0 - 0.5	600 feet north of SPDES Outfall 001	Target Metals and PCBs	> Cleanup Objectives See Table 3-1
VA1-3a	0 - 0.5	600 feet north of SPDES Outfall 001	Target Metals and PCBs	< Cleanup Objectives See Table 3-1

3.4.2 Areas 4 and 4D

Post-excavation sediment sampling occurred on September 15, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 4 at a frequency of one sample per 200 linear feet. Two post-excavation sediment verification samples were collected and analyzed:

- VA4-1 (0-6"); and
- VA4-2 (0-6").

The analytical results indicated that the concentrations of target PCBs and metals of concern in samples VA4-1 and VA4-2 were below the cleanup objectives established by the NYSDEC for the site.

The table below summarizes the post-excavation verification sample information for Area 4:

Sample ID	Depth (feet)	Sample Location	Analysis	Result
VA4-1	0 – 0.5	200 feet east of Area 3	Target PCBs and Metals	< Cleanup Objectives See Table 3-1
VA4-2	0 – 0.5	400 feet east of Area 3	Target PCBs and Metals	< Cleanup Objectives See Table 3-1

Note that post excavation verification sampling of Area 4D was not required as these were staged Area 4 sediments excavated and placed adjacent to Area 4 and delineated in the RI/FS.

3.4.3 Area 5

Post-excavation sediment sampling occurred on September 26, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from each sidewall of Area 5 at a frequency of one sample per 100 linear feet. Six post-excavation sediment verification samples were collected and analyzed for PCBs and metals of concern:

- VA5-SS (0-6");
- VA5-WS (0-6");
- VA5-NS (0-6");
- VA5-NSa (0-6");
- VA5-ESa (0-6"); and
- VA5-ESb (0-6").

The analytical results indicated that the concentrations of target PCBs in samples VA5-SS, VA5-WS, VA5-NS, and VA5-ESa were below the cleanup objectives. The analytical results indicated that the concentration of target metals in samples VA5-SS and VA5-WS were below the cleanup objectives. The analytical results indicated that the concentrations of target metals in samples VA5-NS and VA5-ESa were above the cleanup objectives.

Based on the guidelines established in the FSP, additional soil was removed 2 feet radially from the north sidewall and east sidewall, and two additional verification sediment samples VA5-NSa (0-6") and VA5-ES6 (0-6") were collected for metal analysis. The analytical results indicated that the concentrations of target metals of concern were below the cleanup objectives.

The table below summarizes the post-excavation verification sample information for Area 5:

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA5-SS	0-0.5	South sidewall 1/3 up from bottom	Target Metals, PCBs	< Cleanup Objectives See Table 3-1
VA5-WS VA5-WS (DUP)	0-0.5	West sidewall 1/3 up from bottom	Target Metals, PCBs	< Cleanup Objectives See Table 3-1
VA5-NS	0-0.5	North sidewall 1/3 up from bottom	Target Metals, PCBs	> Cleanup Objectives See Table 3-1

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA5-ESa	0-0.5	East sidewall 1/3 up from bottom	Target Metals, PCBs	> Cleanup Objectives See Table 3-1
VA5-ESb	0-0.5	East sidewall 1/3 up from bottom	Target Metals	< Cleanup Objectives See Table 3-1
VA5-NSa	0-0.5	North sidewall 1/3 up from bottom	Target Metals	< Cleanup Objectives See Table 3-1

3.4.4 Area 6

Post-excavation sediment sampling was conducted between September 16 and September 18, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 6 at a frequency of one sample per 200 linear feet. Five post-excavation sediment verification samples were collected and analyzed for PCBs and metals of concern:

- VA6-1 (0-6");
- VA6-2 (0-6");
- VA6-3 (0-6");
- VA6-4 (0-6"); and
- VA6-4a (0-6").

The analytical results indicated that the concentrations of PCBs and metals of concern in samples VA6-2 and VA6-3 were below the cleanup objectives established by the NYSDEC for the site. The analytical results indicated that the concentrations of target PCBs in samples VA6-1 and VA6-4 were below the cleanup objectives; however, the concentration of copper in samplesVA6-1 and VA6-4 was above the cleanup objectives.

Based on the guidelines established in the FSP, additional sediment was removed from Area 6 in the vicinity of VA6-1 and VA6-4. One additional sediment verification sample (VA6-4a) was collected and analyzed for copper. The analytical results indicated that the concentrations of copper were below the cleanup objectives. The sediment in the vicinity of sample VA6-1 was excavated to the top of till; therefore, no additional verification sample was obtained.

The table below summarizes the post-excavation sediment verification sample information for Area 6:

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA6-1	0-0.5	200 feet east of upstream end	Target Metals and PCBs	Copper >40 See Table 3-1
VA6-2	0-0.5	400 feet east of upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-1
VA6-3	0-0.5	600 feet east of upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-1
VA6-4	0-0.5	800 feet east of upstream end	Target Metals and PCBs	Copper > 40 ppm See Table 3-1
VA6-4a	0-0.5	800 feet east of upstream end	Copper	< Cleanup Objectives See Table 3-1

3.4.5 Area 6 A

Post excavation verification sediment sampling was conducted on September 24, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 6A at a frequency of one sample per 200 feet. One post excavation sediment verification sample was collected and analyzed for PCBs and metals of concern:

- VA6A-2 (0-6")

The analytical results indicate that the concentrations of PCBs and metals of concern in sample VA6A-2 were below cleanup objectives established for the site.

The table below summarizes the post excavation sediment sample infiltration for Area 6A.

Sample ID	Depth (feet)	Sample Location	Analysis	Result
VA6A-2	0 - 0.5	200 feet east of downstream edge of Area 6	Target PCBs and Metals	< Cleanup Objectives See Table 3-1

3.4.6 Area 6 Seep

Excavation and sample of soil at Area 6 Seep occurred on June 10, 1999. The seep was discovered after the scheduled remedial activities, therefore, the discussion and accompanying post-excavation verification results are contained in correspondence to the NYSDEC, provided in Appendix J.

3.4.7 Area 11

Post-excavation sediment sampling was conducted between September 16 and September 18, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 11 at a frequency of one sample per 200 linear feet. Post-excavation sediment verification samples were collected and analyzed for PCBs and metals of concern:

- VA11-1 (0-6");
- VA11-2 (0-6");
- VA11-2a (0-6");
- VA11-3 (0-6");
- VA11-4 (0-6"); and
- VA11-4a (0-6").

The analytical results indicated that the concentrations of PCBs and metals of concern in sample VA11-1 were below the cleanup objectives established by the NYSDEC for the site. The analytical results indicated that the concentrations of PCBs and metals of concern in samples VA11-2 and VA11-4 were above cleanup objectives. The concentration of copper in sample VA11-3 was above the cleanup objectives.

Based on the guidelines established in the FSP, additional sediments were removed from Area 11 in the vicinity of samples VA11-2, VA11-3, and VA11-4. Three additional sediment verification samples were collected and analyzed:

- VA11-2a;
- VA11-3a; and
- VA11-4a.

The analytical results indicated that the concentrations of target metals and PCBs in samples VA11-2a and VA11-4a were below the cleanup objectives. The analytical results indicated that the concentrations of target metals in sample VA11-3a remained above the cleanup objectives.

Based on the guidelines established in the FSP, additional sediments were removed from Area 11 in the vicinity of sample VA11-3a, an additional sediment verification sample was collected (VA11-3b) and analyzed for metals of concern. The analytical results indicated that concentrations of target metals in sample VA11-3b was below the cleanup objectives.

The table below summarizes the post-excavation sediment verification sample information for Area 11:

Sample ID	Depth (feet)	Sample Location	Analysis	Result
VA11-1	0-0.5	200 feet east of the upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-2
VA11-2	0-0.5	400 feet east of the upstream end	Target Metals and PCBs	Metals > Cleanup Objectives See Table 3-2
VA11-2a	0-0.5	400 feet east of the upstream end	Target Metals	Metals > Cleanup Objectives See Table 3-2
VA11-3	0-0.5	600 feet east of the upstream end	Target Metals and PCBs	Metals > Cleanup Objectives See Table 3-2
VA11-3a	0-0.5	600 feet east of the upstream end	Target Metals	Metals > Cleanup Objectives See Table 3-2
VA11-3b	0-0.5	600 feet east of the upstream end	Target Metals	< Cleanup Objectives See Table 3-2
VA11-4	0-0.5	800 feet east of the upstream end	Target Metals and PCBs	Metals and PCBs > Cleanup Objectives See Table 3-2
VA11-4a	0-0.5	800 feet east of the upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-2

3.4.8 Area 12

Post-excavation sediment sampling was conducted on October 7, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 12 at a frequency of one sample per 200 linear feet. Three post-excavation sediment verification samples were collected and analyzed for PCBs and metals of concern:

- VA12-1 (0-6");
- VA12-2 (0-6"); and

- VA12-3 (0-6").

The analytical results indicated that the concentrations of PCBs and metals of concern in samples VA12-1, VA12-2, and VA12-3 were below the cleanup objectives established by the NYSDEC for the site.

The table below summarizes the post-excavation verification sample information for Area 12:

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA12-1	0-0.5	200 feet north of the upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-2
VA12-2	0-0.5	400 feet north of the upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-2
VA12-3	0-0.5	600 feet north of the upstream end	Target Metals and PCBs	< Cleanup Objectives See Table 3-2

3.4.9 Area 14

Post-excavation sediment sampling was conducted on October 5, 1998. As set forth in the FSP, one post-excavation sediment sample was collected from the bottom of Area 14 at a frequency of one sample per 200 linear feet. Four post-excavation sediment verification samples were collected and analyzed for PCBs:

- VA14-1 (0-6");
- VA14-2 (0-6");
- VA14-3 (0-6"); and
- VA14-4 (0-6").

The analytical results indicated that the concentrations of PCBs in samples VA14-1, VA14-2, VA12-3, and VA14-4 were below the cleanup objectives established by the NYSDEC for the site.

The table below summarizes the post-excavation verification sample information for Area 14:

Sample ID	Depth (feet)	Sample Location	Analysis	Results
VA14-1	0-0.5	200 feet north of the upstream end	Target PCBs	< Cleanup Objectives See Table 3-2
VA14-2	0-0.5	400 feet north of the upstream end	Target PCBs	< Cleanup Objectives See Table 3-2
VA14-3	0-0.5	600 feet north of the upstream end	Target PCBs	< Cleanup Objectives See Table 3-2
VA14-3	0-0.5	800 feet north of the upstream end	Target PCBs	< Cleanup Objectives See Table 3-2

3.5 Tables

3 - 1 Post-Excavation Verification Sediment Sample Results

3 - 1 Post-Excavation Verification Sediment Sample Results

Insert Table 3-1 Post-Excavation Verification Sediment Sample Results Page 2

4.0 WORK TASK 4 - PIPE CLEANING/REPLACEMENT

The pipe cleaning activities were performed prior to removal of sediment in Areas 1, 4, 5, 6, 11, 12, and 14, and SPDES Outfalls 001 and 002. Pipes and culverts encountered during sediment removal activities were cleaned, removed, or replaced, as required. As-Built Drawing G2 identifies the locations of the pipes and culverts addressed in the RA. The culverts that were removed do not appear on the drawing. The cleaning, replacement, or removal of pipes and culverts are discussed further below.

4.1 Culvert Cleaning

The pipe cleaning activities provided removal of visible debris and staining from the culvert interior. First, the upstream and downstream ends of the culverts were cleared of vegetation to provide access. Sediment in the immediate vicinity of the upstream and downstream ends of each culvert was removed, providing a cleared, pooled area or sump. A sump was installed at each end of the culverts to collect washwater and debris generated during pressure washing. A dam was constructed in the vicinity of the upstream and downstream ends of the culvert, expanding the sump volume. This also minimized the quantity of surface water entering the area where culvert cleaning was being conducted and facilitated dewatering. The dam consisted of a temporary earthen dike encapsulated in 20-mil polyethylene sheeting. Upstream water was discharged downstream of the sediment removal activities. Pneumatic plugs were installed in the upstream manholes at Outfalls 001 and 002 to prevent washwater and sediments from entering the upstream storm sewer pipes previously cleaned during the Sediment Removal IRM.

A high pressure, low flow nozzle was utilized, starting at the downstream end of the culvert and advanced upstream, with a reverse spray action. The nozzle direction forced water radially outward to flush debris from the pipe and the reverse flow pressure propelled the nozzle upstream. The washwater and debris collected in the sump was subsequently removed by a vacuum truck. The vacuum truck was used to transfer the wastewater to the on-site water treatment system. The temporary water treatment system is reviewed in Section 6.0.

After each culvert was cleaned, it was visually observed to confirm that no visible sediment remained. A total of eight culverts were cleaned. Cleaning was conducted at two additional culverts, one in Area 12, and one beneath Bleecker Street adjacent to Area 12.

Permanent erosion control measures were applied around the cleaned culverts. Riprap was placed on geotextile fabric at the entrance and exit of each culvert for energy dissipation. This included installation of riprap for the full ditch width and extended out from the culvert end approximately 15 feet. This type of construction was generally applied at all site culverts, including those along Bleecker Street, although it was not a project requirement.

4.1.1 SPDES Outfall 001

The cleaning of SPDES Outfall 001 was started on September 22, 1998. The culverts were mechanically plugged at the manhole to prevent washwater and sediments from migrating upstream of the manhole. Upstream stormwater culverts associated with this manhole were previously cleaned during the Sediment Removal IRM. A high pressure-washing nozzle attached to a flexible carrier hose was advanced upstream from Outfall 001. The washwater and debris collected in the sump was subsequently removed by vacuum truck and transferred to the on-site water treatment system.

SPDES Outfall 001 culvert was depicted as a straight pipe on RDS Contract Drawing G2, originating from a manhole at the southwest corner of the former manufacturing building and discharging to the Unnamed Creek (Area 1). Subsequent to the pipe cleaning activities, it was determined that two pipes originating upstream of Area 1 intersect the Outfall 001 culvert in the west parking lot. As-Built Drawing G2 depicts the culverts and intersection point.

The pressure-washing device encountered an apparent obstruction in the 24-inch CMP at approximately 150 feet. Due to the apparent obstruction, AAA attempted to clean the culvert from the upstream end at the manhole. Pressure cleaning proceeded approximately 180 feet and advancement ceased. A second attempt was made from the downstream end to no avail.

Underground Technology Inc. was contracted to video the SPDES Outfall 001 culvert. Videoing the culvert was not originally scheduled for the project; however, due to the apparent obstruction it was unclear if Outfall 001 was acceptably clean. Underground Technology Inc. provided a van equipped with a monitor, video recorder, and camera equipment. The camera was attached to a fabricated 4-wheel drive tractor and included a bright light. The camera unit was placed in the upstream end (in the manhole) of Outfall 001 and in the downstream end (outlet). The videotaping of the culvert involved two technicians. One operated the recorder and viewed the monitor while the other technician handled the camera unit and its attached cord. The camera unit, self-propelled, traversed the culvert, providing a view of the culvert's internal conditions on the monitor.

The internal video inspection, determined that Outfall 001 culvert was clean and in generally good condition. The obstruction was determined to be a junction point of three pipes. The 24-inch clay pipe originating from the manhole intersected an 18-inch CMP and 24-inch CMP, as indicated on As-Built Drawing G2. The video showed the construction at the pipe intersection to be narrow and the reason for the inability to pass through.

The NYSDEC viewed the video. SPDES Outfall 001 was determined to be clear and acceptable. Riprap was placed at the outfall end for energy dissipation and erosion control.

4.1.2 SPDES Outfall 002

SPDES Outfall 002 culvert originates from a manhole at the northwest corner of the former manufacturing building, as indicated on As-Built Drawing G2 and discharges to the Unnamed Creek (Area 1).

Prior to cleaning, the outlet end of Outfall 002 was determined to be damaged and deteriorated. AAA removed and replaced a 20-foot section of 24-inch CMP. The new culvert was backfilled and received a layer of riprap for erosion control.

The cleaning of SPDES Outfall 002 occurred on September 20, 1998. The upstream culverts were mechanically plugged at the manhole to prevent washwater and sediments from migrating upstream of the manhole. The upstream stormwater culvert associated with this manhole was previously cleaned during the Sediment Removal IRM. The high pressure-washing nozzle was advanced from the outfall end approximately 350 feet. Washing continued upstream until it appeared at the manhole. The washwater and debris collected in the sump area and was subsequently removed by a vacuum truck and transferred to the on-site water treatment system.

Due to the fact that the SPDES Outfall 001 culvert required video inspection, the Outfall 002 culvert was also videoed. The result of the inspection indicated that the culvert was clean and in good condition.

4.2 Culvert Replacement

One culvert was found to be in relatively poor condition, as determined by the *SECOR* Engineer. Specifications regarding the HDPE pipe were set forth in the Contract Specification Section MP-02526. The 12-inch CMP culvert located in Areas 2 and 3 was determined to be deteriorated with large holes. A 12-inch HDPE pipe was installed in its place. The new pipe extended 105 feet from the pavement drainage catch basins into Area 3, as shown on As-Built Drawing G2.

The removed pipe was relocated to a site decontamination pad, where it was cleaned prior to disposal. Off-site disposal is reviewed in Section 10.

4.3 Culvert Removal

During the construction activities, particularly as sediments were being removed from the ditches, certain culverts were recognized as unnecessary to maintain drainage. Such unnecessary culverts were identified by the *SECOR* Engineer in Areas 4, 5, 6, and 14.

Removal of unnecessary culverts in these areas eliminated in-place cleaning, as well as riprap backfill. The culvert was cleaned in a decontamination area and ultimately disposed of, as described in Section 10. Soils located around the culverts were removed as waste. Surface drainage was greatly improved as open ditches replaced culvert bottlenecks, which were prone to clog up with debris.

Culverts removed can be identified by comparing Contract Drawings G1 and G2 with the As-Built Drawings G1 and G2. The following culverts were removed:

- One culvert in Area 4 was removed at the intersection with Area 5;
- Two culverts were removed from Area 6;
- One culvert located adjacent to the former foundry building in Area 6;
- One culvert at the intersection of Area 6 with Area 5; and
- One culvert at the intersection of Area 14 and Area 5.

The majority of culverts removed occurred at Area 5, the skimmer pond. Although this pond was scheduled to be reconstructed, it was concluded that it was no longer necessary. The skimmer pond was previously installed to intercept oils contributed by the former chip chute operations (Areas 2, 3, and 4).

5.0 WORK TASK 5 - MONITORING WELL ABANDONMENT AND INSTALLATION

A total of 19 Remedial Investigation/Feasibility Study (RI/FS) monitoring wells were abandoned and two additional RA monitoring wells were installed, in accordance with the RDS and procedures set forth in the FSP, NYSDEC document, "Groundwater Monitoring Well Decommissioning Procedure" October 1996, and ASTM Method D5299. One well was replaced due to physical damage. A total of 6 monitoring wells exist at the site to provide groundwater quality data utilized to assess the effectiveness of the RA. The existing monitoring well network is referenced on As-Built Drawing G2. Monitoring well logs for existing wells are provided at the end of this section for reference.

5.1 Well Abandonment

A total of 19 monitoring wells were decommissioned between July 31 and August 6, 1998. A health and safety meeting was conducted by *SECOR* to review the overall site condition, as well as the extent of contamination at individual well locations. PW utilized an Ingersoll-Rand Model A300 truck-mounted drill rig and a Mobile B52 rig to complete the decommissioning activities.

The monitoring wells were decommissioned in the following order: MW-10D, MW-10, MW-1, MW-8, MW-9, MW-12, MW-11, MW-5, MW-9D, MW-15, MW-4, MW-2D, MW-7D, MW-7, MW-15D, MW-6D, MW-16S, and MW-13D. MW-13S was not scheduled for decommissioning. However, it was observed to be physically damaged; therefore, it was removed and replaced.

Decommissioning procedures began by measuring and recording the depth to water as well as total well depth to check concurrence with the original logs. The drill rig was used to remove the protective casing or flush mount cover, and then to remove the casing and screen intact. When required to remove the well materials, the boreholes were over drilled using 43-inch diameter hollow stem augers. The augers were advanced to a depth that coincided with the original boring, as indicated on the boring logs.

The boreholes were filled with 94 lbs. Portland cement, 5% bentonite and 7 to 8-gallon water mixture, using a tremie pipe to fill the hole from its bottom to within 6 inches of surface grade. Holes were periodically observed for evidence of settling to insure grout filled the entire area formerly occupied by the well materials. The holes were then topped with clean soil, or asphalt, to restore the surface to original grade and to match the surrounding surface.

Materials recovered from the wells were staged separately for waste stream characterization and disposal. The well materials were steam cleaned and placed into a roll-off and disposed of off site, as discussed in Section 10. Materials from MW-5 were staged separately, due to potential for residual PCBs on the well casing and screen. Spoils produced by augering were staged on 20-mil polyethylene sheeting near each borehole and later placed in the containment cell, with the exception of MW-5, which was disposed of off-site as TSCA waste.

Prior to use and between each monitoring well, specific decontamination procedures were implemented for drilling equipment and recovered well materials, in accordance with the FSP. A decontamination pad was constructed of 2 x 6 inch pine frame, and lined with two layers of 20-mil polyethylene sheeting, with a wooden pallet placed below the fabricated containment. Augers were placed on the pallet and brushed with an Alconox detergent solution, followed by a tap water rinse. On the final day of work, a steam generator was mobilized and all augers, the drill rig, and all staged well casings/screens were steam cleaned. Rinse water generated by decontamination procedures was temporarily placed in a 1,000-gallon site tank and later pumped to the on-site water treatment system.

5.2 Well Installation

Installation of two additional groundwater monitoring wells (MW-17 and MW-18) was required as part of the RA. The two new monitoring wells were installed at key locations to provide groundwater quality data to be utilized to assess the effectiveness of the RA. Monitoring well MW-17 was located hydraulically downgradient of the former debris landfill (Areas 9 and 10) and separation ponds (Areas 7 and 8). A third well (MW-13A) was installed, replacing the decommissioned MW-13S. The monitoring well boring logs are provided at the end of this section for reference.

The three wells were installed on January 20, 1999, using a truck-mounted drill rig (CME-55). Soil borings were advanced to a depth of approximately 5 to 6 feet into the saturated overburden using 43-inch inside diameter hollow-stem augers. Continuous soil sampling was conducted to provide visual soil descriptions. Soil samples were obtained continuously from ground surface to the total depth of each boring using a 2-foot long, 2-inch diameter split spoon sampler driven by a 140-pound hammer falling 30 inches, as designated in ASTM D-1586.

Groundwater monitoring wells were installed in accordance with procedures outlined in Attachment G of the FSP. Wells were constructed by installing a 2-inch diameter flush threaded Schedule 40 polyvinyl chloride (PVC) riser and 0.010-inch slot well screen. As the augers were raised from the boring, filter sand was placed between the PVC screen and the boring. A hydrated bentonite slurry was tremied into place above the sand pack to create a seal. The remaining annular space was filled with a concrete/bentonite mix to the ground surface. The well riser pipe was encased a steel protective casing concreted in place.

Upon completion of the well construction, the wells were developed to remove any fine material from the sand pack. Development was accomplished by repeatedly surging and removing water from the well with a 2-foot long, 1.6-inch diameter weighted Teflon bailer. This procedure was continued until the water was free of sediment.

All purge water collected was placed in an on-site polyethylene tank for later transfer to the on-site treatment system. All drilling tools were decontaminated prior to starting and between each well, as set forth in Attachment B of the FSP.

5.3 Site Groundwater Monitoring

The final groundwater monitoring well network was established during the RA to accommodate remediation activities and refine the monitoring well locations to meet the RA monitoring objectives. The locations of the six RA monitoring wells were selected to provide groundwater quality data for specific RA areas. The physical locations of MW-3, MW-6R, MW-13A, MW-14, MW-17, and MW-18 are indicated on As-Built Drawing G2. The well installation logs are provided at the end of this section. The monitoring wells are designed to intersect and monitor the shallow overburden water table.

The RA monitoring well network consists of the following:

- Monitoring well MW-3, located hydraulically downgradient of RA Areas 4, 5, 6, 13, and 14, and the southern collection trench;
- Monitoring well MW-6R, located hydraulically downgradient in the northeast perimeter corner of the site;
- Monitoring well MW-13A, located downgradient of the debris landfill;
- Monitoring well MW-14, located upgradient of the debris landfill and excavated areas;
- Monitoring well MW-17, located downgradient of the north collection trench; and
- Monitoring well MW-18, located downgradient of Areas 7 and 9, prior to the southern collection trench.

5.4 Well Installation Logs

Insert MW-3 Log

Insert MW-6R Log

Insert MW-13a Log

Insert MW-14 Log

Insert MW-17 Log

Insert MW-18 Log

6.0 WORK TASK 6 - TEMPORARY WATER TREATMENT SYSTEM

AAA provided, operated, and maintained a temporary water treatment system that was used to treat liquid waste streams generated during RA activities. The treated effluent was discharged to the Oneida County Department of Water Quality and Pollution Control (OCWQPC) (see Section 1.3.3 for permit information).

The treatment system operated in a batch mode; the treated water was not discharged until analytical results indicated that the treated effluent met the Oneida County permit criteria. The analysis was performed on a 24-hour turnaround basis using the methods specified in the SAP and as required by OCWQPC. The temporary treatment provided minimal capacity to treat water generated from one day of RA activities.

6.1 Equipment

The temporary treatment system achieved the required effluent criteria by removing solids via gravity settling, and using filtration to remove the remaining suspended particles potentially containing absorbed PCBs. The water potentially containing dissolved PCBs and VOCs was then pumped through granular activated carbon (GAC) units. The treatment system and tanks were contained within an earthen, bermed, polyethylene lined containment pad.

The process flow schematic designed by Tetra Sol, Inc. is presented in Submittal Section MP-11001. The temporary treatment system consisted of the following primary components:

- Two influent equalization/settling tanks, each with a 21,000-gallon capacity;
- Two multi-media filters (in parallel);
- Two bag filters (in parallel);
- Two GAC units (in parallel); and
- Two 21,000-gallon effluent storage tanks.

The multi-media filter, bag filter, and GAC units were consolidated on a framed skid, as with the valving and plumbing appurtenance.

All water generated by AAA during RA activities was transferred via an on-site vacuum truck to one influent equalization tank. The water remained in the influent equalization tank for a minimum of 12 hours (dependent upon turbidity of the water), for gravity settling, then passed into the second influent (holding) tank.

The water was pumped from the holding tank through one multi-media filter (effective filter size of 1 micron) and then through one liquid bag filter to remove any solids, processing between 45 to 50 gpm. After filtration, the water continued through one 1,000-pound GAC unit to complete the treatment process. The treated water was stored in a 21,000-gallon effluent tank, until laboratory analytical confirmed compliance with the OCWQPC. AAA provided second influent and effluent tanks, which were not required in the original contract specifications, to operate the system without delays that would otherwise have been associated with the batch discharge of the treated water (see Section 6.3 for operational details).

6.2 Startup Activities

Following mobilization and system setup, AAA performed startup testing activities, and troubleshooting prior to initiating normal operations. Startup activities were conducted in accordance with the Manufacturer's design and O&M Manual. The startup and testing consisted of treating 21,000 gallons of water collected from the Area 13 excavation. The treatment system was operated at initial flow rate of approximately 50 gpm. During startup, AAA monitored and recorded readings every 30 minutes, noting flow rates, pressure differential, and piping integrity.

Following the completion of the startup batch, *SECOR* collected one effluent sample (EW-1) and submitted it for laboratory analysis according to the OCWQPC requirements:

- Oil & Grease (USEPA 1664);
- VOCs (USEPA 624);
- Semi-Volatile Organic Compounds (SVOCs) (USEPA 625);
- PCBs & Pesticides (USEPA 608);
- Total Suspended Solids (TSS); and
- Metals (zinc, chromium, copper, lead, nickel, cadmium).

The sample (EW-1) was also submitted under the quality assurance/quality control (QA/QC) requirements outlined in the FSP, on a 24-hour turnaround basis. Based on the analytical results, EW-1 met the discharge criteria established by the OCWQPC.

Based on the analytical results and startup monitoring data supplied by AAA, *SECOR* approved normal treatment system operations.

6.3 Operation Activities

Following approval of operation activities, AAA operated and controlled the temporary water treatment system. AAA designated two on-site personnel to serve as operators during the temporary treatment system's operation. The daily activities performed by the system's operators included the following:

- Visually inspect the influent and effluent tanks to avoid overfilling;
- Control of the influent and effluent tank valves to fill and drain the tanks;
- Visually inspect all piping, pumps, fittings, gauges; and equipment for leaks;

- Record readings from the system pressure gauges associated with the filters and GAC units;
- Record readings from the flow meter to monitor the system to maximize the treatment process; and
- Record readings from the flow totalizer to determine total system flow and calculate the daily flow total.

AAA maintained daily operation logs in which process gauge and flow meter observations were recorded at the start, midpoint, and end of each effluent tank filling. Once an effluent tank was full (a batch) the discharge was switched to the second tank. Prior to discharging a batch to the sanitary sewer, one effluent sample was collected by *SECOR* and submitted for laboratory analysis on a 24-hour turnaround basis to confirm conformance to the OCWQPC permit requirements. Twelve additional effluent samples were collected (EW-2 through EW-9) and analyzed for the discharge criteria. Appendix E presents the analytical results.

6.4 Shutdown Activities

Following completion of sediment and soil removal activities, the temporary treatment system was systematically shut down in the following order of progression:

- The final 21,000-gallon batch of treated effluent was discharged to the sanitary sewer;
- Sediments were removed from the two influent equalization tanks and disposed of with the containment cell general waste;
- The carbon and filtering media were removed from the GAC units, multi-media filters, and the liquid bag filters. These materials were staged within a lined disposal container pending waste characterization; and
- The temporary water treatment system components and related equipment were transported off site via truck.

6.5 Leachate Handling

The leachate generated from the containment cell prior to completion of the leachate manhole and leachate storage facility was collected and transferred to the on-site temporary water treatment system for treatment subsequent to discharge to the sanitary sewer system, as outlined in Section 6.3.

Following the demobilization of the temporary water treatment system on November 11, 1998, the leachate was directed to temporary on-site storage. Two 1,500-gallon polyethylene tanks provided by AAA served as temporary storage for the untreated leachate. One leachate sample (CC-EF-1) was collected as a baseline sample and analyzed for the OCWQPC permit requirements. The analytical results indicate that untreated leachate sample CC-EF-1 was below discharge criteria established by the OCWQPC. Batch, test, and then discharge of the leachate continued in this fashion until the permanent system was complete and functioning. Appendix E provides the analytical results (EW-10 through EW-

13) for the leachate effluent discharge during the interim period. Subsequent leachate handling procedures are provided in the OMM Manual.

7.0 WORK TASK 7 - SOIL/SEDIMENT DISPOSAL

This section reviews the disposal of excavated soils and sediments. This section also provides a detailed description of the construction of the on-site containment cell. Disposal of other types of material from the site is covered in Section 10.0. Components of Work Task 7 include the following:

- Protocol for deciding disposal destination;
- Off-site disposal of PCB-laden soils;
- Construction of on-site containment cell base liner system;
- Placement of the excavated soil and sediments in containment cell;
- Construction of the leachate management system;
- Construction of the containment cell cover system;
- The containment cell perimeter components, and;
- The construction of the on-site building and internal components.

7.1 Soil Disposal Protocol

Soil and sediment excavated as part of the Remedial Action were direct loaded or staged, chemically stabilized, and gravity dewatered, as necessary, prior to disposal under one of the following methods:

- Off-site disposal at a TSCA-permitted landfill when the excavated soil/sediment contained greater than 50 ppm total PCBs;
- On-site treatment via an SVE treatment system constructed within the on-site containment cell, when the excavated soil/sediment contained less than 50 ppm total PCBs and greater than 10 ppm total VOCs of concern; and
- Direct placement in the on-site containment cell when the excavated soil/sediment contained less than 50 ppm PCBs and less than 10 ppm total VOCs of concern.

7.2 Off-Site Disposal

As part of this work task, the soil/sediment removed from Areas 6, 12, and 13 were handled and containerized. *SECOR* prepared the manifests, bills-of-lading, and the material tracking associated with the material removed from Areas 6, 12, and 13, which are included in Appendix G. The soil/sediment removed from these areas was disposed of as TSCA-regulated waste, at Chemical Waste Management's solid waste landfill, located in Model City, New York. The in-place volume of TSCA-regulated soil/sediment disposed of was 918 cubic yards. Drawing G2 shows the final horizontal limits of the excavation areas, as well as a table that details the individual excavation volumes.

7.2.1 Area 6

The sediments excavated from Area 6 required off-site disposal as TSCA-regulated waste. Prior to off-site disposal, the Area 6 sediments required chemical stabilization within a lined staging area located on the east parking lot designated for TSCA material only. A total of 238 tons of TSCA-regulated sediments were excavated from Area 6.

7.2.2 Area 12

The sediments excavated from Area 12 required off-site disposal as TSCA-regulated waste. Prior to off-site disposal, the Area 12 sediments required chemical stabilization within a lined staging area designated for TSCA material only. A total of 80 tons of TSCA-regulated sediments were excavated from Area 12.

7.2.3 Area 13

The soils excavated from Area 13 required off-site disposal as TSCA-regulated waste. A total of 600 tons of TSCA-regulated material were excavated from Area 13.

7.2.4 Area 6 Seep

On May 19,1999, an oily sheen was noted emanating from a point along the Area 6 ditch. This issue was addressed in correspondence to the NYSDEC, which is included in Appendix J. Soil associated with the excavation of the Area 6 Seep (30 cy) was disposed of off site as hazardous material due to the fact that the containment cell had been closed. The sediments were placed into two lined roll-off containers pending waste characterization prior to off-site disposal. Appendix G presents the final receipts and disposal location of the Area 6 Seep waste soils.

7.3 Containment Cell Liner System

The containment cell liner system consists of a single composite design as presented on Contract Drawing G-15. The cell liner system consisted of the following sequentially placed components from the base up to the waste:

- Compacted soil fill for berms and subbase;
- 60-mil HDPE geomembrane;
- Non-woven geotextile layer;
- Twelve inches of granular drainage material with a permeability of 1×10^{-2} cm/sec;
- A 6-inch HDPE SDR 17 leachate collection pipe;
- Non-woven geotextile layer; and
- Twelve inches of protective soil layer (special waste), free of protruding objects and deleterious

materials, and particles larger than 6 inches.

7.3.1 Subgrade Preparation

The subgrade surface was prepared in accordance with the Contract Specification MP-02200, free of protruding objects 6 inches or greater and free of surface water. The footprint of the containment cell was initially stripped of existing vegetation and debris to allow for subgrade preparation. The subgrade emplaced to the proposed grade and compacted to ensure proper drainage of the leachate collection system and to provide adequate support. This area was proofrolled and observed by *SECOR* to confirm that no soft spots were evident prior to liner construction.

7.3.2 Berm Construction

As part of liner placement, a perimeter berm was constructed around the containment cell footprint. The berm was constructed from imported soil fill material (Juliano Sand and Gravel), as specified (see Construction Submittal MP-02222). The berm was constructed approximately 4 feet high and 11 feet wide at the top with 3-to-1 (horizontal to vertical) side slopes. The interior side slopes of the berm were approximately 2.5-to-1 (see Contract Drawing G15).

The berm was constructed in lifts and required acceptable compaction prior to additional fill placement. PW provided a technician equipped with a nuclear density machine to perform the test as required by Contract Specification MP-02200. Results of these compaction tests are incorporated into Appendix H.

7.3.3 Subbase Layer

A minimum of 12 inches of soil fill subbase material was placed over the entire containment cell footprint, in accordance with Contract Specification MP-02222. The subbase material was graded to parallel the final liner, to provide adequate support and ensure proper drainage of the leachate collection system. The selected subbase material has a maximum particle size of 3 inches or less and is free of protruding objects and deleterious materials.

The perimeter berm is part of the subbase system and was constructed of the same soil fill material Compaction testing was also performed on the subbase. Results provided in Appendix H.

7.3.4 Geomembrane Installation

Following subgrade preparation berm construction, and subbase placement, a 60-mil textured HDPE geomembrane liner was placed over the berm, subgrade, and subbase layer within the entire limits of the containment cell, totaling approximately 5,159 square yards (sy). AAA subcontracted the HDPE liner installation to SOLMAX Corporation (SOLMAX) to meet the requirements presented in Contract Specification MP-02234.

SOLMAX and *SECOR* inspected the entire subbase surface prior to liner placement to ensure that no protruding objects were present. The HDPE liner was then deployed, welded, and then tested. The outside edges of the liner were keyed into a minimum 2-foot wide by 2-foot deep anchor trench, located at the crest of the berm (see Contract Drawing G-15).

7.3.4.1 CQA

The geosynthetic layer of the containment cell was constructed and tested in accordance with the procedures set forth in Section 5.0 of the CQAP. All work was constructed to the lines, grades, and dimensions presented on the Contract Drawings, and in accordance with the RDS. Furthermore, SOLMAX provided its own QA/QC during liner construction, as presented in Contract Submittal MP-02234.

<u>Field Panel Identification</u>

As part of the geomembrane placement, the installation contractor was responsible for ensuring each field panel was given an identification code consistent with the layout plan. A chart was used to show correspondence between roll numbers and field panel identification codes (i.e., A1 = Panel 1; 001 = Roll # 1; or A1001). *SECOR* CQA personnel verified that the following conditions were achieved during panel placement:

- The mean ambient air temperature was greater than 32□F and less than 120□F;
- The field panels were installed at the location identified in the SOLMAX layout plan;
- The subbase/subgrade was accepted prior to geomembrane placement;
- All personnel working on the geomembrane were prohibited to smoke, wear damaging shoes, or engage in activities that could damage the geomembrane;
- Minimize wrinkles in the panels during deployment;
- Adequate slack in the geomembrane was provided to allow for thermal expansion and contraction; and
- Temporary anchoring was placed to prevent uplift by wind.

<u>Seam Layout</u>

Prior to geomembrane placement, SOLMAX provided *SECOR* CQA personnel with a seam layout drawing. *SECOR* reviewed the layout and confirmed that it was consistent with accepted practices. The seams were generally oriented parallel to the line of maximum slope, not perpendicular to the slope. A seam numbering system, corresponding with the panel numbering system, was utilized to track QC testing.

Extrusion Process

SOLMAX provided documentation certifying that the extrude is compatible with the specifications and that the welding resin is comprised of the same resin as the geomembrane liner. SOLMAX provided CQA personnel log apparatus temperatures, extrude temperatures, and geomembrane surface temperatures at designated intervals. *SECOR* CQA personnel verified the following:

- Adequate number of spare operable seaming apparatus;
- The extruder was purged prior to beginning a seam;
- Grinding was performed perpendicular to the seam in as far as possible and was completed no more than two hours prior to seaming;
- The connecting panels of the geomembrane have a minimum overlap of 3 inches for extrusion welding; and
- A smooth insulating plate or fabric was placed beneath the hot weld apparatus after usage.

Fusion Process

SOLMAX provided documentation regarding the automated vehicular fusion welding apparatus, equipped with gauges capable of giving applicable temperature and pressure. SOLMAX CQA personnel logged ambient seaming temperature, and geomembrane temperature and pressure. *SECOR* CQA personnel verified that:

- For cross seams at the connections, the edge of the cross seam was ground to a smooth taper prior to welding;
- A movable protective layer was used, as necessary, directly below each overlap of the geomembrane to be seamed to prevent buildup of moisture between the sheets;
- Prior to seaming, the seam area was clean and free of moisture, dust, and debris of any kind;
- Seams were aligned with the fewest number of wrinkles; and
- The panels of the geomembrane had a minimum overlap of 5 inches for fusion welding.

Trial Seams

Trial seams were fabricated from fragments of geomembrane to verify that the seaming conditions were adequate. Trial seams were made at the beginning of each seaming period. Also, each seamer was required to make at least one trial seam every four hours. The trial seam was, at a minimum, 3 feet long. *SECOR* CQA personnel observed all trial seams. Destructive testing (peel and shear) were performed by SOLMAX CQA person on all trial seams with the results relayed to the master seamer so equipment adjustment, if any, could be made. Results of this testing is contained in SOLMAX QC Report (See

Contract Submittal MP-02234).

General Seaming Procedures

The general seaming procedures implemented by SOLMAX were as follows:

- A firm substrate was used to provide a hard surface, in order to achieve proper support;
- Seaming extended to the outside edge of panels to be placed in the anchor trench; and
- A moveable protective layer of plastic was placed directly below each overlap of geomembrane that was seamed.

Non-Destructive Testing

SOLMAX performed non-destructive testing of all field seams using the air pressure test or a vacuum box test unit. Non-destructive tests were performed to check the continuity of seam leakage, not seam strength. SOLMAX provided internal CQA consisting of the following:

- Record location, date, test unit number, name of tester, and outcome of all testing; and
- Inform the master seamer of any required repairs or adjustments.

Destructive Testing

SOLMAX performed destructive testing at locations selected by *SECOR*. The destructive tests were used to evaluate the seam strength. *SECOR* selected the locations where the seam samples were cut from. The locations were established as follows:

- At a frequency of one sample per 500 linear feet of seam length;
- Test locations were determined during seaming at the discretion of *SECOR* CQA personnel;
- A number was assigned to each sample, and marked accordingly;
- The sample location was recorded on the layout drawing; and
- The sample for testing was approximately 12 inches wide by 54 inches long, then cut into three parts: one portion for the SOLMAX QC person for on-site testing, one for the independent CQA laboratory, and one to archive.

Geosynthetic Quality Assurance Testing

Destructive test samples were packaged and shipped overnight to TRI Environmental Inc. (TRI) for the independent testing. The QA destructive testing included Seam Strength and Peel Adhesion (ASTM D638). The destructive testing results and specific material qualities are included in the SOLMAX QC Report (see Contract Submittal MP-02234).

7.3.5 Leachate Collection Pipe

All leachate generated from the containment cell is collected and conveyed by a 6-inch HDPE SDR 17 pipe located along the center of the containment cell floor (see As-Built Drawing G3). The leachate collection pipe consists of a single wall with 2-inch diameter perforations throughout its length within the containment cell (see Contract Submittal MP-02526). The collection pipe was backfilled with washed NYSDOT Type II select fill drainage material. All joints of the 6-inch HDPE leachate collection pipe were joined by butt-fusion (thermal-weld). The cell bottom, as well as the pipe, is constructed to drain to the penetration.

7.3.5.1 Cell Penetration

The leachate collection pipe penetrates the liner system at the west end of the containment cell and ends at the leachate collection manhole. At the containment cell penetration, the leachate collection pipe changes to a 6-inch diameter solid conveyance pipe inside a 10-inch diameter secondary containment pipe with annulus caps. The 10-inch diameter secondary containment pipe was extrusion welded to the 60-mil geomembrane using a standard boot penetration detail. The standard penetration construction differed from the original design (see Contract Drawing G-16). A letter dated October 29, 1999, was issued to the NYSDEC detailing the adjustments (see Appendix J).

7.3.5.2 Pipe Cleanout

At the eastern portion of the containment cell, the upgrade end of the leachate collection pipe is constructed to surface and provides access for inspection and cleaning. The cleanout pipe penetrates and is welded to the HDPE cover liner. A steel protective casing with a lock is placed over the cleanout pipe and is structurally held in place by a 12-inch thick concrete slab (see Contract Drawing G-16). Procedures for using the pipe cleanout access are reviewed in the OMM Manual.

7.3.6 Drainage Layer

As part of the base liner system and the leachate collection system, a 12-inch layer of drainage material (Type 3 select fill) was placed over the entire containment cell bottom, overlying the 60-mil geomembrane (see Contract Drawing G-15). The containment cell side slopes were covered with a geosynthetic drainage composite (see Section 7.3.7) in lieu of the select fill drainage material. The composite material consisted of clean medium-to-coarse sand free of organics. The drainage material has an in-place permeability of 1.0×10^{-2} cm/sec or greater, in accordance with Contract Specification MP-02221. The drainage layer was placed over the leachate collection pipe, providing a minimum of 12 inches of cover. Placement of this material was performed using a low ground pressure dozer. A minimum of one CQA observer was assigned to this spreading operation at all times to assure the dozer did not come in contact with HDPE liner.

7.3.7 Geosynthetic Drainage

The containment cell liner side slopes are drained with a geosynthetic drainage composite, in lieu of the 12-inch thick drainage layer. The geosynthetic drainage composite consists of HDPE drainage net with a 6-oz/sy non-woven textile on either side. The drainage composite was installed in accordance with Contract Specification MP-02219 and as detailed on Contract Drawing G-15.

7.3.7.1 CQA

The containment cell base liner system along the side slopes consisted of one layer of 60-mil geomembrane, followed by one layer of geosynthetic drainage composite. The liner subcontractor deployed both of these materials. The manufacturers product properties certifications were included in the SOLMAX QC Report. The report also includes the panel layout configuration, provided in Contract Submittal MP-02234.

7.3.8 Geotextile Layer

The containment cell liner system consists of a Type-1 non-woven geotextile fabric (see Contract Specification MP-02232), which covers the entire 12-inch drainage layer. The geotextile fabric provides separation between the 12-inch drainage layer and the 12-inch special waste layer. The geotextile panels were installed with a 12-inch overlap, in accordance with Contract Specification MP-02232.

7.3.8.1 CQA

The non-woven geotextile submittals were initially reviewed for compliance with the specifications to include certifications and warranties. *SECOR* CQA personnel examined rolls upon delivery to assure the material was consistent with that specified. The deployment operations were also observed. The Contractor then submitted a panel layout sketch, which was checked with that observed (see Contract Submittal MP-02232).

7.3.9 Protective Soil Layer

The protective soil layer consisted of a minimum of 12 inches of special waste material that was free of deleterious substances and objects that could potentially harm the liner system. The protective soil layer material was processed through a screen, which removed objects larger than 6 inches in diameter. Placement of the protective soil layer was performed using a low ground pressure dozer.

7.3.10 Anchor Trench Drain

The anchor trench drain consists of a 2-foot wide by 2-foot deep trench along the centerline of the containment cell perimeter berm (see Contract Drawing G-15). The 60-mil HDPE textured geomembrane was keyed into the bottom of the trench, then backfilled with soil fill to within a minimum of 12 inches from the top of the trench. The anchor trench drain was then lined with Type 1 non-woven fabric (see Contract Specifications MP-02232). A 4-inch diameter flexible HDPE perforated pipe was placed within the anchor trench, and backfilled with Type 3 select fill (see Contract Specifications MP-02221). The anchor trench drain penetrates through the geotextile at four perimeter locations and empties into the B ditch along the perimeter of the cell (see As Built Drawing G-3). These were constructed of a 4-inch diameter solid HDPE pipe and set at the low point in order to positive drain. A 6-inch protective casing surrounds this drain pipe and was equipped with a screen over the end.

7.4 Soil/Sediment Placement

Upon completion of the containment cell liner system and drainage components, the process of placing soil/sediment waste in the cell was initiated. The soil/sediment placement activities occurred between October 17 and November 17, 1998. Drawing G2 presents the limits of the soil and sediment removed from each excavation, as well as the excavated soil/sediment volumes. Once waste placement began, the liquid collected in the containment cell was considered leachate and was directed to the temporary water treatment system, as described in Section 6.5.

7.4.1 General Waste

The general waste portion of the cell consisted of soil/sediment not requiring treatment via SVE (i.e., less than 10 ppm total VOCs), and soil/sediment containing less than 50 ppm PCBs, as determined by the guidelines set forth in the FSP. This included material received from Areas 1, 3, 4, 4D, 5, 7, 9, 10G, 11, and 14, as well as the northern and southern collection trenches (see As-Built Drawing G2 for individual volumes). Portions of the general waste volume consisted of visibly stained wood, concrete, granite test blocks, metal fragments, and miscellaneous debris not suitable for off-site disposal. Note that Area 10G materials were objects greater than 4 inches, which were sieved from Area 10 material, to include the fragmented granite test blocks.

7.4.1.1 Placement

The soil/sediment was placed into the cell in loose 18-inch lifts. The soil/sediment was moderately compacted during the placement process; grading performed by a low ground pressure dozer. The compaction process was visually observed by the on-site Engineer. Larger objects requiring placement in the containment cell were incorporated in the general waste. This involved singly burying these objects so as not to create voids and limit settlement. Placement location was selected to provide safe distance from both the base liner and cover system.

7.4.1.2 Select Waste

The select waste comprised the final 12-inch thick lift of waste within the containment cell and is similar to the special waste in the base liner (see Section 7.3.9). The select waste material consisted of soil/sediment having a maximum particle size of 3 inches and free of protruding or deleterious objects, such as concrete, metal, wood, and brick. Subsequent to placement, the select waste layer was graded to a smooth surface.

7.4.1.3 Passive Gas Venting System

As part of the select waste placement, AAA constructed a passive gas vent trench for general waste located at the approximate high point of the cell (see Contract Drawing G-7). The trenches were excavated a minimum of 2 feet deep and 3 feet wide within the select waste. The trenches were then lined with Type 1 non-woven geotextile (see Contract Submittal MP-02232) and backfilled with Type 2 select fill material (see Contract Submittal MP-02221).
As part of the passive gas vent system, vent No. 1 was installed to provide a release pathway for any potential gas. The passive gas trench associated with the general waste portion of the containment cell intersects passive gas vent No. 1. The passive gas vents consist of a 6-inch diameter slotted Schedule 80 PVC riser pipe extending a minimum of 3 feet below the liner with a cap on the bottom. Below grade, riser pipe was surrounded by Type 2 select fill. The geomembrane was mechanically seated to a solid 6-inch diameter Schedule 80 PVC riser pipe as it passed through the cover system. At the surface, the riser pipe was equipped with elbows in order for the outlet to be positioned downward and included a screen over the end.

7.4.2 SVE Waste

The SVE portion of the containment cell consists of soil/sediment containing VOCs of concern at concentrations greater than 10 ppm. The soil/sediment contained in the SVE cell was removed from Areas 2, 6A, 8, and 10 (see As-Built Drawing G2 for individual volumes). VOC concentrations were determined by the methods set forth in the FSP. The total volume of soil/sediment contained in the SVE portion of the cell is 2,523 cy, including the one-foot of select waste on top.

7.4.2.1 Placement

The soil/sediment waste was placed and graded in the SVE cell in loose 18-inch lifts, utilizing a low ground pressure dozer. Prior to placement, the soil/sediment to be located in the SVE cell was mechanically screened to remove particles greater than 4 inches in all dimensions. Material larger than 4 inches was placed in the general waste portion of the cell (see Section 7.4.1). The SVE extraction/injection system was installed during waste placement. Construction of the SVE system is covered in the following section.

7.4.2.2 Extraction/Injection System

The piping system associated with the SVE cell included the following:

- Seventeen horizontal, 4-inch diameter, 0.020-inch slotted Schedule 80 PVC pipes were installed spanning the width of the SVE cell for air injection or extraction of vapor phase VOCs of concern. The horizontal piping was placed at different depth intervals within the SVE cell, as shown on As- Built Drawing M3;

- Seventeen vertical, 4-inch diameter solid schedule 80 PVC, vapor extraction/injection wells, penetrating through the 60-mil geomembrane cover. The vertical extraction/injection wells are sealed to the 60-mil HDPE geomembrane liner with a boot, waterproof caulk, and a stainless steel band; and

- Seven vertical sampling ports were installed on top of the SVE waste. The ports consist of 4-inch diameter, solid, Schedule 80 PVC pipe penetrating one foot below the HDPE liner. The ports were sealed in the same fashion as the extraction/injection wells.

The SVE system was determined to not be needed (see Section 7.9); therefore, the ancillary surface equipment was not installed. Consequently, the extraction/injection wells and sampling port have been truncated and capped approximately one foot below final grade.

7.4.2.3 Waste Separation

To provide separation between the general waste and the SVE waste, a 20-mil HDPE liner was constructed during material placement. Based on field screening results, the volume of actual SVE waste to be placed in the cell was determined to be less than originally estimated in the design specifications. Therefore, the waste material separator was relocated further to the west than originally shown in the design specifications. As-Built Drawing M3 indicates the final location of the waste material separator.

Once the SVE material had been placed and graded, the Contractor installed a 20-mil HDPE liner (see Contract Submittal MP-02234) across the entire face. The purpose of the liner is to prevent precipitation from infiltrating through the VOC-impacted soils, to prevent the escape of VOCs into the atmosphere, and to reduce potential short-circuiting of the SVE system. Select waste was used beneath and on top of the liner to prevent potential damage. The general waste was then placed against the liner, providing grading continuity of the two waste subcells.

7.4.2.4 Select Waste

The select waste placed over the SVE portion of the containment cell and was essentially the same material as that used in the general waste area. See Section 7.4.1.2 for additional information.

7.4.2.5 Passive Gas Venting System

During construction of the final lift of select waste on top of the SVE subcell, AAA constructed a passive gas venting system similar to that installed in the general waste area. Although not indicated on the Contract Drawings, a separate trench and surface vent were constructed (see As-Built Drawing M3). A review of the gas venting system is provided in Section 7.4.1.3 (Note: A 4-inch diameter passive gas vent, as opposed to a 6-inch diameter, was installed near the east edge of the waste separator).

7.4.2.6 Waste Sampling

To allow for closure during the 1998 construction season and to eliminate the need for re-mobilization upon completion of the SVE process, a permanent 60-mil cover was placed over the SVE portion of the containment cell. Nine vertical sampling ports (A through G) traversing the length of the SVE cell were installed to provide discrete sampling locations, without damaging or compromising the integrity of the 60-mil geomembrane. The sampling port construction is covered in Section 7.4.2.2.

Separate from the RDS and the FSP, *SECOR* collected two baseline soil samples from the SVE cell to evaluate the operation of the SVE system. The analytical results from the initial baseline SVE samples indicated that total VOCs of concern were at or below cleanup objectives for the site, which eliminated the current need for the SVE system.

Section 7.9 provides a detailed discussion pertaining to the use of the SVE system.

7.5 Leachate Management

The leachate management system was designed and installed to collect water that has come into contact with waste soils and provide controlled disposal of this water, and is an integral part of the overall containment cell. In order to control the amount of leachate, a containment cell cover system was constructed (see Section 7.6) to divert precipitation away from the waste. Furthermore, the containment cell is constructed with a liner system (see Section 7.3) to retain and divert leachate to a collection pipe. The primary components of the leachate management system are the collection system, drainage pipe, pumping manhole, conveyance pipe, and storage tank.

7.5.1 Collection System

The leachate collection system lies at the bottom of the containment cell and provides an easy path for the leachate to gravity flow. The construction of this system is reviewed in Section 7.3.5 as part of the containment cell liner system. Generally, the 6-inch diameter perforated HDPE pipe begins at the cleanout and follows the lowest point along the base of the cell approximately 370 feet to the liner penetration. The location and extent of the leachate collection system is displayed on As-Built Drawing G3.

7.5.2 Drainage Pipe

The drainage pipe is a continuation of the leachate collection pipe at the point where the containment cell liner is penetrated (see Section 7.3.5.1). It extends underground approximately 50 feet from the liner penetration point and terminates in the manhole. The drainage pipe consists of a 6-inch diameter solid HDPE SDR 17 pipe, as specified in Contract Submittal MP-02526. It is encapsulated by a 10-inch diameter solid HDPE pipe through its entire length, which serves as secondary containment. The 6-inch drainage pipe and 10-inch containment pipe are sloped to gravity drain into the manhole. Although the 6-inch drainage pipe is not under hydrostatic pressure, the 10-inch secondary containment pipe is provided as a contingency, should the drainage carrier pipe acquire a leak.

7.5.3 Collection Manhole

The Leachate Collection Manhole is located directly east of the containment cell and west of the Remedial Action Facility (RAF) building, as shown on As-Built Drawing G3. The purpose of the manhole is to safely collect leachate generated by the containment cell waste through gravity drainage and then pump the leachate to a storage tank located inside the RAF building. The manhole and associated influent and effluent pipes are of double containment construction. If a pipe or the manhole should acquire a leak, the secondary containment pipe system is provided as a contingency.

7.5.3.1 Manhole Construction

The manhole is constructed of a 2-inch thick, 50-inch inside diameter HDPE pipe, approximately 10 feet deep, set on a concrete base, as displayed in As-Built Drawing M4. The 50-inch pipe is set within a 2-inch thick, 63-inch outside diameter HDPE pipe, which provides interstitial space for leak detection. The manhole was prefabricated by Ayer Sals Systems Division, Syracuse, New York (see Contract Submittal MP-15146). The entire manhole is capped with a pre-cast concrete cover, which includes a 42-inch by 42-inch access door. At the surface, there is an electrical panel to control the pumps and instrumentation, and two bollards for protection.

The prefabricated manhole contains the following:

- Six-inch HDPE leachate drainage (influent) pipe within a 10-inch HDPE containment pipe;
- Lead/lag pumping system (two pumps);
- Check valve and shut-off valve for each pump;
- Two-inch HDPE leachate conveyance (effluent) pipe within a 6-inch HDPE containment pipe;
- Float switch on the effluent containment pipe;
- Four mercury float switches;
- Electrical service appurtenance;
- Two manhole interstitial space access ports (one is fitted with a float switch); and
- Fixed access/egress ladder.

The interior of the manhole is considered to be a hazardous area (NEC Class 1, Division 1, Group D); therefore, proper confined space entry and health and safety protocol must be followed when entering. Confined space entry and health and safety protocols, as well as inspection and maintenance, are detailed in the OMM Manual.

7.5.3.2 Pumps

The two pumps housed within the manhole are submersible, centrifugal, explosion-proof, sewage grinder type units. Each is rated at 2 horsepower (HP), 460 volts, 3-phase, 60 hertz, 3,450 revolutions per minute (RPM), producing 40 gpm at 20 feet of total head. The pumps (Model No. G1LX200JD) are manufactured by Aurora Hydromatic Pump, Inc., and have been installed with an electrical power cord, a sensor cord, a service chain, and plumbing running vertically upwards. A manufacturer's service manual is included in the Contract Submittal MP-15146. The leachate transfer system is designed with an automatic lead/lag pumping system. Two identical submersible pumps (Pump No. 1 and Pump No. 2) are located in the manhole, either one can be activated as the lead pump. The volume of leachate is expected to be such that one pump can handle transfer of the leachate. Therefore, the lag pump would only be (automatically) activated if the lead pump should fail. During scheduled inspection, the active lead pump will be changed over to allow similar running times for both pumps, as outlined in the OMM Manual. The control panel, located adjacent to the manhole, contains a three-position switch (HAND/OFF/AUTOMATIC [HOA]) for each pump, as well as a lead pump switch. This lead pump switch will dictate which pump is running under normal operations. A pump must be switched to automatic for the lead/lag system to function. The pump's automatic controls are reviewed in Section 7.5.3.4.

7.5.3.3 Plumbing

A 2-inch diameter PVC pipe extends upward from each pump, passing through a check valve, an elbow, and a ball valve prior to joining the other pump at a tee (see As-Built Drawing M4), which connects to the leachate storage tank by way of the conveyance pipe. The ball valve is a union connection, which facilitates pump removal and plumbing repair. The piping can be viewed from the surface through the access door.

7.5.3.4 Pump Controls

The control panel for the pumps is located on the north side of the manhole. Externally, the panel has operational lights, control switches, and hour meters. The operation of these features is discussed in the next section. Attached to the control panel are an overhead light, a receptacle, and the 3-phase to single-phase transformer. Internally, the control panel contains important fuses, circuit breaker, relays, and a heater. The manhole receives power via an underground conduit from the building to the manhole control panel, then underground into the manhole (see As-Built Drawings E2, E3, and M4). A 480-volt, 3-phase, 20 amp service is installed. A wiring schematic and layout for the control systems are provided in the Contract Submittal MP-16900.

The face of the control panel contains all functions for the two leachate pumps housed in the manhole. An upper light (white) will indicate that there is power to the panel. Three pump control switches are located below the "power on" white light. The center switch is the "Lead Selector Switch," identifying which pump, Number 1 or Number 2, is actively being controlled by the lead float switch. A float switch is provided for the lag pump as well. A green light, above the pump switch, when lit, indicates that the pump is running. The pump control switches, to the left and right of the lead selector switch, have three positions (HAND/OFF/AUTOMATIC [HOA]), as follows:

- The HAND position allows the pump to operate manually without the automatic liquid level controls;
- OFF is used for the period when the pump is not in use or during system testing; and

- AUTOMATIC is the normal operating position for both pumps. The AUTOMATIC setting allows the mercury switch level controls to maintain the amount of leachate in the manhole.

The leachate collection manhole contains four mercury float switch level controls (Hydromatic Model 3900 by Aurora Pump), as indicated on As-Built Drawings M1 and M4. The float switches are bulb-shaped in appearance and hang loose in the manhole. During normal operations, two float switches are used to turn on (Level Switch Low [LSL 100]) and turn off (Level Switch Low Low [LSLL 100]) the active lead pump when placed in the AUTOMATIC mode. If, for some reason, the lead pump is not able to control the liquid level, the manhole is equipped with an additional mercury float switch (Level Switch High [LSH 100]. This switch is set such that the lag pump will be activated as a contingency. The fourth mercury switch (Level Switch High High [LSHH 100]) operates the alarm circuit. If the liquid level in the manhole surpasses the lag pump switch and the two pumps do not control the leachate, this switch will then activate the auto dialer.

The control panel also contains an hour meter for each pump. These readings can be recorded during scheduled inspections and during the pump changeover or when a pump is in changeout. These procedures are detailed in the OMM Manual. The pump operation is also controlled by a fail-safe system. This is a permissive relay contained in the manhole control panel, which is activated only by certain conditions at the tank. If the storage tank is full or liquid is in the containment dike, the permissive relay will be activated, resulting in the power being shut off to the pumps. This discontinues leachate transfer until the situation at the tank is corrected.

7.5.3.5 Alarm System

The manhole control panel receives alarm signals from the three sensors located in the manhole, as follows:

- "High Manhole Level" (LSHH 100) notes a high liquid level in the collection manhole, which, in turn, activates the alarm channel A-5 of the auto dialer;

- Manhole Leak" (LSHH 200) senses liquid in the interstitial space of the manhole, which, in turn, activates the alarm channel A-6 of the auto dialer; and

- "Pipe Leak" (LSHH 201) indicates that liquid is in the manhole effluent containment pipe, which, in turn, activates the alarm channel A-7 of the auto dialer.

Each of these sensors is supported by a red light on the control panel, which illuminates in an alarm situation. These alarm signals also activate the auto dialer (see Section 7.8.3.5) located in the building. As previously described, the manhole contains four mercury float switches. The uppermost switch (LSHH 100) is set to sense high leachate levels in the manhole. If the pumps do not control the leachate level, this switch will activate the auto dialer.
As described in Section 7.5.3.1, the HDPE leachate collection manhole is encompassed by a HDPE secondary containment providing an approximately 3-inch wide annular or interstitial space. This space will collect leachate and provide a warning if the collection manhole should acquire a leak. Access to the annular space is through two ports located inside the manhole. These ports can be viewed through the access door at the surface. One port is fitted with a liquid level detection device that will activate the

light on the control panel, as well as the auto dialer, and provide a warning that the interstitial space contains liquid. The second port has a removable cap to allow observation and servicing.

The interstitial space-monitoring device is a liquid level switch (float switch, manufactured by Flowline; see Contract Submittal MP-15146) that should be extended within a few inches (initially set at 3 inches) of the bottom of the manhole. Due to condensation and the inability to totally pump out the interstitial space volume, the probe cannot be placed at the base of the manhole. If the liquid level in the interstitial space rises to the liquid level switch (LSHH 200), the auto dialer will be activated to notify the Engineer that servicing is required.

As with the manhole, the influent and effluent piping is constructed such that leaks can be detected and contained. This type of construction is commonly known as double containment piping. It involves a conveyance pipe that handles the leachate transfer, and an outer or second pipe, which totally surrounds the conveyance pipe. The annular area between the pipes is identified as the interstitial space that contains and provides a means of leak detection.

Leachate is transferred from the leachate collection manhole to the leachate storage tank by means of a conveyance pipe consisting of a 2-inch diameter HDPE pipe within a 6-inch HDPE pipe. It has been constructed such that any liquid in the interstitial space resulting from leakage will gravity-flow back to the manhole. The annular space is capped at the manhole and is equipped with a liquid level detection device, similar to the float located in the manhole interstitial space. If the conveyance pipe, which is under pressure from the pumps, should acquire a leak, it would be contained and detected by this float switch (LSHH 201). Subsequently, the panel light and auto dialer would be activated. The float switch is attached to the bottom of the 6-inch containment pipe within the manhole, as well as a valve for sampling and draining.

Similar to the manhole effluent line, the influent leachate line into the manhole is of double containment construction. It is also graded to allow flow, by gravity, into the manhole. Although this drainage pipe is not under pressure, a leak could occur. As there is no alarm system for the influent line, it must be visually checked during scheduled inspections, as outlined in the OMM Manual.

7.5.4 Conveyance Pipe

The conveyance or carrier pipe routes leachate pumped from the manhole to the storage tank. This is a buried 2-inch diameter HDPE pipe (see Contract Submittal MP-02526) extending approximately 85 feet and surfaces in the building, as can be seen on As-Built Drawing M2. The HDPE conveyance pipe was constructed on site using hot plate thermal process. The leachate is pumped from the manhole through the conveyance pipe as well as a flowmeter and check valve just prior to entering the storage tank.

The carrier pipe is encapsulated by a 10-inch diameter HDPE containment pipe as a contingency. This secondary containment pipe extends from the manhole to a point just over the steel dike tank. The pipe is capped and should leachate leak from the remaining carrier piping, it would receive by the dike tank.

The containment pipe is constructed to gravity drain back to the manhole and contained. Should a leak occur, the alarm in the manhole would be activated as described in Section 7.5.3.5.

The aboveground section of the conveyance pipe is located within an unheated portion of the building.

To prevent freezing, the pipe is wrapped with electrical heat tracing tape (heat tracing) (see Control Submittal MP-15051) and 2 inches foam insulation extending from one foot below the floor to the connection at the top of the storage tank. The heat tracing tape is equipped with an automatic temperature switch, which activates it when weather conditions approach freezing.

7.5.4.1 CQA Pipe Pressure Test

Following installation, the conveyance pipe (interior) and containment pipe (exterior) were pressure tested on April 1, 1999. The conveyance pipe was hydrostatically tested at 80 psi for four hours under the supervision of CQA personnel. Results of the hydrostatic test were accepted.

Following the hydrostatic test of the conveyance pipe, the containment pipe was pneumatically tested at 25 psi for four hours under the supervision of CQA personnel. The test identified a leak in the containment pipe at a fitting near the leachate aboveground storage tank. The fitting was field repaired by extrusion welding and the conveyance pipe was hydrostatically retested on May 7, 1999, at 25 psi for 4 hours under the supervision of CQA personnel. Results of the second hydrostatic test were accepted.

7.5.5 Storage System

As the manhole collects leachate from the containment cell, the leachate is pumped from the manhole into a leachate storage tank located in the tank pad area to await final disposition. Primary components of the leachate storage system include the following:

- Leachate storage tank;
- Secondary containment dike tank;
- Control panel; and
- Alarm features and instrumentation.

When the tank is full, it is sampled and transferred to a tanker truck, then hauled to an approved treatment facility.

7.5.5.1 Storage Tank

A 5,000-gallon above ground leachate storage tank is located in the tank pad area within the building (see As-Built Drawing M2). This storage tank is single-wall, cylindrical in design and was constructed of steel by Mohawk Metal Products Co., Inc., of Utica, New York (see Contract Submittal MP-15000). The tank sets horizontally within a steel dike tank that provides secondary containment should the leachate storage tank fail. The dike tank is capable of containing 110% of the capacity of the storage tank. The dike tank stands 4.5 feet tall; therefore, a stairway and landing are attached to provide access.

The storage tank is equipped with fittings which allow access through the top and west end. The top includes the following:

- A 4-inch vent;

- An 18-inch manhole for cleaning and inspections;
- A liquid level transmitter;
- An influent pipe with a check valve and flow totalizer;
- A full tank float switch; and
- A temperature probe.

The west end includes the following:

- A 3-inch drain fitting, where leachate is transferred out; and
- A 2-inch sampling port.

7.5.5.2 Plumbing

The leachate storage tank influent conveyance pipe originates underground from the manhole. The 2-inch diameter HDPE conveyance pipe is contained within a 6-inch diameter HDPE containment pipe until it reaches over the dike tank. The conveyance pipe continues to direct the leachate through a flow totalizer meter and check valve prior to entering the top of the storage tank. The flow meter provides the total number of gallons of leachate pumped and can be read directly or from a remote unit located next to the control panel. Inside the storage tank, the pipe is extended to within a few inches of the bottom to facilitate leachate mixing.

The storage tank is equipped with a 3-inch diameter effluent pipe for transferring the leachate into a tanker truck. This pipe has a valve and a male quick connect hose fitting to assist in the transferring process. Frost protection is covered in Section 7.5.5.5.

7.5.5.3 Control Panel

The leachate storage system includes an electrical control panel located along the east wall of the tank pad area. The control panel displays three operation lights, three control buttons, and an audible alarm. An illuminated white light indicates that the control panel has power. Two red lights on the panel indicate a full tank and liquid in the containment tank.

The control panel is equipped with an audible alarm system. This includes the alarm horn; horn reset button, horn test button, and a fault-reset button. Due to the fact that all of the sensors are passed through the auto dialer and generally no one is at the RAF, the horn has been disconnected. Furthermore, the fault reset button is no longer necessary, as the liquid sensors are automatically reset.

Internally, the control panel directs information regarding the leachate storage tank to the auto dialer. The storage tank is equipped with a liquid level indicator that provides analog information to the auto dialer through a controller located in the control panel.

A permissive control relay is a fail-safe system that will override the pump operation. If the tank is full or if liquid is sensed in the dike tank, the relay will shut down the power to the pumping system and not permit additional leachate to be pumped. Although the relay for this function is located in the manhole control panel, activation emanates from the above noted storage tank sensors. A wiring schematic and layout is provided in the auto dialer manual located in Contract Submittal MP-16900.

7.5.5.4 Alarm System

The leachate storage tank and its secondary containment tank are equipped with four sensors, as indicated on As-Built Drawing M1 and identified below:

- "Tank Low Temperature" (TSL 302): This sensor monitors the leachate temperature and activates the auto dialer (Channel A-8) as it approaches freezing (set at approximately 35ºF);

- "Tank Leak" (LSH 301): This is the dike tank liquid level sensor, which is set to activate the auto dialer (Channel A-3) if the liquid rises approximately 5 inches in the containment tank;

- "Tank High Level" (LSHH 300) is a leachate storage tank 100% full sensor, which activates the auto dialer (Channel A-2); and

- "Tank 90% Full" (LSH 300) works through LI 300 controller and transmitter sensor LT 300 to provide a leachate storage tank 90% full alarm through the auto dialer (Channel A-4).

The temperature sensor, located within the storage tank, activates the auto dialer as the leachate approaches freezing. This is set to activate the auto dialer at 35 degrees Fahrenheit (ºF). The temperature setting is adjustable.

The secondary containment dike tank has a liquid level sensor (float switch). The float switch will trigger an alarm if the liquid in the containment dike increases to a level approximately 5 inches above the bottom of the tank. The dike tank's liquid level sensor is located in the southeast corner of the tank. This sensor will act as a fail-safe system if the leachate tank alarms should fail and leachate overflows into the containment dike tank. In the event that an overflow occurs, the permissive relay will also be activated, disconnecting the power to the pumps.

The tank 100% full sensor is a separate float switch unit, which provides a fail-safe system should the liquid level transmitter fail. If this float is activated, the red 100% tank full light on the control panel will illuminate. This also triggers the auto dialer and will disconnect the power to the pumps through the permissive relay.

The liquid level transmitter is located on top of the storage tank and senses the liquid level by means of SONAR. The transmitter sends information to the relay controller located in the tank control panel. The liquid level transmitter has the ability to send an alarm at any preset depth, and is currently set at 90% full. Therefore, when the tank is 90% full, an alarm is sent through the auto dialer. This activates the receiver to transfer the collected leachate, as outlined in the OMM Manual. Additional information on the transmitter and auto dialer can be found in the Contract Submittal MP-16900. An overview of the auto dialer system functions is presented in Section 7.8.3.5.

7.5.5.5 Heat Trace System

The tank pad area is not heated; therefore, the leachate tank and external plumbing have been protected from freezing temperatures using dedicated heating elements. The leachate temperature is thermostatically controlled using electrical heat tape for the piping, and a heat pad for the tank. Both types of heat units are manufactured by Thermon. Additional information can be found in the Contract Submittal MP-15051. These heating elements are covered with 2 inches of foam insulation and wrapped with a protective layer of mesh fabric and mastic. As-Built Drawings E2 and E5 illustrate the circuitry and location of the electrical components.

The tank is equipped with a thermostatic liquid temperature sensor (see Section 7.5.5.4), which will trigger the auto dialer in the event of freezing conditions. The probe is immersed in the leachate and is set to actuate at approximately 35ºF. The temperature trip setting is adjustable.

7.6 Containment Cell Cover System

Once soil/sediment waste placement was completed within the containment cell, a cover system was constructed to reduce infiltration of precipitation into the containment cell and prevent potential contact with the waste. The cover system consisted of the following components listed from bottom to top:

- A geosynthetic clay liner (GCL). This layer was only installed on the general waste portion of the containment cell with slopes that were less than 25 percent;
- A 60-mil textured HDPE geomembrane liner;
- A 12-inch thick granular drainage layer;
- A non-woven geotextile layer;
- A 12-inch thick protective soil layer;
- A 6-inch thick topsoil layer; and
- Vegetation.

7.6.1 Passive Gas Vent

During construction of the final layer of select waste, AAA constructed two passive gas-venting systems. A 6-inch gas vent (Vent No. 1) passes through the cover system in the general waste portion of the containment cell and a 4-inch gas vent (Vent No. 2) emanates from the SVE portion. These systems are covered in detail within Sections 7.4.1.3 and 7.4.2.5, respectively. The locations of these two vents are included on As-Built Drawing G3.

7.6.2 Geosynthetic Clay Liner

The GCL was installed over the general waste portion of the containment cell where the slopes were less than 25 percent. In general, the GCL was deployed parallel to the direction of the slope. The GCL was seamed by first overlapping the adjacent panel a minimum of 6 inches, then exposing the underlying edge, and applying a continuous layer of granular sodium bentonite along a zone defined by the edge of the underlying panel. The application rate of bentonite was approximately one pound per linear foot. The vertical penetration associated with the passive gas vent (Vent No. 1) was sealed with granular bentonite (2 pounds per linear foot) to seal the GCL at this juncture.

7.6.2.1 CQA

The CQA process started with the review and subsequent acceptance of the AAA submittal (see Contract Submittal MP-02235). The GCL was deployed over the select waste layer once it was inspected by *SECOR* and SOLMAX to be free of protruding rocks, construction debris, or other foreign material. The GCL was deployed and inspected for imperfections, including a check of each seam. Seams were assured an overlap of a minimum of 6 inches. The GCL was then covered with geomembrane to prevent hydration of the bentonite.

The location and orientation of the GCL is provided in the SOLMAX QC Report, as well as CQA documentation and warranties.

7.6.3 Geomembrane

A 60-mil textured HDPE geomembrane liner was extended over the entire containment cell. The liner was penetrated at the collection cleanout pipe and two gas vents. The SVE portion of the cell was constructed with additional penetration to allow for extraction/injection wells and closure sampling ports for the SVE system (see Section 7.4.2.2). The HDPE liner was extended out to the centerline of the perimeter anchor trench along the berm. Installation was performed by SOLMAX, who met the requirements presented in Contract Specification MP-02234.

7.6.3.1 CQA

The containment cell final cover consisted of a single HDPE geomembrane liner, constructed and tested in accordance with the procedures set forth in Section 5.0 of the CQAP.

Field Panel Identification

As part of the geomembrane placement, the installation contractor was responsible in ensuring each field panel was given an identification code consistent with the layout plan. A chart was used to show a correspondence between roll numbers and field panel identification codes (i.e., A1 = Panel 1; 001 = Roll # 1; or A1001). *SECOR* CQA personnel verified the following conditions were achieved during panel placement:

- The mean ambient air temperature was greater than 32 ºF and less than 120 ºF;
- The field panels were installed at the location identified in the SOLMAX layout plan;
- The subbase/subsurface was accepted prior to geomembrane placement;
- All personnel working on the geomembrane was prohibited to smoke, wear damaging shoes, or engage in activities that could damage the geomembrane;
- Minimize wrinkles in the panels during deployment;
- Adequate slack in the geomembrane is provided to allow for thermal expansion and contraction; and
- Temporary anchoring was placed to prevent uplift by wind.

Seam Layout

Prior to geomembrane placement, SOLMAX provided *SECOR* CQA personnel with a seam layout drawing. *SECOR* reviewed the layout and confirmed that it was consistent with accepted practices. The seams were generally oriented parallel to the line of maximum slope. A seam numbering system, corresponding with the panel numbering system, was utilized to track QC testing.

Extrusion Process

SOLMAX provided documentation regarding the extrude certifying that the extrude is compatible with the specifications and that the welding resin is comprised of the same resin as the geomembrane liner. SOLMAX provided CQA personnel to log apparatus temperatures, extrude temperatures, and geomembrane surface temperatures at designated intervals. The following were also verified:

- Adequate number of spare operable seaming apparatus;
- The extruder was purged prior to beginning a seam;
- Grinding is performed perpendicular to the seam in as far as possible and is completed no more than 2 hours prior to seaming;
- The connecting panels of the geomembrane had a minimum overlap of 3 inches for extrusion

welding; and

- A smooth insulating plate or fabric is placed beneath the hot weld apparatus after usage.

Fusion Process

SOLMAX provided documentation regarding the automated vehicular fusion welding apparatus, equipped with gauges capable of giving applicable temperature and pressure. SOLMAX CQA personnel logged ambient seaming temperature, and geomembrane temperature and pressure. *SECOR* CQA personnel verified that:

- For cross seams at tee connections, the edge of the cross seam was ground to a smooth taper prior to welding;
- A movable protective layer was used as necessary directly below each overlap of the geomembrane that was to be seamed to prevent buildup of moisture between the sheets;
- Prior to seaming, the seam area was clean and free of moisture, dust, and debris of any kind;
- Seams were aligned with the fewest number of wrinkles; and
- The panels of the geomembrane had a minimum overlap of 5 inches for fusion welding.

Trial Seams

Trial seams were fabricated from fragments of geomembrane to verify that the seaming conditions were adequate. Trial seams were made at the beginning of each seaming period. Also, each seamer was required to make at least one trial seam every four hours. The trial seam was, at a minimum, 3 feet long. *SECOR* CQA personnel observed all trial seams. Destructive testing (peel and shear) were performed by SOLMAX CQA person on all trial seams with the results relayed to the master seamer so equipment adjustment, if any, could be made. Results of this testing is contained in SOLMAX QC Report (see Contract Submittal MP-02234).

General Seaming Procedures

The general seaming procedures implemented by SOLMAX were as follows:

- A firm substrate was used to provide a hard surface, in order to achieve proper support;
- Seaming extended to the outside edge of panels to be placed in the anchor trench; and
- A moveable protective layer of plastic was placed directly below each overlap of geomembrane that was seamed.

Non-Destructive Testing

SOLMAX performed non-destructive testing of all field seams using the air pressure test or a vacuum box test unit. Non-destructive tests were performed to check the continuity of seams, leakage, not seam strength. SOLMAX provided internal CQA consisting of the following:

- Record location, date, test unit number, name of tester, and outcome of all testing; and
- Inform the master seamer of any required repairs or adjustments.

<u>Destructive Testing</u>

SOLMAX performed destructive testing at locations selected by *SECOR*. The destructive tests are used to evaluate the seam strength. *SECOR* selected the locations where the seam samples were cut from. The locations were established as follows:

- At a frequency of one sample per 500 linear feet of seam length;
- Test locations were determined during seaming at the discretion of *SECOR* CQA personnel;
- A number was assigned to each sample, and marked accordingly;
- The sample location was recorded on the layout drawing; and
- The sample for testing was approximately 12 inches wide by 54 inches long, then cut into three parts: one portion for the SOLMAX QC person for on-site testing, one for the independent CQA laboratory, and one to archive.

<u>Geosynthetic Quality Assurance Testing</u>

Destructive test samples were packaged and shipped overnight to TRI Environmental Inc. (TRI) for the independent testing. The QA destructive testing included Seam Strength and Peel Adhesion (ASTM D638). The destructive testing results and specific material qualities are included in the SOLMAX QC Report (see Contract Submittal MP-02234).

7.6.4 Drainage Layer

As part of the containment cell cover system, a 12-inch layer of drainage material was placed over the entire top of the 60-mil geomembrane liner. The drainage material consisted of clean medium-to-coarse sand free of organics and has an in-place permeability of greater than 1.0×10^{-2} cm/sec, in accordance with Contract Specification MP-02221. Placement of this material was performed using a low ground pressure dozer. A minimum of one observer was assigned to the spreading operation at all times to assure the dozer did not come in contact with the HDPE liner.

7.6.5 Geotextile Layer

The containment cell cover system includes a Type 1 non-woven geotextile (see Contract Submittal MP-02232), which covers the entire 12-inch drainage layer. The geotextile panel is joined with a 12-inch minimum overlap. This provides a separation layer between the 12-inch drainage layer and the 12-inch protective soil layer. The non-woven geotextile layer was installed in accordance with the Contract Specification MP-02232.

7.6.5.1 CQA

The non-woven geotextile submittals were initially reviewed for compliance with the specifications to include certifications and warranties. *SECOR* CQA personnel examined rolls upon delivery to assure the material was consistent with that specified. The deployment operations were also observed. The Contractor then submitted a panel layout sketch (see Contract Submittal MP-02232), which was checked with that observed.

7.6.6 Protective Soil Layer

The protective soil layer consisted of a minimum 12-inch layer of soil fill material (see Contract Submittal MP-02222), free of excessive moisture, stumps, sod, or other unsuitable materials. The protective soil layer was placed over the non-woven geotextile layer with use of a low ground pressure dozer, as indicated on Contract Drawing G-15. This layer was placed over the entire containment cell and extended out to the perimeter ditch (B). Overall shaping of the cell was accomplished with this layer in preparation for the final 6 inches of topsoil.

7.6.7 Topsoil Layer

The topsoil layer consisted of a minimum 6-inch layer of unfrozen, friable, natural loamy soil. It was required to be free of clay lumps, brush, litter, stumps, stones, and other extraneous matter. The topsoil had an organic content between 5 and 20 percent, and a pH range of between 5.5 and 7.5, as provided in the Contract Submittal MP-02212. This material was graded over the entire protective soil layer, extending to and inclusive of the perimeter ditch B.

7.6.8 Vegetation

To establish required vegetation across the topsoil layer, the soil surface was finely graded and a seed mixture was applied uniformly upon the prepared soil surface. The seed mixture consisted of 65% Kentucky Blue Grass, 20% Perennial Rye Grass and 15% Fescue (see Contract Submittal MP-02212). The seed mix was applied using hydroseeding technology. An erosion control fabric was placed along the toe of the containment cell and riprap was located in certain areas of the perimeter ditch. This construction is detailed in Section 7.7.2.

7.7 Perimeter Components

The RAF must remain accessible yet secure at all times of the year. Perimeter component construction included grading to control precipitation and roadways as well as appropriate fencing and utilities. As-Built Drawing G3 identifies the locations of these components and final grading. Associated perimeter components surrounding the containment cell include:

- Perimeter and access roads;
- Ditches;
- Culverts;
- Perimeter fence; and
- Utilities.

7.7.1 Perimeter and Access Roads

The containment cell is encompassed by a minimum 10-foot wide perimeter road. The perimeter road is identified in three sections (north, southeast, and southwest) and is constructed to allow easy access to the containment cell for inspection and subsequent maintenance. Two minimum 15-foot wide access roads emanate from the perimeter road, from the east and west. The access roads ultimately connect with Bleecker Street and are gated for security purposes. All roadways are constructed of a 6-inch layer of crushed stone on a geotextile fabric overlying compacted general soil fill. Specific information on these materials is provided in the Contract Submittals MP-02221, 02222, and 02232.
Compaction results for the fill placement is found in Appendix H.

7.7.2 Ditches

Generally, on either side of the perimeter road, there is a ditch designed to channel runoff. These are identified as Ditches A, B, and C, as well as Area 6, on As-Built Drawing G3. Erosion control fabric was installed during construction along Ditch B, Area 6, and Area 4. Medium-sized riprap (see Contract Submittal MP-02271) was placed in certain locations along the ditches across the site. In general, the riprap was placed at culvert inlets and outlets and at the juncture of two ditches. The remaining areas were sown with grass seed and covered with hay to establish vegetative cover.

7.7.3 Culverts

Culverts have been installed at four locations along the containment cell ditches. These culverts are identified as CV-1, CV-2, CV-3, and CV-4 (see As-Built Drawing G3). The culverts are constructed of 18-inch HDPE pipe (see Contract Submittal MP-02526) with riprap placed approximately 15 feet upstream and downstream to control erosion.

Culvert CV-1 is approximately 25 feet in length and provides access from the east side. Culvert CV-2 is approximately 20 feet in length and provides access to the containment cell. The containment cell perimeter drainage, ditch B, is drained through the 20-foot long culvert, CV-3. Installation of Ditch C required crossing an existing road; therefore, culvert CV-4, 35 feet in length, was installed.

7.7.4 Perimeter Fence

The containment cell, building, and the perimeter road are encompassed by a 7 and 8-foot high, including barbed wire, chainlink fence (see Contract Submittal MP-02711). Access is provided through a gate at the northwest (Gate No. 1) and northeast (Gate No. 2) portions of the RAF. There are basically five sections of fencing (As-Built Drawing G3), which include:

- The north fencing section (8 feet high, approximately 645 feet long), newly constructed and generally follows the edge of the north perimeter access road;

- The northeast section (8 feet high, approximately 230 feet long), newly constructed and which crosses the access road. This section includes Gate No. 2;

- The southeast section (7 feet high, approximately 355 feet long), which generally follows the edge of the property right-of-way (ROW) and is part of the original site fencing;

- The southwest section (7 feet high, approximately 490 feet long) is also original fencing and borders the woods; and

- The northwest fence section (8 feet high, approximately 80 feet long) newly constructed and crosses the access road. This section includes Gate No. 1.

The RAF is a secured area; therefore, it is intended that the two gates will remain locked when authorized RAF personnel are not present. There are 11 signs posted on the fencing that state "Warning, No Trespassing, Violators Will Be Prosecuted." These signs are in red lettering on a white background and are placed at a minimum of every 500 feet.

7.7.5 Utilities

Two public utilities are present within the secured area. NMPC poles and overhead high tension power lines are located along the south and east sides of the RAF and include service to the RAF building, as noted on As-Built Drawing G1. An underground telephone line is supplied to the building, generally running just inside the south and east fence (As-Built Drawing G1). The telephone service is provided by Bell Atlantic. Although the RAF currently uses only one line, a 12-line service wire is installed.

7.8 Building

The RAF contains one building structure. The location of the building is shown on the Contract Drawings. The purpose of the building is to provide a central location for utilities, leachate handling, and treatment.

7.8.1 Foundation and Floor Slab

The RAF building is located within the Remediation Areas 7 and 8 excavation and sets on top of compacted fill overlying glacial till. The fill material (see Contract Submittal MP-02222) was placed in lifts, compacted, and tested (see Appendix H for results). A minimum of 12 inches of Type 4 select fill (see Contract Submittal MP-02221) was placed prior to concrete placement.

To provide support to the building, eight subgrade reinforced concrete spread footings were installed on November 17, 1998. Appendix I contains the concrete cylinder compression tests that were performed by PW at 7 and 28 days from placement. Concrete was specified (see Contract Specification MP-03002) to obtain 4,000 pounds per square inch (psi) compressive strength at 28 days. The size and location of the concrete and rebar is detailed on As-Built Drawing S1.

The positions of the concrete columns (piers) placed over the footings were modified from the locations shown on the Contract Drawings. Because the steel column's centerline location was narrower than shown on the drawings, the concrete columns were adjusted wider, inward and additional rebar was added. The concrete piers extending to the finish floor elevation were poured on December 4 and December 9, 1998.

The building floor, a floating reinforced concrete slab was poured on December 10, 1998. The finished floor elevation was similar to the top of concrete columns but separated by an expansion joint so as to work as separate units. The treatment enclosure area received perimeter insulation and was finished to a flat, level surface. The tank pad area was finished flat on top and received an 18-inch diameter casing to facilitate installation of the leachate conveyance pipe. The truck pad floor was finished with a sloped surface area. This is graded into a formed sump for spill control.

Eight bollards were cast in place around the building to prevent possible impacts from vehicular traffic accessing the building. These bollards were constructed of 6-inch diameter steel pipe filled and set in 4,000 psi concrete. As indicated on As-Built Drawings S1, S2, and M4, the bollards were placed at truck loading entrances and at the manhole.

7.8.2 Structure

The RAF building is constructed of all steel with dimensions of approximately 25 feet by 65 feet and approximately 15 feet high at the eaves, as indicated on As-Built Drawing S2. The final design and fabrication of the pre-engineered steel building was performed by CECO Building Systems (CECO) of Rocky Mount, North Carolina (see Contract Submittal MP-13600).

The structural steel columns are based on and anchored to concrete columns, as shown on As-Built Drawing S1. Girts were affixed to these rigid frame columns followed by 24-gauge acrylic enamel (light stone) coated metal wall panels. The columns are attached at the top by a rigid frame rafter. Purlins are affixed to the rafters, followed by 24-gauge acrylic enamel (burnished slate) coated metal roof panels. Appropriate cross bracing was applied to accommodate 80-mile per hour (mph) wind speed. Gutters with accompanying downchutes have been installed on both the front and rear of the building.

There are three portions to the building:

1. The treatment enclosure;

2. The tank pad; and

3. The truck pad area.

Treatment Enclosure

The treatment enclosure is insulated and has the interior finished in painted sheet metal. This area is entered through a doublewide man door (6'4' wide x 7'0" high) or through a roll-up door (9'0" wide x 10'0" high) equipped with bollards. An electric heating unit (15 kilowatt [Kw]) with thermostatic control is provided, as well as two exterior vents. There are no windows. The treatment enclosure also houses the main electrical panels (PP and LP), the transformer, the telephone, and the auto dialer. This area has hand-switch lighting (three high-pressure sodium light fixtures) and five 110-voltage receptacles (see As-Built Drawing E2). It also has an emergency light unit as well as an automatic outside light and outside ground fault receptacle. The designed SVE system was scheduled to be installed in this area; however, it is no longer required or necessary (see Section 7.9).

Adjacent to the treatment enclosure is the tank pad area. The tank pad area houses the 5,000-gallon steel leachate storage tank and the surrounding secondary containment dike tank. This area also contains the tank control panel, which services all of the sensors affiliated with the leachate storage system. The tank pad area is enclosed on three sides. Although not included in the original design, the north and south walls of this portion of the building between column lines 2 and 3 were extended to the floor during installation to provide additional protection of the leachate tank. This area is equipped with overhead lighting and two 110-voltage ground fault receptacles. The hand-switched overhead lights consist of six high-pressure sodium light fixtures. The area also has an emergency light unit.

The truck pad area provides open access to the tank pad area. Access to the truck pad area is provided by roadways on two sides, allowing for drive-through of the receiving tanker truck. In order to provide drive-through access for tanker trucks, the south wall of this portion of the building, between column lines 1 and 2, was removed during installation (see As Built Drawing S2). The concrete floor of the truck pad area is constructed with a sump to collect any leachate transfer spills. This area shares the overhead lighting with the tank pad area via a switch at the north wall near the opening. All modifications to the original building design and fabrication, described herein were approved by CECO prior to implementation.

7.8.3 Electrical

7.8.3.1 Electrical Service

Electrical power to the RAF building is provided by NMPC. There is a 200 amp, 480 volt, 3-phase service entering from the east side of the site, running overhead to a utility pole located within the RAF. This service is provided only for the RAF building, and is separate from other site buildings (see As-Built Drawing E1). The transformers are mounted on the utility pole. From there, the service is run through conduits underground to the building. The power is run through a master switch and meter mounted outside on the south side of the building. Power is then routed to the panelboard (PP) located inside of the building.

7.8.3.2 Telephone Service

Telephone service is provided by Bell Atlantic, and emanates from a junction box at the corner of Bleecker Street and Industrial Park Road. The telephone line runs underground from this junction to the south, following the inside of the fence along the east side of the site (see As-Built Drawing G1). The telephone line then turns west and follows beneath the electrical lines, entering from the east side of the site, to the RAF utility pole. The telephone line surfaces at this pole and then through a conduit underground into the building.

The telephone service is capable of handling 12 separate lines. This telephone service is provided only for the RAF and is separate from service provided to other site buildings. The RAF presently uses one line (315-724-3928).

7.8.3.3 Panels and Transformers

Electrical power entering the building is routed to panelboard "PP." This panel services all 3-phase power needs, including the leachate pump control panel and unit heater. Panelboard "PP" contains serviceable circuit breakers that protect the electrical components, and additional breakers for future use.

The 25 KVA transformer takes power from panel "PP" and converts it from 3-phase to single phase. The 100-amp service is then routed to panelboard "LP." The "LP" panelboard provides 20-amp circuit breakers for the remaining electrical needs, including power to lights, plugs, heaters, and tank control panel. The "LP" panelboard is designed to accommodate additional future power need, as necessary. Electrical information and diagrams are provided in the "E" series of the As-Built Drawings.
Both panels are equipped with a key type lock for security purposes.

7.8.3.4 Major Components

Heat is provided to the treatment enclosure portion of the building only. This heater is a 3-phase, 18 amp, 480 volt, 15 horizontal overhead unit manufactured by Berko (Model HUHAA-1548) equipped with a disconnect switch. The fan is automatically controlled and area temperature is adjusted by a thermostat located on the east wall. Consult the furnished manufacturer's service manual contained in the Contract Submittal MP-15500.

The tank pad area is unheated; therefore, the leachate tank and external plumbing must be protected from freezing temperatures. The leachate temperature is thermostatically controlled by heat tape for the piping, and a heat pad for the tank. Both types of heat units are manufactured by Thermon. Additional information can be found in the Contract Submittal MP-15051. These heating elements are then covered with insulation.

The electrical grounding system for the building consists of buried bare copper wire located around the entire outside perimeter. Each of the building's four corners has two driven grounding rods connected to the perimeter ground wire. The metal building frame and electric panel are connected to this grounding system. The grounding system is also connected to the lightning protection. The lightning protection consists of two down conductors connected to three air terminals. As-Built Drawing E2 provides additional details.

7.8.3.5 Auto Dialer

The auto dialer is a Sensaphone - Intelligent System for Automatic Control and Communication (ISACC), manufactured by Phonetic, Inc., and is located in the treatment enclosure area of the RAF building. It is capable of monitoring up to 16 inputs, providing eight outputs, and calling out an alarm message to a maximum of eight phone numbers. It is programmed with use of a PC, either locally or remotely and utilizes a Windows-based software package. ISACC communicates in voice or data transferred through a modem. A comprehensive outline of the auto dialer is provided in the manufacturer's manual included in the Contract Submittal MP-16900.

ISACC monitors two major components of the RAF (see As-Built Drawing M1):

1. The leachate collection manhole; and

2. The leachate storage tank.

The leachate collection manhole has the following sensors that trigger the auto dialer to call out an alarm:

- Manhole High Level, Alarm A-5: Indicates that the leachate level is high (float switch set between the lead and lag pump on switches);

- Manhole Leak, Alarm A-6: Indicates that the manhole interstitial space has liquid in it (this is set at approximately 3 inches above the bottom); and

- Pipe Leak, Alarm A-7: Indicates that the conveyance piping containment pipe has liquid in it.

The leachate storage tank has the following sensors connected to the auto dialer:

- Tank Level, Alarm A-1: Provides the level of leachate in the tank (this information is provided on an as-call basis, although it can be set as a contingency liquid level alarm, if required);

- Tank 90%, Full Alarm A-4: Alerts the receiver that the tank has approximately 4,500 gallons (90% full) and needs to be emptied (this can be adjusted to a different value);

- Tank Leak, Alarm A-3: Indicates that there is liquid in the secondary containment dike tank (triggers at approximately 5 inches of liquid) and, ultimately, shuts down the pumps;

- Tank High, Alarm A-2: Indicates that the storage tank is full (at 92 inches with 4 inches remaining headspace) and, ultimately, shuts down the pumps; and

- Tank Low Temperature, Alarm A-7: Indicates that the leachate is approaching freezing temperature (this activated at or about 35 ºF and can be changed as necessary).

The auto dialer also handles other general information, such as:

- Inside Temperature, Alarm A-9: Monitors inside temperature of the treatment enclosure (a high and low alarm can be set);

- Outside Temperature, Alarm A-10: Monitors the outside temperature within the tank enclosure (a high and low alarm can be set); and

- Power Off, Alarm A-16: ISACC internally responds to a power outage.

The tank level indicator, noted above, provides an analog account of the depth of leachate in the tank. This ultrasonic level transmitter, located atop the tank, is manufactured by Flowline, Inc. (Model LU30), as well as its accompanying relay (Model LC52) located within the tank control panel, which triggers Alarm A-4. Specifications are contained in the auto dialer manual provided in the Contract Submittal MP-16900. The transmitter has been set up to provide depth, in inches, of leachate in the tank (0 to 96 inches). This value can be viewed by either directly connecting a PC to the auto dialer or through a remote PC with a modem.

The value received, in inches, can easily be converted into gallons by using the following conversion table:

Tank Capacity Table

Liquid Level (inches)	Volume (gallons)	Liquid Level (inches)	Volume (gallons)	Liquid Level (inches)	Volume (gallons)
1	9	33	1,526	65	3,613
2	25	34	1,589	66	3,675
3	47	35	1,653	67	3,736
4	71	36	1,717	68	3,797
5	100	37	1,782	69	3,857
6	130	38	1,847	70	3,914
7	164	39	1,912	71	3,975
8	200	40	1,977	72	4,033
9	237	41	2,043	73	4,091
10	277	42	2,109	74	4,147
11	319	43	2,175	75	4,202
12	362	44	2,241	76	4,257
13	406	45	2,307	77	4,310
14	453	46	2,374	78	4,363
15	500	47	2,440	79	4,414
16	549	48	2,507	80	4,464
17	599	49	2,573	81	4,513
18	651	50	2,640	82	4,561
19	703	51	2,706	83	4,607
20	757	52	2,772	84	4,652
21	811	53	2,839	85	4,695
22	867	54	2,905	86	4,736
23	923	55	2,971	87	4,776
24	980	56	3,036	88	4,814
25	1,038	57	3,102	89	4,850
26	1,097	58	3,167	90	4,883
27	1,156	59	3,232	91	4,914
28	1,216	60	3,296	92	4,942
29	1,277	61	3,360	93	4,967
30	1,339	62	3,424	94	4,988
31	1,400	63	3,488	95	5,004
32	1,463	64	3,551	96	5,013

The ISACC auto dialer must be programmed to call out to pre-determined and ordered telephone numbers. The designated receivers must be versed in the ISACC operation in order to properly respond to alarm calls. As-Built Drawing M1 provides a one-line diagram, which outlines the leachate control and monitoring system. The E Series Drawings show general location and routing of the circuits. Specific wiring of individual components and the auto dialer are located in the ISACC manual. Testing and programming of the ISACC unit is also covered in the manual.

7.8.3.6 Electrical CQA

All electrical equipment was installed in accordance with the RD Specification, Sections MP-16100 and MP-16900, and the Contract Drawings, E1 through E5. The CQA requirements for electrical equipment are covered in Section 8 of the CQAP.

Prior to construction, submittals for the electrical equipment identified in the RD Specification were required from the Contractor. Appendix C contains submittals approved by the Engineer and included equipment data sheets and shop drawings. The control panels and auto dialer submittal provided the component layout and wiring diagram.

The construction was performed under a building and zoning permit (No C-10-98-098) pursuant to the N.Y.S. Uniform Fire Prevention and Building Code. At the conclusion of the work, all circuits, components, and fixtures were tested in the presence of the CQA personnel. An electrical inspection, by a qualified independent inspector, was conducted and a certificate of acceptance was issued on July 6, 1999 (see Appendix D). The town of Frankfort Codes Department examined the facility and provided approval on July 19, 1999, by issuing a Certificate of Occupancy (see Appendix D). Final setting of controls and calibration of instrumentation was conducted by the Engineer.

7.9 SVE Treatment System

The RAF design included soil treatment provision for VOCs in excess of 10 ppm. This design included segregation of the higher VOC soils at the west end of the containment cell and would include the installation of a series of vapor extraction and injection pipes. These pipes were intended to be connected to SVE equipment housed within the building. The proposed SVE equipment incorporated the use of a water separator, air filter, vacuum/blower, heat exchanger, carbon unit, and system controls, as outlined in RDS Section 2.9.4.

The remedial process involved exhuming the SVE destined soils and staging them until the containment cell liner was complete. These soils were then screened, as required (no particle larger than 4 inches in diameter), and placed in layers in the containment cell. During soil placement, 4-inch diameter Schedule 80 slotted PVC extraction/injection pipes were placed horizontally, as shown on As-Built Drawing M3. These were connected to vertical wellheads to the surface. Once the SVE soil was placed and final graded, initial baseline samples were taken, as well as the installation of 4-inch diameter PVC sampling ports.

The results of the initial baseline sample indicated that the total VOC levels were below 10 ppm in three out of the four samples collected. The RDS Section 2.9.4 provides guidelines for the ultimate shutdown of the SVE system. In accordance with this section, shutdown can occur once verification samples fall below 10 ppm. Specifically, the total sum of the four VOCs of concern (VC, trans-1,2- DCE, cis-1,2-

DCE, and TCE) were below the cleanup objectives of 10 ppm. This prompted the first round of verification samples (a total of 16 samples) on November 23, 1998, which was observed by the NYSDEC. Waste sampling and subsequent results are provided in Section 7.4.2.6. A letter requesting closure of the SVE cell dated December 2, 1998, was issued to the NYSDEC, which included all analytical laboratory results (a total of 20 verification samples), as well as two sketches indicating sampling locations. These sketches are reiterated in As-Built Drawing M3. An additional eight samples taken from the sampling ports further confirmed closure. These data were transmitted to the NYSDEC in a letter dated November 9, 1998. An acceptance letter was received from the NYSDEC, on January 6, 1999, indicating approval to eliminate the SVE system. These correspondences are provided in Appendix J.

With the SVE system deemed unnecessary, the wellheads and sample port were cut off and capped approximately 12 inches below the final grade. The final containment cell cover system was then extended over the SVE area, completing the entire cell. A gas venting system, separate from the main cell, was constructed providing a 4-inch diameter vent to the surface. The treatment equipment, planned to be located in the building, was not installed. This excluded the header piping system as well.

8.0 GROUNDWATER COLLECTION TRENCHES

Task 8 consisted of the installation of two groundwater collection trenches, designated as the northern perimeter collection trench and the southern perimeter collection trench. The collection trenches were constructed as outlined in Contract Drawings G18, G19, and G20 and as set forth in the RDS M&P Specifications, as well as in conformance with Section 7 of the RDS CQA plan.

The northern and southern trenches were designed and installed connecting to the existing IRM system. The groundwater collected in these trenches is piped to the IRM pumping manhole 1 (south) and manhole 2 (north) and subsequently to the air stripper (see As-Built Drawing G2). The groundwater is then processed by the air stripper and released into the Area 14 ditch. This effluent is monitored under a SPDES permit as Outfall 03A.

8.1 Northern Trench

The northern groundwater collection trench required connection to the existing pumping manhole (No. 2 of the IRM constructed in 1995). Using a Caterpillar Model 320 backhoe, the excavation started at this manhole and proceeded northwest approximately 120 feet. Due to depth (approximately 12') and saturated unconsolidated lower soils, the excavation was dug wider and with stepped sides, in compliance with Section 3.2.3 of the RDS HASP. Additionally, a trench box was used for shoring when workers were in the excavation.

A vacuum truck was used to clean and vacuum the liquids from the manhole. All pipes leading into the manhole were plugged during the construction process. Once the proper excavation depth was acquired, the manhole was penetrated and the new 6-inch diameter HDPE pipe (see Contract Submittal MP-02526) was installed. The void between the new HDPE pipe and the manhole was then filled with grout.

The installation of the drainage system was followed in unison with the excavation. Once the trench box was in place, the non-woven geotextile (see Contract Submittal MP-02232) was positioned and a layer of washed drainage stone was added and leveled. The 6-inch diameter perforated HDPE pipe was placed and surveyed to assure the required 0.25% grade. With the pipe properly located, the remaining stone was placed and the fabric closed over.

The installation of the drainage system continued 120 feet where a cleanout was fabricated. This included a Y-pipe and solid 6-inch diameter HDPE pipe extending to the surface. The open end of the Y-pipe was fitted with a cap. At the surface, the HDPE cleanout pipe was protected by a 12-inch diameter metal flushmount well casing cover. This was further encased in a formed (approximately 3' x 3') concrete at grade pad with wire fabric reinforcement.

The excavation received final backfill with the native soil the next day, as well as removal of the plugs within the manhole. Given that excavated soil exhibited no indication of impact (i.e., PID reading, odor, staining) and was not excavated from an identified area of concern, it was reused as fill for completion of the trenches. The excess excavated soil (347 cy) was placed in the containment cell. The excavated area was allowed to settle prior to top soil application and final grading. The disturbed area was then raked, seeded, and hay was applied (see Contract Submittal MP-02212).

8.2 Southern Trench

The construction of this collection trench was very similar to that of the northern trench. The excavation started at the manhole and proceeded upgradient using a backhoe with the drainage system installation following close behind. The soils were field screened with a PID and HASP protocol was followed with regards to the excavation. At the end of the day, temporary barrier fencing was installed around the excavation.

A concrete cutoff wall was poured, as outlined on the Contract Drawings, prior to the collection trench installation. The proposed pipe entry side of the existing Manhole No. 1 was exposed and the inlets plugged. A 6-inch diameter HDPE pipe (see Contract Submittal MP-02526) was installed through the manhole wall and grouted.

A solid 6-inch HDPE pipe was installed in bedding sand at a 0.4% slope extending from the existing Manhole No. 1, 75 feet through the precast cutoff wall. This penetration received grout between the pipe and concrete. At this juncture, the pipe was changed to perforated for the remainder of the installation.

The excavation continued westerly and ranged between 5 to 9 feet in depth. The soil type was such to allow step-sided excavation; therefore, a trench box was unnecessary. The collection trench consisted of placement of a non-woven geotextile (see Contract Submittal MP-02232), followed by a layer of washed drainage stone and the 6-inch diameter perforated pipe. The pipe was surveyed and adjusted to the required 0.4% grade and the remaining stone placed on top.

Approximately 65 feet from the cutoff wall, the first cleanout was installed. This involved installing a Y-pipe and solid 6-inch diameter HDPE pipe extending to the surface. The drainage system continued approximately 160 feet to the second cleanout, and another 165 feet to the end at cleanout number three (see As-Built Drawing G1). The 6-inch diameter cleanout pipes are protected by a 12-inch diameter metal flushmount well casing cover. These are further encased in a formed at grade (approximately 3' x 3') reinforced concrete pad.

The drainage stone was covered with geotextile fabric and the eastern portion of the excavation was backfilled with the native soils. Structural fill (see Contract Submittal MP-02221) was placed and compacted in locations where asphalt paving was to be restored. The appropriate asphalt pavement was applied at a later date, after allowing for any settlement.

Once the excavation was backfilled, the existing manhole was unplugged and returned to normal operating condition. The excess excavated soil (1,095 cy) was placed into the containment cell, as discussed in Section 7.4.1.1.

8.3 Collection Trench CQA

Construction of the two groundwater collection trenches was performed in accordance with the RD Specification, Sections MP-02221, 02232, 02526, and 03002 and Contract Drawings G-18, G-19, and G-20. The CQA requirements for the construction of the collection trenches are covered in Section 7 of the CQAP.

Prior to construction, submittals, in conjunction with the materials to be used in the construction of the collection trenches, were required from the Contractor. This included mix design, factory test results and laboratory data. Appendix C contains submittals approved by the Engineer for use on the project.

Construction of the groundwater collection trench system was observed by CQA personnel. This included confirmation of material used with that noted in the approved submittals, viewing construction methods, checks on horizontal and vertical alignment, and observation of connections to the existing manholes, as well as compiling as-built information.

9.0 MISCELLANEOUS MATERIAL HANDLING

This task covered miscellaneous construction-related activities, including site dewatering, soil stabilization, dust and vapor control, handling of excavated debris, and site security.

9.1 Site Dewatering

Controlling water during the RA construction involved specific activities for identified situations. Dewatering activities covered surface precipitation and wet soils, excavations that collected precipitation and groundwater, work in the Unnamed Creek and ditches, and handling of leachate from the containment cell.

During construction, attempts were made to divert any accumulated precipitation from RA areas. Occasionally, wet soils had to be removed or dried prior to continuing construction. Water collected in excavations, whether from precipitation or groundwater, was removed with use of centrifugal pumps. When water came in contact with impacted material, it was collected and transported to the temporary on-site water treatment system (see Section 6.0) by means of a vacuum truck.

Controlling water during excavation in the Unnamed Creek and ditches was more involved. Controls included damming sections in the ditch and efforts to keep unaffected water separate from impacted water. Most critical was the preparation of pumps and dams for the sediment excavation at Area 1 (see As-Built Drawing G2). Because of the estimated quantity of stormwater that could potentially result, special provisions were required. Two high capacity pumps were rented and set up to control the northwest and southwest roof drain stormwater outlets (SPDES Outfall 001 and 002) directed into Area 1. Additionally, large temporary earthen dams were constructed upstream across the creek.

9.2 Soil Stabilization

Waste soil that was saturated underwent stabilization. Resulting free liquid was also managed. All attempts were made to remove free liquid with the vacuum truck, as described in Section 9.1. During direct loading of trucks for off-site disposal, some unacceptable saturated soils were encountered. These soils were mixed with drier soils to create an acceptable consistency.

Large quantities of wet material, such as ditch sediments, were transported to a lined staging area, where the soils were allowed to drain and solidify. If an acceptable consistency was not acquired naturally, a drying agent was added. Hydrated lime was used to stabilize wet soils. Lime was added and mixed using a backhoe to acquire an acceptable consistency.

Soil material destined to be placed in the on-site containment cell also required acceptable consistency. As reviewed in the previous paragraph, wet soils underwent similar stabilization procedures. Mixing wet soils with drier soils or lime was performed in staging areas, as well as within the ongoing excavation.

Another form of stabilization was required during placement of debris in the containment cell. Large boulders and broken pieces of granite blocks, generally found in Area 9, were incorporated within the cell (see Section 9.4). This was accomplished by separately placing the larger debris within the cell waste and surrounding it with waste soils. This eliminated the possibility of large voids and subsequent settlement. The larger debris was placed well within the center of the soil mass, such that it does not encroach on the liner or cap system.

9.3 Dust and Vapor Control

During the remedial activities, dust and vapor that resulted from the ongoing construction was controlled. An overview of the dust and vapor control measures was provided in the AAA Site Management Plan. *SECOR* provided the monitoring in accordance with the Remedial Action Contingency Plan, the Air Monitoring Plan, and the Engineer's HASP.

SECOR selected four primary perimeter locations and three additional locations; each was designated with a tag number. These locations were used to monitor potential dust particulate leaving the site. One of these locations was selected daily, dependent upon site wind direction (downwind). The information was automatically recorded in real time by a DataRam (Model No. DR-2000 with PM-10 head) manufactured by MIE Inc. in mg/m^3 units. Dust monitoring was also performed by *SECOR* in the workers breathing zone, generally by visual observation. Results of downwind site perimeter monitoring are presented in Appendix K.

Occasionally, notable dust was observed, particularly in high traffic areas. A dedicated water truck was implemented to suppress dust and limit the amount of airborne particulate.

Certain areas required observation for organic vapors. Higher concentrations were expected during the excavation of Areas 2, 8, and 10. The *SECOR* Engineer monitored these and other mass excavations for VOCs using an OVM (Model 580B) manufactured by Thermal Environmental Equipment. Results of this monitoring effort are provided in Appendix L.

During the excavation, reworking, loading, or grading of soil suspected of containing VOCs, *SECOR* implemented air monitoring of the workers breathing zone. As the action level was approached or exceeded, the workers upgraded their PPE until the level receded.

9.4 Handling Excavated Debris

Objects larger than 2 feet, including boulders, granite testing blocks, stumps, concrete, and assorted piping were excavated during excavation. Handling, staging, breaking up, and final deposition were specifically conducted for each type of material encountered, as per the RDS guidance.

A hydraulic hammer mounted on a backhoe was employed to break up the granite blocks and concrete to a size that could be handled easily. These materials were assumed to be impacted; therefore, were placed in the containment cell, as outlined in Section 9.2. Tree stumps were placed in the same fashion.

Metals encountered in the form of culverts and pipes were transported to the decontamination pad, cleaned, then loaded on a rolloff for disposal. Other material handling such as the chipping up of cleared trees, grubbing, fence removal, and relocation of the large granite blocks that were not contaminated is reviewed in Section 1.3.6. Handling of railroad track and ties are reviewed in Section 10.2.

9.5 Site Security

The majority of the construction was performed south of the main manufacturing building; therefore, secluded from Bleecker Street and within the confines of the property fence. Two additional gates at the northeast end of the site were employed to deter access during the off work time. The main gate located at the southwest end of the main building was secured by the tenants in the evening. A security guard was employed by the building owner to occasionally patrol the site during off work hours. Furthermore, equipment, office trailers, and tools were locked up. No notable thievery or vandalism occurred during construction.

10.0 HANDLING, TRANSPORT, AND OFF-SITE DISPOSAL OF WASTE MATERIAL

This work task details; handling, storing, containerizing, transporting, and off-site disposal of the non-soil waste streams, in accordance with all applicable federal, state, and local laws. Off-site disposal and on-site containment cell disposal of soil and sediment are detailed in Section 7.0.

10.1 Vegetation

During clearing and grubbing activities, vegetation removed from above grade, that was not in contact with the impacted media, was chipped and placed over the existing topsoil in the same area. Small vegetation and organic matter located below grade that came in contact with the impacted media was disposed of with the topsoil in the containment cell as select waste (see Section 7.4). Analytical test results of the topsoil are contained in Appendix E. Large vegetation and tree stumps, greater than 6 inches in diameter, were tested (see Appendix E) and transported to Clifton Recycling, Inc., for wood recycling. Appendix G presents the final disposal receipts (manifests) and the disposal facility for the vegetation.

10.2 Railroad Track/Ties

Railroad tracks/ties and associated debris required removal as part of the site clearing and excavation activities. The railroad tracks and ties were segregated and staged separately during the disposal determination process, as outlined in the RDS. The railroad tracks were decontaminated and cut to manageable lengths prior to off-site disposal as C&D material. The railroad ties were staged within a polyethylene lined staging area pending waste characterization, analysis, and subsequent off-site disposal as a hazardous solid waste. Appendix G presents the final disposal receipts and the disposal facility for the railroad tracks and ties.

10.3 Temporary Construction Materials

Temporary construction materials used to construct surface water diversion measures, material staging areas, decontamination pads, vapor suppression barriers, water treatment system secondary containment, and low permeability materials used to cover excavated materials and excavated areas were disposed of off site as non-hazardous material. The temporary construction materials that were or became in contact with the TSCA-regulated materials (Areas 6, 12, and 13) were disposed of off site with the TSCA-regulated waste, as required by the RDS. Appendix G presents the final disposal receipts and the disposal facility for the temporary construction materials.

10.4 Sampling Equipment

Disposable sampling equipment such as bailers, sample containers, and Geoprobe sleeves were disposed of off site as non-hazardous material; therefore, placed with the general C&D waste streams. Appendix G presents the final disposal receipts and the disposal facility for the disposable sampling equipment.

10.5 Personal Protection Equipment

PPE such as gloves, Tyvek suits, and boots were disposed of off site as non-hazardous material;

therefore, placed with the general C&D waste streams. Appendix G presents the final disposal receipts and the disposal facility for the disposable sampling equipment.

10.6 Construction Debris

Construction debris associated with the containment cell and the SVE system, such as 60-mil textured geomembrane, geotextile fabric, Schedule 80 PVC piping, and treated lumber was disposed of as non-hazardous material. Concrete forms and leftover materials from the building construction were also considered non-hazardous. The construction debris was placed with the general C&D waste streams for off-site disposal. Appendix G presents the final disposal receipts and the disposal facility for the construction debris.

11.0 SITE RESTORATION/DEMOBILIZATION

AAA was responsible for restoring areas that were disturbed during the implementation of the remedial activities, as described in Contract Submittal Section MP-02211. This included restoration of the soil excavation areas (Areas 2, 3, 7, 8, 9, 10, and 13) reviewed in Section 2.0 and sediment removal areas (Areas 4, 4D, 5, 6, 11, 12, and 14) reviewed in Section 3.0 (see As-Built Drawing G2). This also included restoring miscellaneous areas such as collection trenches, temporary roadways, staging and laydown, as well as fencing. Furthermore, a controlled demobilization follows the site restoration assuring satisfactory removal of remaining materials and equipment. These tasks did not commence for an area until the sampling analytically confirmed that it was acceptable.

11.1 Area 1

Area 1 involved sediment removal along a 530-foot portion of the Unnamed Creek. The excavation did not extend to a width or depth detrimental to the natural function of the stream; therefore, no soil backfill was required. A section of pipe, approximately 30 feet, at the outfall of the northern roof drains was replaced as it was found to be in a deteriorated condition. Riprap backfill (see Contract Submittal MP-02271) atop geotextile fabric (see Contract Submittal MP-02232) was placed in Area 1 at the junctures of the culverts. Generally, the riprap was installed along the stream bottom and up the sides, and extended from the culvert junction approximately 15 feet. Temporary sediment control, in the form of hay bales, was placed across the stream.

The adjacent area, just east of the stream, was disturbed in conjunction with the sediment removal. Trees and brush had been chipped up earlier during clearing. A geotextile erosion control fabric had been installed along the top of the stream bed. This was the site of a temporary soil staging area as well.

After sediment removal and backfilling had been completed and the staging area removed, the adjacent area was restored. Restoration involved dressing the surface with a dozer and spreading grass seed (see Contract Submittal MP-02212). A hay mulch was applied atop the seeded areas and then allowed to go dormant. Once the grass was established, the sediment control features, hay bales and geotextiles were removed.

11.2 Area 2

Excavating Area 2 involved removal of soils around a water main and culvert, as well as up to the foundation for the loading dock. As with the excavating, the subsequent backfilling proceeded upstream; therefore, Area 3 was done prior to Area 2, as well as the cleaning of the upstream pavement drainage.

The existing 12-inch CMP was found to be deteriorated; therefore, it was replaced with a new 12-inch diameter HDPE pipe (see Contract Submittal MP-02526). The new culvert extended from the pavement drains approximately 105 feet downstream and into Area 3. The culvert was adjusted to positively drain as the Type 4 (see Contract Submittal MP-02221) structural fill was placed.

The backfill was placed in lifts and compacted with special care around the water main and against the foundation wall. During the backfilling process, compaction tests were performed by PW and, furthermore, required passing results prior to allowing additional placement. Compaction test results are contained in Appendix H. The 50-foot by 36-foot excavation (see As-Built Drawing G2) was backfilled up to approximately its original grade.

This are received a layer of topsoil, followed by grass seed and hay mulch (see Contract Submittal MP-02212). The temporary sediment control was instituted downstream. The western end of the area was the site for an extended concrete loading dock, asphalt ramp, stairway, and drain. This was constructed by the building's owner and was not part of the remedial action.

11.3 Area 3

Excavating Area 3 required removal of soil around a gas main conduit and culvert, as well as up to the loading dock foundation. The backfilling process followed closely behind the excavation.

During the backfilling process, a new 12-inch diameter corrugated HDPE pipe (see Contract Submittal MP-02526), which replaced a deteriorated 12-inch CMP. The new culvert extended from the pavement drains. Approximately 110 feet through Area 2, into Area 3, and was incorporated in the backfilling.

The 124-foot by 36-foot excavation was backfilled with a dozer in controlled lifts and compacted with a vibratory roller. Certain caution was incorporated during backfill placement around the utilities and against the foundation wall. PW performed indiscriminate compaction tests (see Appendix H) of the Type 4 structural fill (see Contract Submittal MP-02221) to assure conformance to the specifications. Once a backfill layer received confirmation of compaction, additional layers were constructed.

Final grading involved incorporating the culvert outlet transition into a positively draining ditch located midway in this area (see As-Built Drawing G2). The transition received a layer of riprap (see Contract Submittal MP-02271) atop geotextile fabric (see Contract Submittal MP-02232) extending approximately 15 feet downstream. Topsoil was placed on the remaining area, followed by grass seed and hay mulch (see Contract Submittal MP-02212). Sediment control was provided downstream.

11.4 Areas 4 and 4D

Area 4 and 4D were excavated and restored after the completion of the upstream Areas 2 and 3 (see As-Built Drawing G2). The 365-foot long ditch (Area 4) was cleared of sediment but did not require any overexcavation; therefore, no backfill soils were required. There were old sediments in Area 4D located along the north side of the Area 4 ditch. No utilities were encountered during the excavation. The ditch originally fed into the culvert prior to entering Area 5. This pipe and the surrounding soils were removed during the excavation process.

A small dozer was used to reshape the ditch and its immediate areas were seeded (see Contract Submittal MP-02212) and the Area 4 ditch received an erosion control fabric. This type of material was not specified for the project but deemed necessary by the Project engineer to control erosion and promote revegetation. A biodegradable fiber material (Curlex I), produced by American Excelsior Company, was selected.

Areas outside of the ditch received a layer of hay mulch atop the seed. The lower end of the ditch, at the intersection with Area 6, had a layer of riprap (see Contract Submittal MP-02232) installed for energy dissipation. Section 11.5 further discusses the intersection of the ditches. Temporary erosion control structures, in the form of hay bales, were placed in several locations perpendicular across the ditch. These were later removed once vegetation was re-established.

11.5 Area 5

Area 5 was the location of the intermediate remedial measure skimmer pond. During construction, it was realized that the skimmer pond was no longer necessary as the ongoing remedial action incorporated removal of site source contaminations, as well as sediments. This is outlined in a letter dated August 27, 1998, issued to the NYSDEC. With their acceptance, AAA eliminated Area 5 and Areas 4 and 6 ditch with Area 14.

The excavation of Area 5 involved extensive removal of affected soils, as well as disposal of the its appurtenance, such as fencing, tank, culverts, and catch basin. As this area was over-excavated, a substantial amount of soil backfill (see Contract Specification MP-02222) was placed to bring it up to grade. Furthermore, Area 5 backfill did not require compaction testing. See Section 11.4 and 11.6 for final grading and site restoration features.

11.6 Area 6, 6A, and 6 Seep

The excavation of Area 6 involved removal of sediments along 860 feet of ditch, as well as cleaning or removal of several culverts. Through the CQC process, two additional areas adjacent to the ditch required soil removal. Are 6A extended approximately 115 feet northeast along an apparent backfilled ditch (see As-Built Drawing G2). The second area, designated as Area 6 Seep, was discovered and removed later.

During construction, one 12-inch CMP culvert was cleaned, as reviewed in Section 4.0. As sediment removal proceeded downstream, several old, non-use culverts were encountered. These were removed and the excavation backfilled with soil fill (see Contract Specification MP-02222). The larger overexcavations, Areas 6A and 6 Seep, were returned to approximately final grade with soil backfill. These areas did not require compaction testing.

The Area 6 ditch did not require overexcavation vertically; therefore, no soil backfill was necessary to maintain positive drainage. A small dozer was employed to provide final grading of the ditch and its immediate sides. The existing 12-inch CMP culvert received a layer of riprap (see Contract Submittal MP-02271) atop geotextile fabric (see Contract Submittal MP-02232). This extended from the culvert upstream and downstream approximately 15 feet.

The far downstream end of Area 6 intersects the Area 4 ditch, thence becoming Area 14. As indicated in Section 11.5, the Area 5 skimmer pond was eliminated and the affected ditches were graded together so as to gravity drain without ponding. This intersection was also riprapped for energy dissipation.

Portions of the Area 6 ditch that did not receive riprap had erosion control fabric placed along the entire length. This unspecified item was a biodegradable fiber material (Curlex I) produced by American Excelsior Company. Fabric was installed after the ditch and adjacent areas were seeded (see Contract Submittal MP-02212). This was followed with a layer of hay mulch with the exception of the areas that had received fabric or riprap.

Temporary erosion control structures, in the form of hay bales, were placed in several locations perpendicularly across the ditch. These were later removed once vegetation was re-established.

11.7 Areas 7 and 8

Area 7 and 8 underwent mass excavation and staging (see Section 2.0). Area 8 was located within the boundary of Area 7 (see As-Built Drawing G2), which designated final waste soil relocation. Once analytical verification was confirmed, backfilling followed behind the ongoing excavation proceeding from east to west.

Soil backfill (see Contract Submittal MP-02222) was placed in lifts and compacted to the specified percentage of modified proctor, as outlined in Contract Specification MP-02200. As these areas were cited to receive several structures (containment cell, manhole, building, piping, roads, etc.), acceptable compaction tests were required. Test results prepared by PW are provided in Appendix H.

The backfill was placed up to approximately original grade, totaling 3,540 cy. Construction of the planned structures then proceeded as per Section 7.0. Areas that did not receive a structure were top soiled, seeded, and mulched (see Contract Submittal MP-02212). The temporary silt fence (see Contract Submittal MP-02233), constructed earlier, was removed once the vegetation was re-established.

11.8 Areas 9 and 10

Area 10 was within the extent of Area 9 and designated as such for waste relocation purpose, as reviewed in Section 2.0. The backfilling of the area proceeded generally from west to east following close behind the mass soil excavation.
Soil backfill (see Contract Submittal MP-02222) was placed in approximately 18-inch lifts and compacted. Compaction testing was performed by PW, which is provided in Appendix H, as required in Contract Specification MP-02200. Overall, 5,575 cy were placed to bring Areas 9 and 10 to approximately final grade.

Site restoration of Area 9 included the construction of an access road (see Section 7.7). The remaining area received a layer of topsoil followed by seeding and hay mulch (see Contract Submittal MP-02212). Once the vegetation was re-established, the temporary silt fence (see Contract Submittal MP-02233) was removed.

11.9 Areas 11 and 12

Areas 11 (490 feet long) and 12 (350 feet long) are off site, on the north side of Bleecker Street (see As-Built Drawing G2). These areas are the continuation of an on-site stream. The different area designators were provided for different sediment characterizations. Restoration was conducted as one area.

Prior to sediment removal, woody vegetation was chipped as required. Furthermore, the adjacent culverts were cleaned, as reviewed in Section 4.0. All excavated sediments were removed (see Section 3.0) from the site. The streambed did not require overexcavation; therefore, no soil backfill was necessary.

Riprap backfill (see Contract Submittal MP-02271) was installed at the upstream and downstream ends of all of the affected culverts. The riprap was placed atop geotextile fabric (see Contract Submittal MP-02232) and extended along the stream a minimum of 15 feet.

Areas immediate to the stream affected by construction were graded smooth. This was followed by seeding and mulch (see Contract Submittal MP-02212). Hay bales placed perpendicular to the stream were installed at several locations to control sediment transport (see Contract Submittal MP-02233). Once vegetation was re-established, the bales were removed. Access barriers were replaced similar to the way in which they were found.

11.10 Area 13

Area 13 was a mass excavation which started at the south end and proceeded north (see Section 2.0). The actual limits of excavation extended outside those planned, as displayed on As-Built Drawing G2. As shown on this drawing, the containment cell footprint and appurtenance are positioned atop Area 13; therefore, restoration was primarily controlled backfill.

Once the verification sample confirmed that the cleanup objective had been achieved, backfilling commenced as per Contract Submittal MP-02200. Select fill material (see Contract Submittal MP-02221) was placed in lifts and compacted. A total of 600 cy was installed to bring the excavation to the preconstruction elevation.

Backfill compaction QC was provided by PW. A nuclear density machine was incorporated to acquire in-situ compaction efforts.

Passing results per lift were required prior to additional fill placement. The compaction testing results are provided in Appendix H. No additional restoration was performed until the cell construction that followed.

11.11 Area 14

Area 14 excavation involved sediment removal along 800 feet of the stream (see As-Built Drawing G2). Overexcavation of the stream bottom or sides was not required; therefore, placement of soil backfill was not necessary.

The existing Area 14 culvert had been cleaned (see Section 4.0) before sediment removal. Once sampling indicated that the stream channel was acceptable, riprap was placed from the intersection of

Areas 4 and 6 downstream. With Area 5 eliminated (see Section 11.5), Area 14 begins at the aforementioned intersection. Riprap backfill (see Contract Submittal MP-02271) atop geotextile fabric (see Contract Submittal MP-02232) was placed along the upstream portion to and 15 feet beyond the culvert.

Some areas along the east side of the stream that were affected by construction required restoration. Grass seed (see Contract Submittal MP-02212) was broadcast and covered with a layer of mulch atop bare areas. Earthen barriers were constructed at each end to preclude vehicular traffic along the stream edge.

Prior to construction, a temporary silt fence had been installed along the east side of Area 14. Additionally, hay bales were placed across the stream in several locations to control sediment transport (see Contract Submittal MP-02233). These structures were removed once the vegetation was re-established.

On July 5, 1999, the site received a storm, producing approximately 3 inches of rain. Upon inspection, it was noted that Area 14 and downstream areas required repair. AAA returned to the site and extended the riprap along Area 14, placed riprap at the culverts adjacent to Bleecker Street , and added riprap at the ends of the culvert between Areas 11 and 12. This would provide additional energy dissipation and control site stormwater.

11.12 Miscellaneous Areas

During the remedial construction activities, other areas not specifically designated on the drawing were affected. Therefore, restoration extended to such areas as the contractor materials or laydown area, soil staging areas, decontamination area, field office site, and the location of the temporary water treatment facilities. This also involved other components, including roads, fencing, and monitoring wells. Note that restoration of the north and south collection trenches are reviewed in Section 8.0.

Primarily, three areas were used to locate these miscellaneous construction components. The west end of the existing south fence received the temporary water treatment plant, soil staging, decontamination pad, and some stored construction materials. Once the material and equipment were removed, a dozer was used to grade the surface. Topsoil was added where necessary. Grass seed, followed by hay mulch, was then placed (see Contract Submittal MP-02212) over the areas.

The second miscellaneous area was located between Areas 4 and 6, east of the former foundry building. This was used for the temporary office trailer and laydown area. Only minimal grading and spot seeding were required for restoration.

The third area used was atop the existing gravel parking lot located along the east side of the incoming construction materials, as well as waste soil staging areas. The pavement, although somewhat deteriorated, was not damaged and was easily restored.

A portion of the existing chainlink fence was also restored. Primarily, this was two sections of fence which bound the southeast and southwest borders of the RAF (see Section 7.7.4). Woody vegetation was first removed from the fence. The fencing subcontractor, Cook Fence Company, rehung and mended the chainlink fabric and installed three new strands of barbed wire. Posted signs were then affixed to the fencing. Two gates that had been removed were reused to secure the existing east parking lot. One gate is located at the Bleecker Street entrance and the other at the south corner of the main building (see As-Built Drawing G1).

Monitoring well installation was also part of the RA (see Section 5.0) and required restoration. This involved two types of surface installations: surface casing and flushmount. Surface casing application was used in areas of little traffic and received the general seeding procedure once the construction materials were removed and the area graded, if applicable. In higher traffic areas, a flushmount well protection was implemented. Generally, these were in paved areas and restoration just involved material cleanup.

AAA returned to the site between August 17 and September 30, 1999, to permanently close the 100,000-gallon Number 6 fuel oil aboveground storage tank (AST) and appurtenance located south of the former power plant. Closure of the AST, which is further described in a December 22, 1999 Final Closure Report prepared by *SECOR,* included the following activities:

- Performance of a limited subsurface investigation of surrounding soil and groundwater, which did not identify evidence of impact around the tank or at the water table;
- Off-site disposal of product stored in the tank;
- Cleaning, dismantling, and off-site disposal of the AST and appurtenance; and
- Limited soil excavation and off-site disposal of stained soils around the former fill pipe and containment drain.

The NYSDEC Petroleum Bulk Storage (PBS) database indicates that NYSDEC revised the status of the AST on September 1, 1999 to reflect the permanent closure of the tank. Restoration of the former AST area involved limited soil backfill (see Contract Submittal MP-02222) and grading. Areas that were not previously graveled received grass seed and hay mulch (see Contract Submittal MP-02212).

11.13 Demobilization

Demobilization of material and equipment was primarily conducted by AAA. Unused and/or scrap materials were either disposed of in a rolloff container or loaded and trucked off site. Decontamination measures were performed on all affected equipment. Much of the equipment was provided through rental companies who provided their own demobilization. Some equipment required dismantling prior to removal. Demobilization was conducted in stages, followed by area restoration.

12.0 STANDBY OPERATIONS

During the implementation of the RA, construction was halted due to weather-related incidents. The Contract provided a means to continue certain oversight and maintenance activities continued when planned RA activities could not proceed. The Engineer monitored weather conditions, as well as overall site conditions.

12.1 Description

Standby time was determined based on review of the preceding and pending weather and conditions of the work area affected by weather. This was performed by both AAA and the Engineer to concur that standby time was appropriate. Specifically, the activities covered included cleaning or replacement of the culvert, any containment cell construction, excavation of designated areas, backfilling of designated areas, and construction of the groundwater collection trenches. During standby operations, AAA was responsible for site inspections and providing maintenance or repair of certain critical items. This included oversight and maintenance of the erosion control measures, staged soils, excavation, and the temporary water treatment facility.

A total of 10 standby days were used during the construction between July 29 and November 20, 1998. Upon the request of AAA, the Engineer would review and provide agreement to stand-by time in half-day increments.

12.2 Weather Monitoring

Weather monitoring was collected from two sources:

- An on-site weather station; and
- The weather report from the Oneida County Airport.

A weather station was erected on site as reviewed in Section 1.3.4 (also see Air Monitoring, Section 2.1) and monitored throughout the duration of the project. The instruments were located atop an approximate 20-foot tower with the hourly results automatically recorded. Wind speed, wind direction, and temperature were received and used primarily for air monitoring.

A daily weather report was received from the National Weather Service for the Utica area. These reports provided additional information, such as amount of precipitation.

TABLE 1-1

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

CHANGE ORDER SUMMARY

C.O. Number	Date Issued	General Description	FER Section No.
1	7/13/1998	Bonding	Contract
2	7/13/1998	Meteorological System	1.3.2
3	7/13/1998	Waste Soil Volume Adjustment	2.0 & 11.0
4	8/13/1998	Install Gate Posts	9.5
5	8/13/1998	Movement of East Lot Debris	1.3.5
6	8/31/1998	Temporary Power - Aug	1.3.1
7	8/31/1998	Trench Cleaning - Area 2	2.2.1.1
8	8/31/1998	Area 13 Excavation	2.2.1.4
9	8/31/1998	Area 13 Backfill	11.1
10	8/31/1998	Area 13 Disposal	7.2.3
11	9/25/1998	Water Treatment Influent Tank	6.1
12	9/25/1998	Portable Temp. Power - Sept.	1.3.1
13	9/25/1998	Area 2 Excavation & Backfill	2.2.1.1 & 11.2
14	9/25/1998	Area 3 Excavation & Backfill	2.2.1.1 & 11.3
15	9/25/1998	Area 7 Excavation & Backfill	2.2.1.2 & 11.7
16	9/25/1998	Area 8 Excavation & Backfill	2.2.1.2 & 11.7
17	9/30/1998	Stump Removal	1.3.5
18	9/30/1998	Area 6 & 6A Excavation	3.2.4
19	9/30/1998	General T & M - September	Incidentals
20	10/23/1998	Culvert Video	4.1.3
21	10/23/1998	Two Water Treatment Tanks	6.1
22	10/23/1998	Portable Temp. Power - Oct.	1.3.1
23	10/23/1998	Area 12 Excavation	3.2.6
24	10/23/1998	Offsite Hazardous Disposal	7.2
25	10/23/1998	Area 5 Backfill	11.5
26	10/23/1998	Area 1,4,4D,11&14 Excavation	3.2
27	10/23/1998	Stabilization	9.2
28	10/23/1998	Geomembrane Liner	7.3.4
29	10/23/1998	Standby Operations	12
30	10/23/1998	General T & M - October	Incidentals
31	10/23/1998	Pipe Cleaning	4.1
32	11/30/1998	Two Water Treatment Tanks	6.1
33	11/30/1998	Areas 9&10 Excavation & Backfill	2.2.1.3 & 11.8
34	11/30/1998	Collection Trench Excavations	8
35	11/30/1998	Collection Trench Backfill	8
36	11/30/1998	Area 11 & 12 Backfill	11.9
37	11/30/1998	Area 1 Backfill	11.1
38	11/30/1998	Area 6 Backfill & Restoration	11.6
39	11/30/1998	Waste Placement In Cell	7.4
40	11/30/1998	Consolidation of SVE Material	7.4.2

TABLE 1-1

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

CHANGE ORDER SUMMARY

C.O. Number	Date Issued	General Description	FER Section No.
41	11/30/1998	Break Up Granite	9.4
42	11/30/1998	Stabilization Activities	9.2
43	11/30/1998	Standby Operations - November	12
44	11/30/1998	Geomembrane Cover	7.6.3
45	11/30/1998	Geosynthetic Clay Liner (GCL)	7.6.2
46	11/30/1998	Drainage Layer - Cover	7.6.4
47	11/30/1998	Geotextile - Cover	7.6.5
48	11/30/1998	Protective Soil - Cover	7.6.6
49	11/30/1998	General T & M - November	Incidentals
50	12/28/1998	Water Treatment Influent Tank	6.1
51	12/28/1998	Ditch Seeding	11
52	12/28/1998	Final Cover System	7.6 & 7.9
53	12/28/1998	Area 4, 6A & 14 Backfill & Restor.	11
54	12/28/1998	Perimeter Drain Protection	7.3.10
55	12/28/1998	Topsoil	7.6.7
56	12/28/1998	Vegetation	7.6.8
57	12/28/1998	Temporary SVE Cover System	7.6 & 7.9
58	1/26/1999	Topsoil Placement	7.6.7
59	1/26/1999	General T & M - January	Incidentals
60	1/26/1999	Building Adjustments	7.8.2
61	1/26/1999	Vent Piping	7.6.1
62	2/26/1999	Non-Hazardous Waste	9.0 & 10.0
63	2/26/1999	Building Modification	7.8.2
64	2/26/1999	SVE System	7.9
65	6/16/1999	Electrical Modifications	7.9
66	6/16/1999	System Start Up	7.9
67	6/16/1999	Instrumentation & Controls	7.9
68	6/16/1999	Existing Fence Repair	7.7.4
69	6/16/1999	Additional Roadway	7.7.1
70	6/16/1999	Additional Erosion Control	1.3.4
71	6/16/1999	Non-Hazardous Waste	9.0 & 10.0
72	12/13/1999	Decommishing of 100,000 gal Tank	11.12
73	12/13/1999	July 5, 1999 Storm Repair	11.12
74	2/8/2000	Area 14 Riprap	11.11
75	2/17/2000	Area 6 Soil Replacement	11.6

TABLE 2-1

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

ANTICIPATED VS. ACTUAL SOIL WASTE VOLUMES

Remedial Action Areas	Anticipated Volume		Modified Volume	Actual Excavation Volume
	Design	Contingency		
General Cell Waste				
1	1,270	1,905	1,270	260
3	639	959	639	870
4	120	180	120	132
5	215	323	215	186
7	1,238	1,548	870	2,242
9	4,470	5,588	4,699	5,230
11	240	360	240	204
14	356	534	356	54
North Trench	267	401	267	347
South Trench	750	1125	750	1,095
4D	133	200	133	140
10G (Screenings)				346
Select Waste				2,488
Subtotal	***9,698***	***13,123***	***9,559***	***13,594***
SVE Cell Waste				
2	389	486	389	345
8	933	1,166	889	1,298
10	463	579	463	345
6A				100
Select Waste				435
Subtotal	***1,785***	***2,231***	***1,741***	***2,523***
SUM FOR CELL	**11,483**	**15,354**	**11,300**	**16,117**
TSCA Off-Site Waste				
6	107	160	107	238
12	408	612	408	80
13	237	296	237	600
Subtotal	***752***	***1,068***	***752***	***918***
Area 6 Seep	0	0	0	30
TOTAL Excavated	**12,235**	**16,422**	**12,052**	**17,065**

Note: All values are reported as in-situ in cubic yards (cy).

TABLE 2-2

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

PRE-EXCAVATION VERIFICATION SOIL SAMPLE RESULTS - AREA 7

Constituents of Concern	Chromium	Copper	Lead	Zinc	cis-1,2-DCE	trans-1,2-DCE	TCE	VC
Clean-Up Objectives	(17.8 ppm)	(40.4 ppm)	(25.5 ppm)	(101 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)
Sample I.D.								
VA7-1E (3-5')	8.4	29.5	8.4	43.3	--	--	--	--
VA7-1E-W2 (3-5')	11.2	31.5	7.1	39.8	--	--	--	--
VA7-1S (5-7')	10.1	25.9	9.7	37.6	0.110 U	0.110 U	0.110 U	0.110 U
VA7-2S (3-5')	8.6	30.9	8.3	49.1	--	--	--	--
VA7-2S-N3 (3-5')	13.2	36.4	10.6	55.9	--	--	--	--
VA7-1Nc (3-5')	10.3	27.6	10.8	45.8	0.130 U	0.130 U	0.130 U	0.130 U
VA7-1Nc (3-5') (DUP-1)	13.7	28.1	10.7	54.6	0.130 U	0.130 U	0.130 U	0.130 U
VA7-2Nd (3-5')	11.2	30.0	8.5	59.2	--	--	--	--
VA7-1S-N1 (3-5')	13.3	30.7	8.3	87.8	0.660 U	0.660 U	0.660 U	0.660 U
VA7-1Wl (3-5')	11.9	**56.1**	10.5	55.0	0.140 U	0.140 U	2 J	0.140 U
VA7-1Wl (3-5') (DUP-2)	11.9	39.8	9.1	59.2	0.130 U	0.130 U	0.130 U	0.130 U
VA7-1We-N1 (3-5')	13.0	**43.2**	12.8	57.6	0.140 U	0.140 U	0.140 U	0.140 U
VA7-1We-N2 (3-5')	14.0	23.7	10.7	84.6	--	--	--	--
VA7-1We-S1 (3-5')	11.3	37.8	10.7	60.1	--	--	--	--
VA7-1We-S2 (3-5')	9.1	32.4	10.0	49.7	0.130 U	0.130 U	0.130 U	0.130 U
VA7-1Wf-2 (3-5')	9.6	35.7	20.4	47.4	0.620 U	0.620 U	0.620 U	0.620 U
VA7-1Wm (3-5')	8.1	34.8	11.2	90.6	--	--	--	--
TB-1	--	--	--	--	0.100	0.100	0.100	0.100

Notes:

All concentrations reported in milligrams per kilograms (mg/kg) equivalent to parts per million (ppm).
U = Compound was not detected above instrument detection limit.
J = Estimated value, concentration below minimum quantitation limit, but greater than then instrument detection limit.
D = Indicates sample was analyzed at a secondary dilution.
DUP = Duplicate sample.
TB = Trip blank.

TABLE 2-3

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

PRE-EXCAVATION VERIFICATION SOIL SAMPLE RESULTS - AREA 9

Constituents of Concern	Chromium	Copper	Lead	Zinc	PCBs
Clean-Up Objectives	(17.8 ppm)	(40.4 ppm)	(25.5 ppm)	(101 ppm)	(<1 ppm)
Sample I.D.					
VA9-1Ea (4-6')	11.4	34.4	9.4	43.7	0.020 U
VA9-2Ea (4-6')	13.7	27.3	7.6	53.3	0.022 U
VA9-1S (4-6')	9.9	25.0	6.9	39.7	0.022 U
VA9-2S (4-6')	11.7	25.7	6.9	42.9	0.021 U
VA9-3S (4-6')	10.4	29.2	9.1	43.2	0.020 U
VA9-1N (4-6')	12.7	**53.4**	12.7	56.9	0.021 U
VA9-1Na (4-6')	8.3	38.3	8	41.9	--
VA9-2N (4-6')	22.3	**119.0**	**24.6**	85.4	**0.890 D**
VA9-2Na (4-6')	8.9	**50.9**	9.4	56.1	--
VA9-2Nb (4-6')	8.5	31.6	8.8	44.6	--
VA9-2Nc (4-6')	7.9	24.8	8.1	54.1	--
VA9-3N (4-6')	10.8	34.4	11.1	**107.0**	0.022 U
VA9-3Na (4-6')	9.5	**43.5**	10.1	52.8	--
VA9-3Nb (4-6')	7.9	32.0	10.9	63.1	--
VA9-3Nc (4-6')	8.8	31.6	7.5	50.3	--
VA9-1W (4-6')	11.8	39.5	5.7	42.9	0.021 U

Notes:

All concentrations reported in milligrams per kilograms (mg/kg) equivalent to parts per million (ppm).
PCBs = Polychlorinated biphenyls, including Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260.
U = Compound was not detected above instrument detection limit.
D = Indicates sample was analyzed at a secondary dilution.

TABLE 2-4

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

POST-EXCAVATION VERIFICATION SOIL SAMPLE RESULTS

Constituents of Concern Clean-Up Objectives	Chromium (17.8 ppm)	Copper (40.4 ppm)	Lead (25.5 ppm)	Zinc (101 ppm)	cis-1,2-DCE (<10 ppm)	trans-1,2-DCE (<10 ppm)	TCE (<10 ppm)	VC (<10 ppm)	PCBs (<1 ppm)
Sample I.D.	**AREA 2**								
VA2-1S (2-3.5')	11.8	58.7	87.9	132	<0.30	<0.30	<0.30	<0.30	--
VA2-1Sa (2-3.5')	11.1	52.7	45.1	382	--	--	--	--	--
VA2-1Sb (2-3.5')	8.3	26.7	15.1	43.4	--	--	--	--	--
RB-1	1.0 U	2.0 U	2.4 B	2.0 U	--	--	--	--	--
AREA 3									
VA3-1E (2-4')	14.7	54.2	13.4	79.7	--	--	--	--	--
VA3-1Ea (2-4')	7.8	35.6	8.0	35.8	--	--	--	--	--
VA3-1S (2-4')	25.7	100	32.2	174	--	--	--	--	--
VA3-1Sa (2-4')	17.2	139	30.7	140	--	--	--	--	--
VA3-1Sb (2-4')	13.5	84.5	22.6	111	--	--	--	--	--
VA3-1Sc (2-4')	8.5	27.6	9.0	59.2	--	--	--	--	--
VA3-1Sc (2-4') MSD	8.7	27.8	9.7	56.4					
VA3-2S (2-4')	14.1	59.9	14.5	105	--	--	--	--	--
VA3-2Sa (2-4')	9.8	41.2	11.9	57.9	--	--	--	--	--
VA3-2Sb (2-4')	10.6	42.4	15.1	59.5	--	--	--	--	--
VA3-2Sc (2-4')	--	72.6	--	--	--	--	--	--	--
VA3-2Sd (2-4')	--	26.5	--	--	--	--	--	--	--
AREA 13									
VA13-SS (1-3')	--	--	--	--	--	--	--	--	0.020 U
VA13-ES (1-3')	--	--	--	--	--	--	--	--	0.110
VA13-ES (1-3') MS	--	--	--	--	--	--	--	--	0.400
VA13-ES (1-3') MS/MSD	--	--	--	--	--	--	--	--	0.420
VA13-NS (1-3')	--	--	--	--	<0.680	<0.680	<0.680	<0.680	0.022 U
VA13-NS (1-3') DUP	--	--	--	--	<0.610	<0.610	<0.610	<0.610	0.020 U
VA13-NSa (1-3')	--	--	--	--	<0.560	<0.560	<0.560	<0.560	0.019 U
VA13-WSA (1-3')	--	--	--	--	--	--	--	--	0.053
VA13-NWS (1-3')	--	--	--	--	--	--	--	--	0.024

Notes:

All concentrations reported in milligrams per kilogram (mg/kg) equivalent to parts per million (ppm).
U = Compound was not detected above instrument detection level.
J = Estimated value; concentration below minimum quantitaiton limit, but greater than the instrument detection limit.
D = Indicates samples was analyzed at a secondary dilution.
DUP = Duplicate sample.
MS = Matrix spike.
MS/MSD = Matrix spike/matrix spike duplicate.
RB = Rinse blank.
B = The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Dectection Limit (IDL).

TABLE 2-5

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

CONFIRMATION SOIL SAMPLES

Sample ID	Date Collected	Headspace Screening Results Totals VOCS	Laboratory Results Total VOCs (PPM)	ENSYS Screening Results Total PCBs	Laboratory Results Total PCBs (PPM)	On-siteWaste Stream Disposal Location	Waste Quanity (CY)
		Total VOCs <20 ppm		Total PCBs <40 ppm			
AREA 2							
CA2-1	8/25/1998	>1000	N.A see FSP	N.A see FSP	N.A see FSP	SVE CELL	250
AREA 6a							
CA6a-1	9/25/1999	>500	12	<40	39	SVE CELL	100
AREA 8							
CA8-1	9/1/1998	276	N.A see FSP	N.A see FSP	N.A see FSP	SVE CELL	430
CA8-2	9/2/1999	303	N.A see FSP	N.A see FSP	N.A see FSP	SVE CELL	420
CA8-3	9/3/1999	406	N.A see FSP	N.A see FSP	N.A see FSP	SVE CELL	400
AREA 9							
CA9-1	10/28/1999	<10	N.A see FSP	<40	21	GENERAL CELL	450
CA9-2	10/28/1999	<10	N.A see FSP	<40	8.4	GENERAL CELL	430
CA9-3	11/2/1999	<10	N.A see FSP	<40	1.8	GENERAL CELL	480
CA9-4	11/2/1999	<10	N.A see FSP	<40	0.51	GENERAL CELL	440
AREA 10							
CA10-1	10/30/1999	400	N.A see FSP	<40	13	SVE CELL	320

TABLE 2-6

REMEDIAL ACTON
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

CHARACTERIZATION ON-SITE TOPSOIL SAMPLE RESULTS

Constituents of Concern	Chromium	Copper	Lead	Zinc	cis, 1,2-DCE	trans-,2-DCE	TCE	VC	PCBs
Clean-Up Objectives	(17.8 ppm)	(40.4 ppm)	(25.5 ppm)	(101 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<1 ppm)
Sample I.D.									
ESB-1 (0-6")	14.5	344	114	170	0.690 U	0.690 U	0.690 U	0.690 U	2.40 U
SSB-1 (0-6")	12.9	1030	207	475	0.700 U	0.700 U	0.700 U	0.700 U	0.056 D
SSB-2 (0-6")	122	1950	343	572	0.670 U	0.670 U	0.670 U	0.670 U	1.80 D

Notes:

All concentrations reported in milligrams per kilogram (mg/kg) equivalent to parts per million (ppm).
U = Compound was not detected above instrument detection level.
J = Estimated value; concentration below minimum quantitatIon limit, but greater than the instrument detection limit.
D = Indicates samples was analyzed at a secondary dilution.
DUP = Duplicate sample.
MS = Matrix spike.
MS/MSD = Matrix spike/matrix spike duplicate.
RB = Rinse blank.

TABLE 3-1

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

POST-EXCAVATION VERIFICATION SEDIMENT SAMPLE RESULTS

Constituents of Concern	Chromium	Copper	Lead	Zinc	cis-1,2-DCE	trans-1,2-DCE	TCE	VC	PCBs
Clean-Up Objectives	(17.8 ppm)	(40.4 ppm)	(25.5 ppm)	(101 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<1 ppm)
Sample I.D.	**AREA 1**								
VA1-1 (0-6")	17.6	37.7	13.4	90.7	--	--	--	--	0.026 U
VA1-2 (0-6")	15.4	38.0	13.3	68.7	--	--	--	--	0.020 U
VA1-3 (0-6")	37.3	1310	186	643	--	--	--	--	0.199
VA1-3a (0-6")	16.8	35.8	13.9	72	--	--	--	--	0.022 U
RB-4	1.0 U	2.0 U	1.0 U	2.0 U	--	--	--	--	0.49 U
AREA 4									
VA4-1 (0-6")	6.6	22.7	8.3	26.9	--	--	--	--	0.019 U
VA4-2 (0-6")	8.0	19.3	10.3	40.4	--	--	--	--	0.020 U
VA-4-2 (0-6") DUP-3	8.1	16.3	8.4	38.3	--	--	--	--	0.020 U
AREA 5									
VA5-WS (0-6")	13.5	84.5	22.6	111	<0.110	<0.110	<0.110	<0.110	0.058
VA5-WS (DUP-4)	8.9	32.1	11.9	89.9	<0.110	<0.110	<0.110	<0.110	0.081
VA5-WS (06') MS	10.6	32.0	9.6	53.7	<0.110	<0.110	0.059 J	<0.110	--
VA5-WS (06') MS/MSD	10.6	32.0	9.7	53.7	<0.110	<0.110	0.063 J	<0.110	--
VA5-SS (0-6")	9	28.1	6.7	35.5	<0.120	<0.120	<0.120	<0.120	0.19 U
VA5-NS (0-6")	10.2	43.4	16.8	65.9	<0.110	<0.110	<0.110	<0.110	0.058
VA5-NSa (0-6")	10.2	30.9	18.5	56.4	--	--	--	--	--
VA5-ESa (0-6")	11.2	48.2	26.3	69.4	<0.120	<0.120	<0.120	<0.120	0.086
VA5-ESb (0-6")	12	53.7	24.1	97.6	<0.130	<0.130	<0.130	<0.130	0.180
AREA 6									
VA6-1 (0-6")	12.3	43.4	15.9	57.9	--	--	--	--	0.083
VA6-2 (0-6")	9.7	27.5	8.2	44.9	--	--	--	--	0.019 U
VA6-3 (0-6")	10.4	32.4	9.8	63.5	--	--	--	--	0.097
VA6-3 (0-6") MS/MSD	10.4	32.3	9.7	63.5	--	--	--	--	--
VA6-4 (0-6")	9.7	66.4	10.0	48.9	--	--	--	--	0.022
VA6-4a (0-6")	--	26.2	--	--	--	--	--	--	--
RB-2	1.0U	2.0U	1.0U	5.6 B	--	--	--	--	--
AREA 6a									
VA6a-2 (0-6")	10.0	26.8	8.4	42.3	--	--	--	--	0.057

TABLE 3-1

REMEDIAL ACTION
FORMER CHICAGO PNEUMATIC TOOL COMPANY
UTICA, NEW YORK

POST-EXCAVATION VERIFICATION SEDIMENT SAMPLE RESULTS

Constituents of Concern	Chromium	Copper	Lead	Zinc	cis-1,2-DCE	trans-1,2-DCE	TCE	VC	PCBs
Clean-Up Objectives	(17.8 ppm)	(40.4 ppm)	(25.5 ppm)	(101 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<10 ppm)	(<1 ppm)
AREA 11									
VA11-1 (0-6")	12.2	25.9	6.9	47.5	--	--	--	--	0.020 U
VA11-1 (DUP-5)	12.7	28.1	9.5	52.1	--	--	--	--	0.020 U
VA11-2 (0-6")	54.6	143	73.0	136	--	--	--	--	1.20 D
VA11-2a (0-6") MS/MSD	17.4	30.6	9.7	60.9	--	--	--	--	0.022 U
VA11-3 (0-6")	17.5	50.6	19.1	84.1	--	--	--	--	0.031
VA11-3a (0-6")	42.3	94.1	27.6	89.4	--	--	--	--	--
VA11-3b (0-6")	11.7	25.5	7.2	48.3	--	--	--	--	--
VA11-4 (0-6")	334	967	64.4	220	--	--	--	--	4.90 D
VA11-4a (0-6")	13.2	24.0	8.0	46.3	--	--	--	--	0.020 U
RB-5	1.0 U	5.9 B	1.0 U	2.0 U	--	--	--	--	0.005U
RB-6	1.0U	2.0U	1.0U	2.0U	--	--	--	--	0.005 U
AREA 12									
VA12-1 (0-6")	9.5	26.9	8.7	38.5	--	--	--	--	0.019 U
VA12-2 (0-6")	9.9	31.3	9.0	60.0	--	--	--	--	0.019 U
VA12-3 (0-6")	9.5	26.1	5.9	32.1	--	--	--	--	0.020 U
AREA 14									
VA14-1	--	--	--	--	--	--	--	--	0.019 U
VA14-2	--	--	--	--	--	--	--	--	0.019 U
VA14-3	--	--	--	--	--	--	--	--	0.022 U
VA14-4	--	--	--	--	--	--	--	--	0.023 U

Notes:
All concentrations reported in milligrams per kilogram (mg/kg) equivalent to parts per million (ppm).
U = Compound was not detected above instrument detection level.
J = Estimated value; concentration below minimum quantitaiton limit, but greater than the instrument detection limit.
D = Indicates samples was analyzed at a secondary dilution.
DUP = Duplicate sample.
MS = Matrix spike.
MS/MSD = Matrix spike/matrix spike duplicate.
RB = Rinse blank.
B= The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Detection Limit (IDL).